MANUFACTURING IN AMERICA

A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers

U.S. Department of Commerce
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Message from the Secretary of Commerce

President Bush is committed to making sure every American who wants to work can find a job. In the third quarter of 2003, the U.S. economy grew at 8.2 percent—the strongest growth in nearly 20 years. Over the past five months, more than 250,000 new jobs have been created and the December 2003 unemployment rate of 5.7 percent was significantly below the 30-year average of 6.4 percent. Thanks to the President's pro-growth policies, America's economy is strong—and growing stronger.

The recent economic downturn hit the U.S. manufacturing sector particularly hard, but now our manufacturers are beginning to experience the benefits of the President's pro-growth policies. Factory activity is at its highest level in 20 years and new orders are at the highest level since 1950.

Strengthening American manufacturing is a top priority for the President. America's manufacturers provide our nation and our people with good jobs, a better quality of life, and inventions that have established our national identity. Manufacturing is the backbone of our economy and the muscle behind our national security.

To make sure the administration is doing everything possible to help American manufacturers, last year I ordered a comprehensive review of our manufacturing sector. Our goal is to help the American manufacturers compete and win in the 21st century. Through the Manufacturing Initiative, we will redouble the administration's efforts on behalf of the millions of Americans who work in the manufacturing sector.

The Initiative organized over 20 public roundtables to solicit input from American manufacturers. Our question was simple: How can government help manufacturers compete?

This report includes a series of recommendations aimed at unleashing the full potential of American manufacturers. It is an important first step toward strengthening American manufacturing and creating new jobs. In the coming weeks and months, the Department of Commerce will continue to work with manufacturers, other state and federal agencies, and Congress to help U.S. manufacturers become more competitive in the global marketplace.

American manufacturing has a rich history. After traveling the country and meeting with hundreds of factory workers, executives, and experts, I am confident it will have an equally rich future.

Donald L. Evans
Secretary of Commerce

Introduction

American manufacturers are a cornerstone of the American economy and embody the best in American values. They enhance U.S. competitiveness while improving lives domestically and internationally.

President Bush's concern for the men and women who work in manufacturing and the critical contribution they make to the U.S. economy is the driving force behind this report. Manufacturers are full partners in the effort to build the future of the country in the marketplace for new products and ideas. Simply put, a healthy manufacturing sector is key to better jobs, fostering innovation, rising productivity, and higher standards of living in the United States.

The United States is the world's leading producer of manufactured goods. Standing alone, the U.S. manufacturing sector would represent the fifth-largest economy in the world—larger than China's economy as a whole.[1] The U.S. manufacturing sector also leads in innovation, accounting for more than 90 percent of all U.S. patents registered annually.[2] Investments in technology create new industries and careers in manufacturing as U.S. firms introduce products and cutting-edge manufacturing techniques. Perhaps most importantly, productivity in manufacturing has continued to rise significantly.

Even as U.S. manufacturers engage in global competition with singular strengths, they also face unprecedented challenges. These challenges are both cyclical and structural. The most recent recession in the business cycle—a downturn that first began to be felt in 2000—hit U.S. manufacturers and their workers hardest. Output fell 6 percent in manufacturing even though the recession was relatively shallow overall. Employment fell by 2.6 million jobs in manufacturing, accounting for all of the net job losses from the fourth quarter of 2000 through the third quarter of 2003.

Today, as the overall U.S. economy expands strongly, much of the manufacturing sector continues to operate well below its previous peak. For example, while automobile production remains strong, many of the industries that support this production, such as the machine tools and tool and die industries, continue to lag behind the rest of the economy by a wide margin.

As difficult as the recession has been for U.S. manufacturers, the sector faces

even more significant structural challenges from the effects of rapidly changing technology and adjustment to a global economy. Barriers to trade have fallen rapidly over the past decade. Innovations in communications, computing, and distribution have accelerated the design, production, and delivery of goods. Improved production processes have spread rapidly throughout the world. Private investment now flows largely unimpeded across national borders as investors seek the highest rates of return. All these factors equate to unprecedented global competition for capital and markets. Because manufactured goods make up the bulk of international trade, the competition is especially strong. Taken together, the effects of technology and globalization accelerate the competitive pressures to lower costs and increase productivity.

The challenges facing U.S. manufacturers raise important questions for both industry and government. For industry, the question is how best to reinforce the sector's strengths and maintain its competitive edge in an increasingly competitive global economy. The competitive pressure on U.S. manufacturers has forced them to cut costs, to adopt lean manufacturing techniques, and to implement quality assurance programs that guarantee zero defects in production. Innovation in products, processes, and services has become a key determinant for success.

Fostering a competitive manufacturing sector also requires a different way of looking at government policy. The right policies in Washington, D.C.—and across the nation—can unleash the great potential of the U.S. economy and create the conditions for growth, prosperity, and job creation. For government, the ultimate question is whether the actions that it takes help or hinder American manufacturers as they compete in global markets. What steps should government take to create the economic conditions that foster a healthy and competitive manufacturing sector and spur economic growth? What are the best means of removing the impediments that government action has contributed to in the form of increased energy and healthcare costs and high or distortionary tax and regulatory compliance burdens that make it harder for U.S. manufacturers to attract investment and compete? How can government policy foster an environment in which American manufacturers and their workers are the best trained in the world? And, equally important, how can America ensure that success in the global marketplace is based on economic strength, rather than on government intervention that creates artificial advantages?

The Manufacturing Initiative

In a March 2003 speech to the National Association of Manufacturers in Chicago, U.S. Secretary of Commerce Donald Evans launched the Manufacturing Initiative to begin answering those questions. Secretary Evans called for a comprehensive review of issues affecting the competitiveness of the U.S manufacturing sector. The goal of the review was to develop a strategy designed to ensure "that the government is doing all it can to create the conditions" necessary to foster U.S. competitiveness in manufacturing and stronger economic growth at home and abroad.

Secretary Evans directed the U.S. Department of Commerce to seek the help of American manufacturers themselves in identifying the roots of the manufacturing sector's current challenges and the specific obstacles that government policy might pose to U.S. manufacturing competitiveness. To that end, the Department of Commerce held over 20 roundtable events with manufacturers, in which the advice of individual attendees was sought and obtained. These nationwide discussions included representatives from the aero-

space, auto and auto parts, biotechnology, semiconductor, chemical, pharmaceutical, plastics, and tool and die industries, among others. The manufacturers attending the roundtables represented a broad mix of small, medium-sized, and large companies, as well as minority-owned and women-owned enterprises.

To demonstrate Secretary Evans' commitment to meeting the challenges facing the manufacturing sector, the Commerce Department's senior managers led the roundtables,[3] with help from the Commerce Department's local Export Assistance Centers and private sector District Export Councils. Commerce Department industry specialists attended the roundtables to listen to and report on the discussions to Commerce Department leaders, thus ensuring follow-up action with any companies needing information or assistance.

In addition, the Commerce Department set up a Web site to gather and disseminate information regarding the initiative as broadly as possible. This Web site—*www.export.gov/manufacturing*—was used to provide information on events and activities, and to encourage those who could not attend the roundtables to contact the Commerce Department regarding manufacturing issues.

The process also benefited from discussions with industry association representatives who reflected a broad cross-section of the American manufacturing community. The Commerce Department received considerable help from both the personnel and member companies of the National Association of Manufacturers, Manufacturers Alliance/MAPI, Association for Manufacturing Technology, Society of Plastics Industries, Alliance of Automobile Manufacturers, National Tooling and Machining Association, American Forest and Paper Association, Motor and Equipment Manufacturers Association, Aerospace Industries Association, Association of Equipment Manufacturers, American Foundry Society, American Forest Products Association, and others.

The following report is divided into three chapters. The first chapter provides an overview of the domestic and international economic issues facing American manufacturing and identifies the powerful trends shaping the environment in which U.S. manufacturers compete today.

The second chapter draws on the experience of U.S. manufacturers themselves in identifying the challenges government must tackle. Small, medium-sized, and large manufacturers all stated that the first priority should always be to eliminate government policies and practices that hinder U.S. competitiveness. They identified immediate priorities such as spurring higher economic growth and creating incentives for investment, including research and development, as well as long-term efforts such as the reliability of energy supplies, reducing healthcare costs, and tort reform needed to reduce the indirect costs imposed on manufacturers by government action or inaction.

On the international front, manufacturers stressed the importance of breaking down the barriers that other governments erect against U.S. exporters and eliminating the practices that distort trade and investment. With respect to both finance and trade, manufacturers stressed that the goal of U.S. foreign economic policy should be to ensure that competition is free and fair. They also emphasized the need to reinforce U.S. trade promotion efforts in markets opened by recent trade agreements, particularly in China.

Manufacturers also emphasized the importance of looking to the future and investing in activities that have given U.S. manufacturers their competitive edge. In practical terms, that means ensuring that government does not impede

the development of new technologies that will create the industries and jobs of the future, as well as improving the competitiveness of America's existing manufacturing base. Manufacturers stated that this effort would require government research and development funding and the creation of a highly educated and motivated workforce.

The third chapter of this report sets out a series of recommendations designed to address the challenges identified by U.S. manufacturers. The recommendations represent a first step toward crafting the comprehensive strategy Secretary Evans called for in March 2003.

The recommendations respond to the call by U.S. manufacturers for a greater focus within the federal government on manufacturing competitiveness, including the creation of an Assistant Secretary of Commerce for Manufacturing and Services. President Bush announced on Labor Day 2003 that the creation of this position would help keep the federal government focused on issues relating to manufacturing and would drive the Manufacturing Initiative forward. The recommendations also address the challenges identified by U.S. manufacturers on both the domestic and international front, as well as reinforcing American manufacturing's competitive edge in the development of new technologies and a workforce that can meet the needs of modern manufacturing.

American manufacturers are enthusiastic about meeting the competition, but they need a fair international playing field and a domestic environment free from impediments to investment and growth

These recommendations represent the start of a process, not the end. From the outset, Secretary Evans has viewed this report and its recommendations as an opportunity to work closely with U.S. manufacturers to develop a sound strategy for American competitiveness in manufacturing. The Commerce Department intends to review these proposals with manufacturers across the country, to address the challenges identified, and to help set immediate priorities that will benefit American manufacturing.

In the meantime, the challenges confronting American manufacturers and manufacturing workers are urgent, and President Bush has already taken action. He has implemented a jobs and growth agenda and outlined a six-point plan:

1. To make healthcare costs more affordable.
2. To reduce the lawsuit burden on the U.S. economy.
3. To ensure an affordable, reliable energy supply.
4. To streamline regulations and reporting requirements.
5. To open markets for American products.
6. To enable families and businesses to plan for the future with confidence.

The necessity of acting on these reforms was reflected in the roundtable discussions: each proposal would improve the U.S. manufacturing sector's competitiveness in the years and decades to come.

One final point deserves emphasis. Despite the challenges faced by American manufacturing, there is one fundamental reason for optimism about the future of American manufacturing: the talent and motivation of the men and women who work in and manage America's manufacturing companies. More than anything else, manufacturers participating in the Commerce Department's roundtables expressed their commitment to roll up their sleeves and address the challenges they face in doing business in an increasingly global and competitive environment. American manufacturers are enthusiastic about meeting the competition, but they need a fair international playing field and a domestic environment free from impediments to investment and growth. This

report and its recommendations represent a commitment on the part of the Bush administration to foster an environment for the continuing success of American manufacturing.

Notes

[1] See "Total GDP 2002," World Development Indicators database, World Bank, July 2003.

[2] Jeff Werling, *The Future of Manufacturing in a Global Economy,* December 2003.

[3] They included Secretary Donald Evans; Deputy Secretary Samuel Bodman; Under Secretaries Grant Aldonas, Philip Bond, and Kathleen Cooper; Assistant Secretaries Linda Conlin, Bruce Mehlman, and David Sampson; Directors Arden Bement, Ronald Langston, and John Maxon Ackerly; and Deputy Assistant Secretaries Joseph Bogosian, Kevin Murphy, and Michelle O'Neill. Officials of the U.S. Department of Labor (including Assistant Secretary Emily DeRocco) co-hosted a roundtable focused specifically on workforce, education, and training issues, to which the U.S. Department of Education contributed as well.

Abbreviations and Acronyms

FDA Food and Drug Administration

GATT General Agreement on Tariffs and Trade

GDP gross domestic product

HSA health saving account

IRC Internal Revenue Code

ITA International Trade Administration

ITC International Trade Commission

MEP Manufacturing Extension Partnership

NAFTA North American Free Trade Agreement

NAM National Association of Manufacturers

NIST National Institute of Standards and Technology

NTMA National Tooling and Machining Association

OECD Organization for Economic Cooperation and Development

OEM original equipment manufacturer

OMB Office of Management and Budget

ONR Office of Naval Research

OSTP Office of Science and Technology Policy

PCAST President's Council of Advisors for Science and Technology

R&D research and development

R&E research and experimentation

SBA Small Business Administration

SBIR Small Business Innovation Research

STTR Small Business Technology Transfer

TRIPS Agreement on Trade-related Aspects of Intellectual Property

TPCC Trade Promotion Coordinating Committee

TPSC Trade Policy Staff Committee

USPTO U.S. Patent and Trademark Office

USTR Office of the U.S. Trade Representative

WTO World Trade Organization

One

Competing—and Winning—in a Global Economy

The following discussion sets out a framework for understanding the challenges identified by U.S. manufacturers. This chapter highlights the critical contribution manufacturing makes to the U.S. economy and details the many underlying strengths of the manufacturing sector.

The manufacturing sector's rapidly rising productivity is its greatest strength and a major contributor to the growth of the U.S. economy. Higher productivity offers multiple benefits: stronger competitiveness in manufacturing and other sectors of the economy, higher real wages, and a rising standard of living. That same productivity growth, however, has also been largely responsible for the gradual decline in employment in manufacturing: manufacturing employment has declined even as U.S. manufacturers have become more efficient both in absolute terms and relative to other sectors in the economy.

The manufacturing sector's overall performance in the past 25 years has been very strong, despite difficult periods of adjustment through the 1970s and 1980s. It remained strong despite shocks to the world economy, including those in some of the strongest U.S. export markets during the Asian financial crisis of 1997.

However, the manufacturing sector was hit by a particularly harsh recession in mid-2000, before the overall economy took a downward turn. Although rapid monetary and fiscal responses kept the recession in check, the cyclical changes flowing from the recession hit the manufacturing sector with unusual force.

In fact, the general economic downturn that first appeared in the manufacturing sector in mid-2000 may have masked the far more powerful underlying structural changes affecting manufacturing. With rapid advancements in technology, lower barriers to trade, and the entry of significant new competitors into global markets, the past five to 10 years have been marked by rapid change for America's manufacturers, even as they continue to adapt to the global market.

Importance of Manufacturing to the Economy

Manufacturing is crucial to the U.S. economy. Every individual and industry depends on manufactured goods. In addition, innovations and productivity gains in the manufacturing sector provide benefits far beyond the products themselves.

There is no dispute over the significant contribution that manufacturing

makes to the U.S. economy and to America's standard of living. The sector continues to account for 14 percent of U.S. GDP and 11 percent of total U.S. employment.

Those statistics, however, do not adequately convey the importance of the manufacturing sector to the U.S. economy and to America's future. Manufacturing is an integral part of a web of inter-industry relationships that create a stronger economy. Manufacturing sells goods to other sectors in the economy and, in turn, buys products and services from them.

Manufacturing spurs demand for everything from raw materials to intermediate components to software to financial, legal, health, accounting, transportation, and other services in the course of doing business. According to the Bureau of Economic Analysis, every $1 of final demand spent for a manufactured good generates $0.55 of GDP in the manufacturing sector and $0.45 of GDP in non-manufacturing sectors.[1]

The automotive sector provides a good example. The production of automobiles stimulates the demand for everything from raw materials in the form of coal and iron to manufactured goods in the form of robots to the purchase of services in the form of health insurance for the automobile companies' employees.

A healthy manufacturing sector is critical to America's economic future for other reasons as well—innovation and productivity.[2] Innovation holds the key to rising productivity, and productivity gains are the key to both economic growth and a rising standard of living.[3] As one leading economist put it:

A nation's standard of living in the long term depends on its ability to attain a high and rising level of productivity in the industries in which its firms compete.[4]

Rising productivity is the key to maintaining U.S. competitiveness in manufacturing, but the benefits of rising manufacturing productivity extend to the economy as a whole. For example, improvements in cotton harvesting equipment, manufactured in the Midwest, help improve the productivity of cotton growers in California and Texas. And expanding the power of computers makes on-line banking and other financial services possible.

A recent study by the National Institute of Standards and Technology reinforces how the benefits of improved manufacturing productivity extend to other sectors in the economy. The NIST study detailed the service sector's reliance on U.S. manufacturers for the goods and technology that spur service sector growth. It emphasized "the substantial dependency of services on manufacturing firms for technology" and the "critical role" manufacturing plays in stimulating growth in the services sector, which now makes up more than 70 percent of the U.S. economy.[5]

From the perspective of the average American worker, rising productivity translates into higher real wages and a broader range of higher-quality, lower-cost goods, meaning each additional dollar earned goes further. This makes it is easier to buy a home, save for a child's college education, or set aside money for retirement.

The manufacturing sector has generated many of the innovations that have led to significant productivity gains over the past 25 years in manufacturing and throughout the economy. Increases in manufacturing productivity have consistently outpaced other sectors of the U.S. economy. From 1977 to 2002, productivity in the overall economy increased 53 percent, while manufacturing sector productivity rose 109 percent. The greater than 50-percent increase in overall productivity represents a tremendous gain in the U.S. standard of living, and the more than 100-percent increase in manufacturing productivity is a remarkable achievement. As Figure 1 reflects, labor productivity in manufacturing has doubled since 1977. The rate of change has increased

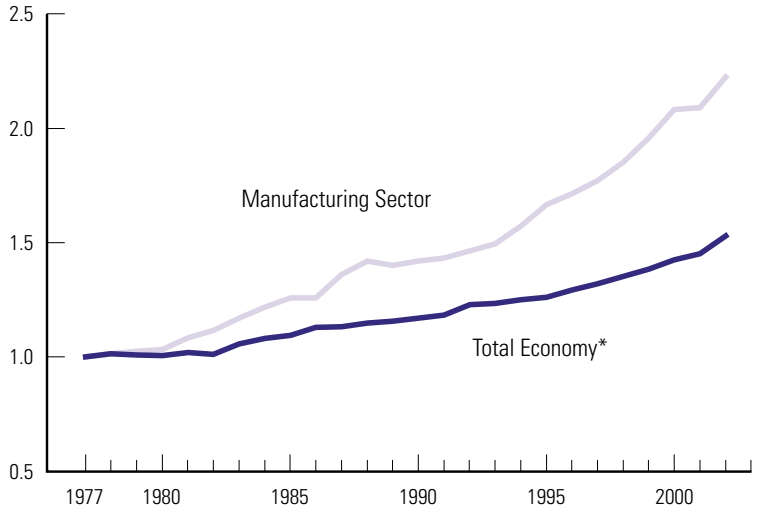
over time, with productivity growing faster (14.2 percent) in the past two and a half years, since the beginning of the last recession, than in any two-and-a-half-year period in the past 50 years.

Further, U.S. productivity strongly exceeds that of America's principal trading partners (Figure 2). The United States leads all countries in the absolute level of labor productivity, both per hour and per employee. This position has enabled the United States to maintain its labor cost advantage over these trade competitors despite the higher wages and benefits paid to American workers. The recently stronger performance of U.S. manufacturing in raising its productivity represents one of the causes for optimism for the sector's ability to adjust to rising levels of competition at home and abroad. The ability to raise productivity, even in the midst of recession and recovery, reflects that U.S. manufacturers have made changes in their operations and production methods to put themselves in a stronger position than manufacturers in other industrialized nations.

The growth in productivity has also had a profound effect on the U.S. standard of living. The 31-percent productivity advantage of the U.S. economy over OECD members accounts for three-quarters of the per capita income difference.[6]

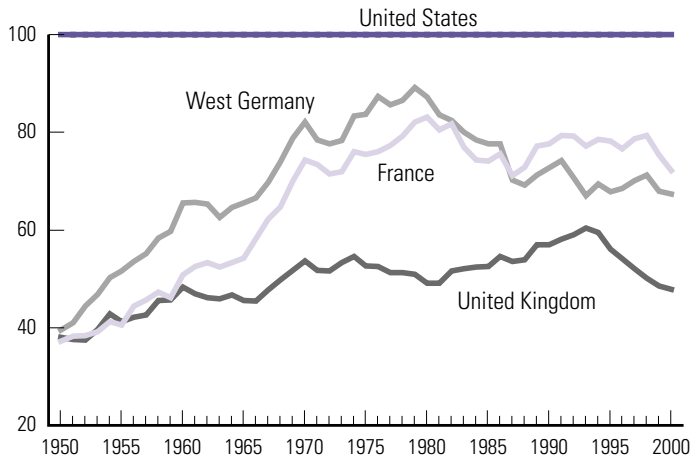
One important vehicle for the rising productivity in manufacturing has been technological innovation. And in manufacturing, technological innovation comes in two forms. First, new inventions provide a leap forward in technology. Consider the first integrated circuits and the astonishing array of products that are directly related to its development. Many of those inventions derive from large investments in research and development in the manufacturing sector: manufacturing firms fund 60 percent of the $193 billion that the U.S. private sector invests annually in R&D.[7] Those technologies are absorbed by the much larger service sector and drive

Figure 1. **Productivity in Manufacturing and the Total U.S. Economy, 1977–2002**



* Excludes government and agricultural sectors.
Index: 1977 = 1.0
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Figure 2. **Per-Capita Manufacturing Output in Western Europe Relative to the United States, 1950–2000**

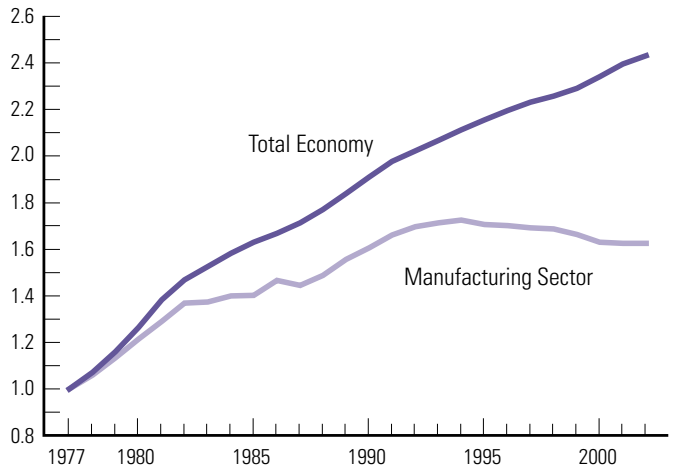


Index: U.S. level = 100
Note: "West Germany" data are for West Germany throughout, even after 1990.
Source: U.S. Department of Labor, Bureau of Labor Statistics; Groningen Growth and Development Center, International Comparisons of Output and Productivity by Industry.

the increasing rates of innovation and productivity growth in that sector.

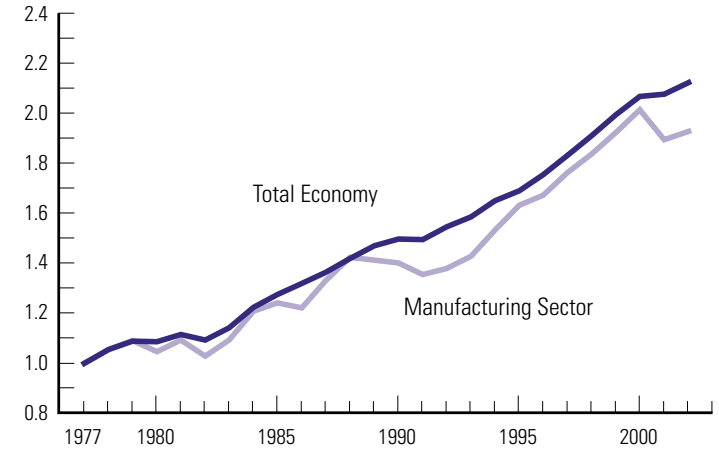
The other form of innovation comes from the steady improvement in products and manufacturing processes within major technology life cycles. Such improvement involves many less dramatic innovations, but collectively these innovations have a significant effect. For example, incremental improvements in the ability to etch a higher number of functions on a microprocessor or to multiply the number of calls a fiber-optic cable can transmit have a remarkable effect over time.[8]

Figure 3. **Prices in Manufacturing and the Total U.S. Economy, 1977–2002**



Index: 1977 = 1.0
Sources: Total economy: U.S. Department of Commerce, Bureau of Economic Analysis; manufacturing sector: U.S. Department of Labor, Bureau of Labor Statistics.

Figure 4. **Output in Manufacturing and the Total U.S. Economy, 1977–2002**



Index: 1977 = 1.0
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Both major and incremental innovations improve the competitiveness of the manufacturing sector and the U.S. economy as a whole. Because productivity has risen faster in manufacturing than in the services sector, prices of manufactured goods have risen more slowly than prices of services. At times, manufactured goods prices have even declined. That pricing pressure helps keep production costs in check for both the manufacturing sector and other areas of the economy.

In the past 25 years, prices in the overall economy have increased more than 140 percent, while prices in manufacturing have increased only slightly more than 60 percent (Figure 3). That also explains why manufacturing's share of nominal private output has declined from around 27 percent in 1977 to around 16 percent at present, even while the sector's contribution to real private output growth has remained roughly the same since 1977.

Real manufacturing output, adjusted for changes in prices, provides the best representation of manufacturing output over the past 25 years relative to the rest of the economy. Real manufacturing output since 1977 has grown nearly as fast as real output of the private economy as a whole (Figure 4).

Another way of measuring the similarity between manufacturing's growth in real terms and that of the broader economy is to look at the sector's contribution to the growth of real private output. Measured that way, the manufacturing sector's contribution has remained roughly steady at 0.6 percentage points for each 10-year

average annually from the 1977–1987 period to the most recent 1992–2002 period (Figure 5).

Compensation and Employment

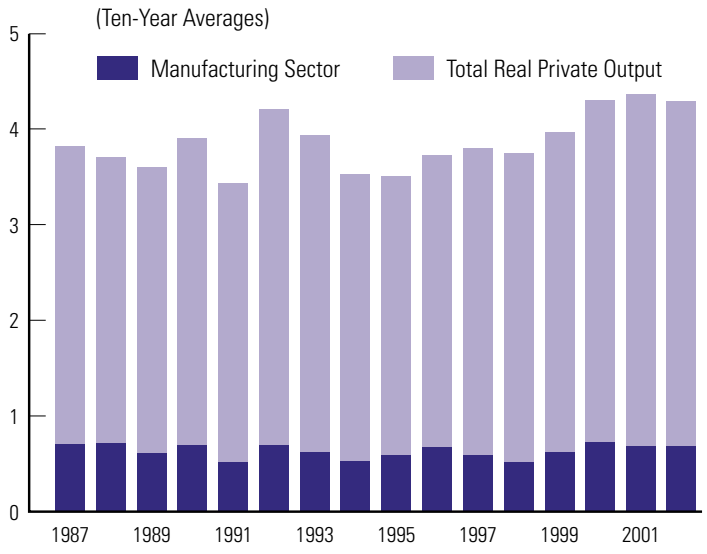
Historically, the manufacturing sector has had the reputation of providing a way for blue-collar workers to find good-paying jobs. Even today, the average hourly total compensation of production workers in manufacturing is higher than the average in all other sectors.

However, manufacturing's advantage in total compensation is based on benefits, rather than higher hourly wages. Average hourly earnings of production workers since 1967, when measured on an inflation-adjusted basis, suggest that manufacturing as a sector has offered an average, rather than high, hourly wage. There are, of course, specific sectors such as autos and steel that have offered wages far above the average, but these are balanced by others that have offered below average wages. In fact, the average hourly earnings in the wholesale trade, finance, and service sectors have surpassed those in manufacturing over the past 10 years; only retail trade remains lower.

The advantage of working in the manufacturing sector has derived, instead, from the higher level of average benefits received ($8.89 per hour for manufacturing versus $5.94 for non-manufacturing). Manufacturers contribute an average of $0.81 per hour more for health insurance, $0.66 more for overtime and supplemental pay, $0.62 more for leave, $0.29 more for retirement, and $0.34 more for other benefits (Figure 6).[9]

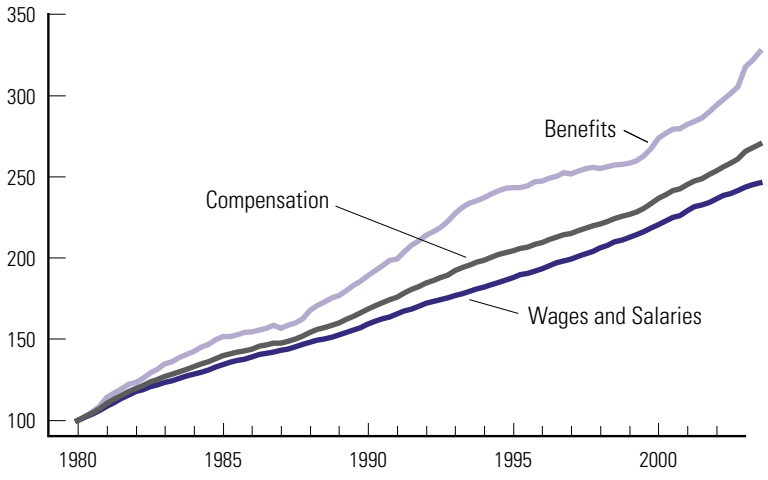
Because productivity gains in manufacturing have outstripped the growth in demand for manufactured goods, manufacturing employment has been falling for the past three decades. Manufacturing employment was significantly lower in 2002 than in 1977, falling from 22 percent of the non-farm economy to under 12 percent. Partial data for 2003 indicate

Figure 5. **Manufacturing as a Percentage of Average U.S. Private GDP Growth, 1987–2002** (Ten-Year Averages)



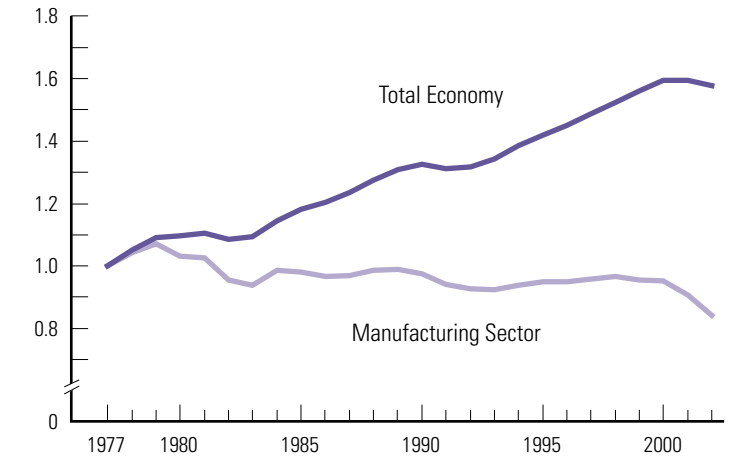
Note: "Total real private output" is the same as total real U.S. private GDP—that is , GDP minus the government sector. The top bars show the 10-year growth of private GDP, annualized to single-year averages. The bottom bars show 10-year moving averages: for a given year, contribution to private GDP growth by the manufacturing sector for that year is averaged with the previous nine years.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 6. **Employment Cost Index, 1980–2002**

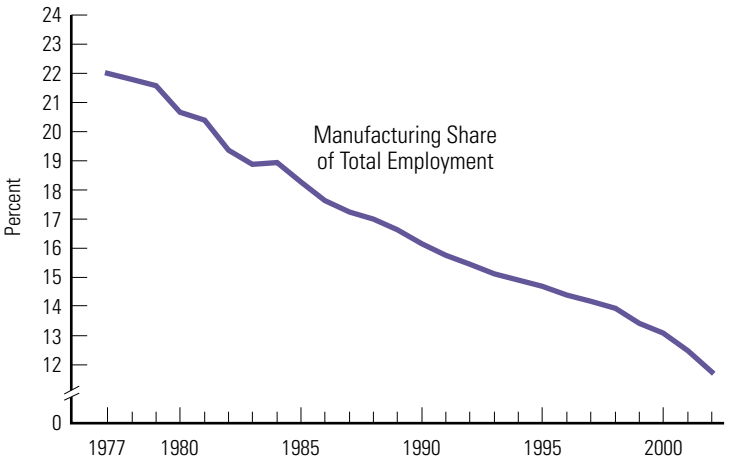


Index: 1980 = 100
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Figure 7. **Total Employment Growth and Manufacturing Employment Decline, 1977–2002**



Index: 1977 = 1.0
Source: U.S. Department of Labor, Bureau of Labor Statistics.



Source: U.S. Department of Labor, Bureau of Labor Statistics.

that the share has fallen further to about 11 percent (Figure 7).

Given that manufacturing represents a stable part of the economy while enjoying outsized productivity gains, the gradual decline in manufacturing employment is not surprising. Expressed another way, given the more rapid gains in labor productivity, manufacturing's share of total output would need to increase dramatically to maintain a given level of employment.

While the number of U.S. manufacturing jobs has fallen since 1979, other advanced economies have experienced the same trend. In the 1990s, manufacturing's share of employment fell at least as fast, if not faster, in Western Europe than in the United States (Figure 8).

On average, U.S. manufacturing employment has fallen 0.4 percent annually over the past 35 years. But that average rate of decline masks large fluctuations. Manufacturing employment rises and falls sharply in each business cycle. With each recession, manufacturing employment falls slightly lower than the previous trough. When the business cycle turns up and manufacturing firms begin hiring again, manufacturing employment rises, but it does not quite reach its previous peak.

These trends provide a useful transition to discuss the more recent developments in manufacturing.

Cyclical Effects of Recession and Recovery

After seeing prospects improve for more than a decade, American manufacturers have, in the past five years, faced harsh economic conditions. Recessions are typically hard in manufacturing. Of the eight recessions since 1950, real GDP has declined, on average, about 2 percent, whereas manufacturing output has declined 7 percent.

By the standard of overall output, the recession of 2001 was relatively mild;

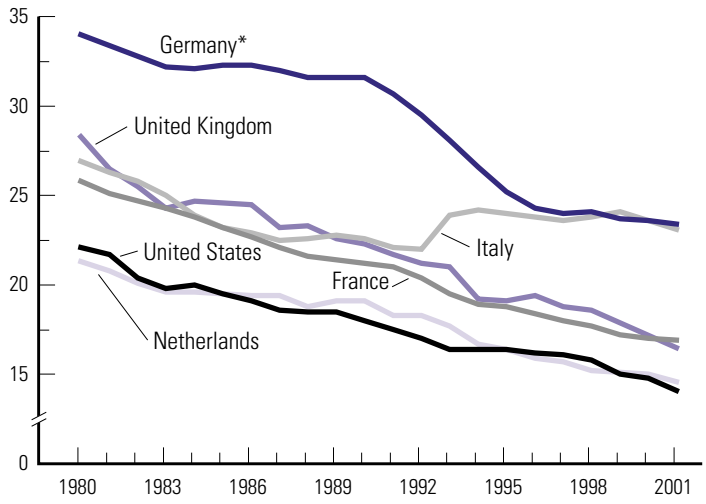
however, it hit the manufacturing sector particularly hard. Manufacturing output declined about 6 percent from the fourth quarter of 2000 to the third quarter of 2001, over which time real GDP fell 0.5 percent.

What has been striking about the most recent recession in manufacturing, however, was not the sharp drop in output, but the slow pace of recovery. In all but the most recent recession since World War II, manufacturing output has increased nearly 15 percent in the first two years of economic recovery. However, over the past two years, a period during which GDP rose nearly 6 percent, manufacturing output declined slightly (Figure 9). Total manufacturing production is still down some 4 percent below its previous peak of mid-2000.

The recession and the slow pace of recovery in manufacturing have been particularly hard on workers in manufacturing. Since the onset of the manufacturing employment downturn, the sector has lost 2.6 million jobs, while employment in other sectors has been relatively stable. In the third quarter of 2003, manufacturing employment remained 15 percent lower than in the period immediately before the recession. Perhaps more significantly, employment in manufacturing has fallen 8 percent since the recovery began. This decline was widespread across all manufacturing sectors (Table 1).

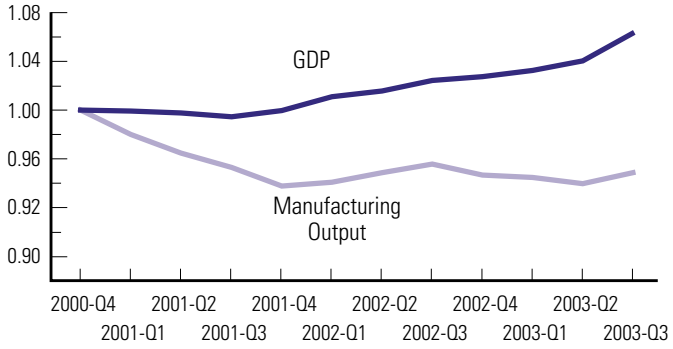
There were several features of the recent recession that made its effect on the manufacturing sector more pronounced. First, there was a significant retrenchment in business investment in technology following a surge in such investment throughout the preceeding decade. It is generally accepted that the high-tech sector spurred the economy in the late 1990s. High-tech production peaked, however, in late 2000 (Figure 10). Output in the sector declined 12 percent by the summer of 2001, decreasing considerably

Figure 8. **Manufacturing Employment as a Percent of Total Civilian Employment in Europe and the United States, 1980–2001**



* "Germany" data are for West Germany through 1990, and for unified Germany thereafter.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Figure 9. **GDP and Manufacturing Output, 2000–2003**



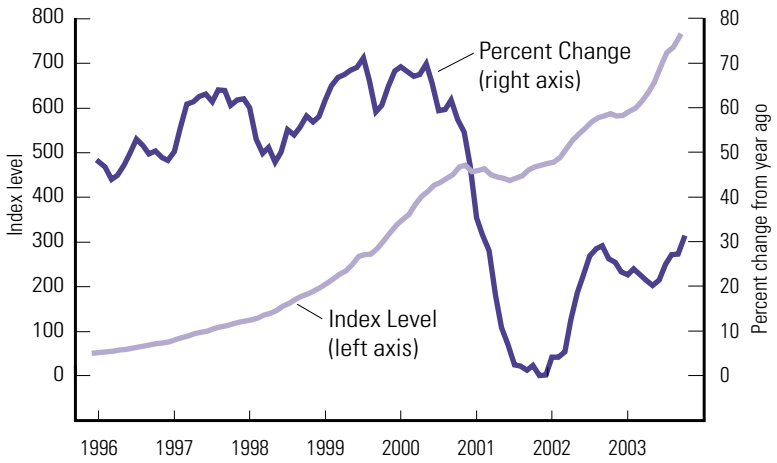
Index: Fourth quarter 2000 = 1.00
Sources: GDP: U.S. Department of Commerce, Bureau of Economic Analysis; manufacturing output: Board of Governors of the Federal Reserve System.

Table 1. **Net Change in Manufacturing Employment, Fourth Quarter 2000 to Third Quarter 2003**

	Percent	Number of Jobs
Total Manufacturing	**-15.1**	**-2,599,000**
Food	-1.8	-29,000
Beverage and Tobacco	-6.7	-14,000
Textile Mills	-29.5	-109,000
Textile Product Mills	-15.8	-34,000
Apparel	-37.4	-178,000
Leather and Products	-34.1	-22,000
Wood Products	-9.6	-57,000
Paper	-12.3	-74,000
Printing	-14.0	-113,000
Petroleum/Coal Products	-3.9	-5,000
Chemicals	-6.3	-62,000
Plastics/Rubber	-11.9	-112,000
Nonmetallic Minerals	-9.4	-52,000
Primary Metals	-22.7	-140,000
Fabricated Metals	-16.6	-293,000
Machinery	-19.6	-285,000
Computers and Electronics	-25.1	-467,000
Electrical Equipment	-21.3	-125,000
Transportation	-12.8	-260,000
Furniture	-15.5	-105,000
Miscellaneous	-8.6	-63,000

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Figure 10. **High-Tech Industrial Production, 1996–2003**



Notes: High-tech industries are defined for this analysis as computers, communication equipment, and semiconductors.
Source: Board of Governors of the Federal Reserve System.

further than the average for the manufacturing sector as a whole.

The drop-off in high-tech spending that led the decline affected the high-tech sector worldwide. Data on global semiconductor sales, for example, indicate a sizable drop beginning in late 2000 and continuing for the next year as businesses spent considerably less on communications and computing technology (Figure 11).

Two manufacturing sectors that experienced among the largest percentage job declines were precisely those industries most affected by the decline in high-tech spending. Employment in computers and electronics fell 24 percent from the fourth quarter of 2000 to the third quarter of 2003, and the decline in employment in electrical equipment was of similar magnitude—23 percent. Both decreases were larger than the 18-percent average for manufacturing as a whole.

The second feature of the recession that deserves attention was the sharp drop in inventories that accompanied the downturn. Inventory imbalances are typical for recessionary periods. Demand falls, and excess inventory is left on the shelves. Businesses respond by cutting back orders, shipments, and production until demand returns.

In the most recent recession, businesses reacted to a modest increase in inventory-to-sales ratios during 2000 by cutting back production in 2001 to get supply under control. The extent of the resulting relatively drastic inventory liquidation was much more severe in the 2001 recession than it was in the 1990–1991 recession.

The third feature of the recession worth noting is the uncertainty caused by the events of September 11, 2001, which depressed investment and demand. In addition to the direct effects on demand for manufactured goods, the decline in the demand for services such as tourism had subsequent effects on other manufacturing sectors such as autos and aircraft.

A fourth feature of the recession is the extent to which slower growth at home was compounded by the effects of slower growth abroad, particularly the dramatic drop in U.S. manufacturing exports to our principal export markets. Stronger growth abroad helps cushion the effects of recession at home.

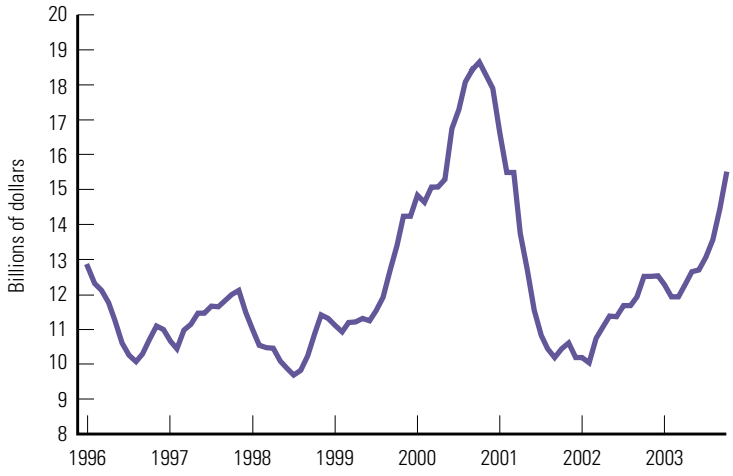
Unfortunately, although they have shown recent signs of growth, both Europe and Japan have grown considerably slower than the United States since the beginning of the recovery. Slower growth among the industrial economies has magnified the effect of slower growth in emerging economies in Asia since the onset of the Asian financial crisis in mid-1997. Although several Asian economies have recovered, the region's growth, with the principal exception of China, has yet to approach the levels reached before to the financial crisis.

Continued slow economic growth abroad produces less demand for U.S. manufactured goods than would otherwise be the case. Figure 12 covers a period that includes the last three U.S. recessions: in 1982, 1991, and 2001. The pattern of the most recent recession resembles that of the 1982 recession, which was marked by stagnation among America's major trading partners.

What the trend lines reflect is that the U.S. economy in general, and the manufacturing sector in particular, received little support from growth among major U.S. trading partners over the past two years.

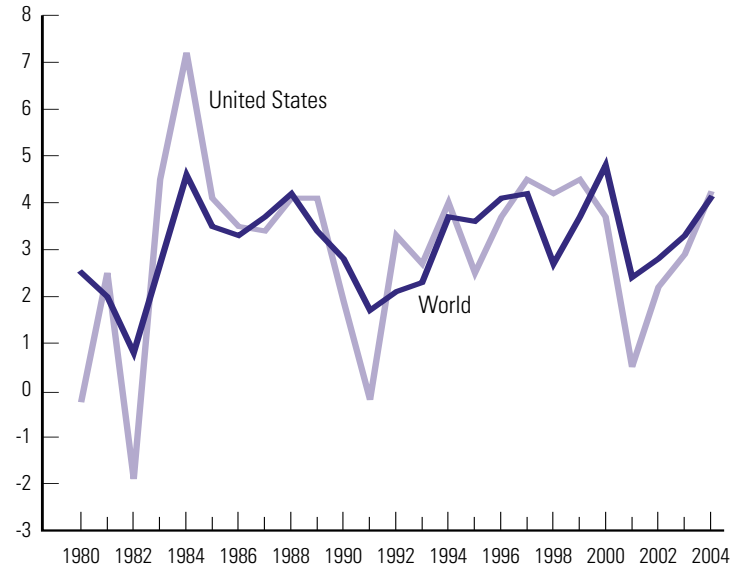
However, the U.S. economy as a whole has responded to both monetary and fiscal stimulus in the past year. The economy grew at an annual rate of 8.2 percent in the third quarter of 2003, which translates into stronger demand for all goods and services, including manufactures. In addition, there are signs of growing strength in a number of markets abroad. That stronger growth, combined with the continued competitiveness of the

Figure 11. **Worldwide Semiconductor Sales, 1996–2003**
(Billions of Dollars)



Notes: Data are based on a three-month moving average, wherein each month's sales figure is an average of its total sales and those of the subsequent two months. Data for 2003 are through October.
Source: Semiconductor Industry Association.

Figure 12. **Economic Growth: History and Forecast, 1980–2004**
(Percent Change)



Sources: World: International Monetary Fund; United States: U.S. Department of Commerce, Bureau of Economic Analysis.

U.S economy, has improved the prospects for exports of U.S. manufactured goods.

The manufacturing sector has recently begun to participate in the broader recovery under way in the U.S. economy. The Institute of Supply Management's Purchasing Manager's Index has remained above 50 (indicating continuing growth in future orders for manufactured goods) since August 2003.

Furthermore, rising productivity remains a bright light. Since the end of the recession, productivity in manufacturing is up 9.7 percent. Measuring from the period immediately before the recession, productivity is up 14.2 percent.

Those increases in productivity speak to the ability of American manufacturing to meet the competitive challenges and make a contribution to the rising standards of living in the economy. What the manufacturing sector can control—to invent, to innovate, and to combine resources to produce quality merchandise—it does quite well.

Structural Changes Shaping the Competitive Environment

With renewed growth in the U.S. economy, rising production numbers in the manufacturing sector, and significant gains in productivity even in the face of the recent recession, the manufacturing sector is poised for what could be a strong recovery. Nevertheless, the cyclical effects of the recession and the strengthening recovery are only part of the manufacturing story. In some respects, the recent recession has obscured the more fundamental structural changes under way in the manufacturing sector globally.

Over the past two decades, three separate, powerful trends have reshaped the manufacturing sector globally. The first is the revolution in technology that has been under way for two decades, raising productivity in manufacturing and reducing costs worldwide. The second is the significant reduction in barriers to trade, particularly with respect to trade in manufactured goods. The third is the end to political divisions that have segmented markets for more than 70 years and the corresponding emergence of Russia, China, and other countries in the world trading system. Each of these trends has significant implications for U.S. manufacturing, both in the form of new market opportunities as well as stronger competition.

Role of Technology

Global manufacturing has been fundamentally reshaped by the remarkable improvements in computing, communications, and distribution. Each factor, standing alone, would have greatly expanded the opportunities for trade, investment, and global production. Taken in combination, however, the rapid changes in all three influence many of the trends that have most reshaped manufacturing from the shop floor to the loading dock to the final customer. What these factors have also done is raise the bar to compete in today's manufacturing environment.

In 1987, in a review of the book *Manufacturing Matters*, Nobel Prize-winning economist Robert Solow famously observed, "You can see the computer everywhere but in the productivity statistics."[10] But, in the latter part of the 1990s, the evidence of the computer's effect on productivity finally surfaced. Compared with the relatively slow rates of productivity growth experienced between 1973 and 1995, labor productivity grew "roughly 1.2 percentage points [faster] a year from 1995 through 2000, a rise of more than 80 percent" above the previous trend line.[11] Investments in information technology are estimated to account for 60 percent of that increase in productivity.[12]

The dramatic expansion of computing power and its application to an ever greater range of tasks in the business environment is without a doubt the single most powerful technological change

affecting manufacturing today. Moore's Law—that computing power will double every 18 months—still prevails and is likely to continue for some time to come. One useful way to think about the explosion in computing power is the fact that the microchip in today's talking greeting cards contains more computing power than existed worldwide in 1945.[13]

Even skeptics of the contribution of information technology to productivity gains, such as Robert Gordon, generally have conceded its impact on manufacturing.[14] The increase in computing power touches every part of the manufacturing process. It has revolutionized product design by introducing computer-assisted design that allows much of the product development and testing to be done at a far lower cost in a virtual environment. Computing power has revolutionized manufacturing by creating a whole new family of multiple-axis machine tools that offer unmatched precision, quality, and efficiency.

Computers have also made possible most of the revolutions in business processes as well. In the absence of the computing power available today, concepts such as "just-in-time" production and "demand-pull" manufacturing processes could not exist in their current forms.[15] The dramatic increase in computing power has created an ever more powerful tool for developing new products, lowering production costs, raising quality, measuring performance, and managing business.

Communications technologies are essential to running high-performance manufacturing operations. New communications technologies create the ability to manage just-in-time inventories and demand-pull manufacturing. Real-time communication is critical to feeding information back into a system that is designed to yield zero defects. Interoperable communications systems provide opportunities for manufacturers and their customers to collaborate in product development.

Similarly, new communications technologies allow engineers to conduct real-time product development discussions with colleagues around the world. In addition to the videoconferencing capability, communications technologies use operating systems that allow anyone participating in the discussion to manipulate the same computer-generated design on the screen.

The revolution in communications has fundamentally changed the way manufacturers do business. Wireless communication means that a cellular phone and a laptop computer can replace a salesperson's office. Not only does the cellular phone allow for greater contact and consultation with customers about their needs, but it also contains the necessary functions to place an order and begin the manufacturing process directly from the point of sale.

manufacturing has been fundamentally reshaped by the remarkable improvements in computing, communications, and distribution

The communications revolution has also significantly changed the delivery of finished goods to customers. For instance, in trucking, the combination of a global positioning system transmitter and a cellular phone has meant less waste, greater efficiency, and a lower cost to manufacturing customers. New communications devices also ease the distribution of goods by creating an interface with government agencies that may require information for security or regulatory reasons. By reducing the costs of distribution, new communications technologies have reduced the cost of the end products.

The application of technology has also transformed the distribution of manufactured goods and reduced the costs of transportation. Obviously, air travel has contributed much to making the competitive marketplace for manufactured goods a single market. In addition, significant changes in shipping since World War II, such as the rise of containerization and

roll-on/roll-off cargo allow for a smooth transition from container ship to rail to truck and dramatically increase efficiency. Distribution is also aided by new cargo handling facilities operated by express delivery services. For example, this enables computer manufacturers to operate overnight repair facilities and deliver repaired computers to their owners in fewer than 24 hours.

The combination of the trends in computing, communications, and transportation has generated a new service of door-to-door logistics. Logistics has become essential to meet the demands of

the market and has been fundamental in lowering the costs of manufacturing to remain competitive. The competitive environment has been reshaped by such advances, which grew out of post-World War II defense research.[16] The Office of Naval Research funded the research of a number of engineering professors at the nation's premier research institutions. Those professors had been instrumental in solving a wide range of practical technical problems attendant to the war effort during World War II and continued to receive ONR funds after the end of the war in 1945.

The post-World War II investment in R&D paid enormous dividends in the form of new products, new industries, and improved growth and competitiveness of U.S. manufacturing. But, increasingly, it is private industry that is making the investments driving innovation. By 1980, industry had become the lead investor in U.S. R&D activities, investing more than the federal government for the first time. Today, robust private sector investment in R&D outpaces federal R&D funding by a ratio of more than two to one, effectively reversing the ratio that prevailed throughout the Cold War and the space race.

The lesson that the post-World War II revolution in science and engineering in the United States flowed from investments in R&D was not lost on foreign nations. Today, nations everywhere recognize the link between technology, economic growth, and job creation. They are, as a consequence, increasingly establishing research institutes and key technology programs; creating incentives for partnerships among industry, academia, and government; and boosting training for scientists and engineers.

That dynamic is reflected in the sharp decline in the U.S. share of total world R&D spending. Through the 1960s, the U.S. share of global R&D ranged between 60 and 70 percent. Today, by contrast, the U.S. share is 30 percent.

Equally important is the proportion of a nation's output that is reinvested in R&D, as this ratio is an indicator of an economy's commitment to competing on the basis of new technology in the future. In this regard, the R&D intensity of the U.S. economy has remained essentially constant for 40 years, during which time the surge in foreign R&D investment has occurred.

The change in R&D funding patterns in technology has led to the broad dispersion of technology worldwide. The increase in foreign direct investment by many global firms has reinforced that

trend. Advanced, state-of-the-art manufacturing facilities capable of producing high-quality, low-cost goods are now available worldwide. American manufacturers face competition not only from manufacturers of low-cost commodity products, but also from manufacturers of sophisticated products and the tools to make them.

Thus, U.S. manufacturers will face constant pressure not only to lower prices, but also to increase the value that they add to their products. Competition from low-cost producers creates an incentive to move up the value chain in the direction of higher-margin goods, where the conditions of competition are not based on price alone. Increasingly, success in manufacturing will depend on the ability to integrate new technologies rapidly into both products and operations. That ability puts a premium on continuing R&D as the primary means of gaining a competitive edge.

Lowering Barriers to Trade

The second trend reshaping the environment in which U.S. manufacturers compete is the significant reduction in tariff and non-tariff barriers to trade in manufactured goods globally. Successive rounds of multilateral trade negotiations under the General Agreement on Tariffs and Trade and its successor, the World Trade Organization, for example, have cut the average tariff on manufactured goods worldwide by 30 percent. For industrialized countries the results are even more remarkable. According to a 1999 study published by the Organization for Economic Cooperation and Development, the average tariff rate for OECD countries, which was 40 percent at the end of World War II, is now 4 percent.[17] The more recent creation of free trade agreements, such as the North American Free Trade Agreement between the United States, Canada, and Mexico, has reinforced the trend. Over the past 10 years, NAFTA eliminated tariffs and many non-tariff barriers applicable to the largest three-way trade in the world.

The value of world trade has grown enormously as a result. Since the creation of the GATT system, world exports grew from $58 billion in 1948 to $5.98 trillion in 2001. According to data compiled by the WTO, the volume of world exports increased at a compound annual rate of 5.8 percent in the past 25 years alone, a pace that was more than twice as fast as growth in the world economy as a whole.[18]

U.S. manufacturers face considerably higher compliance costs than do many of America's trading partners

Most of the growth in world trade has been in manufactured goods. The sector now accounts for approximately three-fourths of all trade in goods and 60 percent of all trade, in goods and services combined.[19] One reason for the predominance of manufacuring trade is that the United States and its trading partners have reduced barriers to trade in manufactured goods further and faster than in other sectors. While trade in agricultural goods, for example, has grown at a relatively strong annual rate of 3 percent over the last 20 years, exports of manufactured goods advanced at nearly twice that rate, averaging 5.7 percent per year.

The growth in trade over the past 50 years, fueled by falling trade barriers, has contributed directly to the most rapid, sustained economic growth in U.S. history. Output in the United States increased fivefold and real GDP tripled. U.S. real GDP, expressed in 2000 dollars, grew from $11,672 in 1950 to $34,934 in 2002.

Trade continues to contribute significantly to U.S. economic growth. In the past decade alone—which included the creation of NAFTA, the conclusion of the Uruguay Round of GATT talks, and the creation of the WTO—world trade grew by 87 percent.[20] Between 1990 and 2000, U.S. exports were up 98 percent and the share of world trade represented by U.S.

exports actually grew from 11.4 to 12.2 percent.[21] In other words, rather than having a negative impact on the U.S. economy and manufacturing sector, the most recent round of trade agreements appears to have allowed U.S. exports to grow at a faster pace than world trade overall.

The U.S. economy grew rapidly over those same years, exceeding the pace of most other industrialized nations. From 1990 to 2002, the economy expanded at a 3-percent annual rate: the economy grew from $7 trillion in 1990 to $10 trillion in 2002.[22] During that time, the growth in U.S. exports accounted for one-sixth of all growth in the U.S. economy.[23] In sectors such as machinery, computers and electronics, and transportation equipment, exports now make up between 50 and 60 percent of all sales.[24] In one-third of U.S. manufacturing industries, exports account for one in every five manufacturing sales. According to the most recent figures available, exports now support more than 12 million jobs, and those jobs pay between 13 and 18 percent higher than the average U.S. wage.[25]

The benefits of trade, of course, flow from imports as well as exports. Reductions in tariffs on imports into the United States represent a cut in regressive taxes. This cut offers significantly higher benefits to low-income households than to those with higher incomes. By some estimates, NAFTA and the Uruguay Round agreements raised the average annual income of an American family of four by $1,300 to $2,000.[26] A further reduction in global barriers by just one-third would increase that family's annual average income by an additional $2,500 a year.[27]

The benefits from import competition are not limited to the final consumer. Access to the highest-quality, lowest-cost components is an essential element of the U.S. manufacturing sector's competitiveness. Imports stimulate competition and spur American manufacturing to increase its own quality and productivity. It is worth underscoring that during the past decade, while trade was expanding significantly, the U.S. manufacturing sector was growing faster and in more dynamic ways than it had in decades.

None of those results are surprising in economic terms. A more open economy has moved the United States toward the position of its greatest comparative advantage. This openness has brought about increasing returns and a more efficient use of resources. Both are consistent with stronger economic performance. Indeed, some of the latest research suggests that the broad engagement of the United States in the world economy—particularly the adjustment of the U.S. economy toward a more competitive state—has actually helped retain employment in the manufacturing sector that would have otherwise been lost.[28]

In fact, to the extent that other countries are currently examining the health of their own manufacturing sectors, they have identified the United States as the model. In its recent study of manufacturing in the United Kingdom, for example, the British government essentially benchmarked the U.S. manufacturing sector as the best measure of its own progress and policies.[29] Similarly, the European Union articulated a vision of aerospace manufacturing that expressly contrasted the development of their aerospace industry with that of the United States.[30] Many developing countries also use the United States as a model.

These developments point to the basic benefits to the U.S. economy, and to its manufacturing sector in particular, from participating in an increasingly open

trading system governed by a common set of rules. They also point to the benefits that can be derived, both for U.S. manufacturers and for the country, from the current effort to open markets through trade negotiations. Furthermore, vigorous enforcement of agreements is needed to ensure that U.S. manufacturers, together with the nation's farmers and service providers, receive the benefit of the bargains negotiated.

Given the concerns expressed throughout the U.S. manufacturing sector about the current trade rules, it is worth reiterating the extent to which the rules adopted in recent trade agreements have served, rather than undercut, U.S. economic interests, including those of U.S. manufacturers. Reducing tariff barriers, improving investment rules, and developing stronger intellectual property protections, for example, mainly benefit the small manufacturers that were previously locked out of foreign markets. While larger firms can afford to invest behind the "tariff wall" and have the resources, in many cases, to develop strategies for protecting their intellectual property, smaller manufacturers have generally had only two options: either export directly or sell to someone who exports.

In the aggregate, macroeconomic forces—rates of growth and relative prices—have the primary effect on our trade balance and help explain the trade deficit. These forces, combined with innovation and productivity, underpin our trade position over the long term.

On the other hand, from the perspective of individual firms, other factors can be seen as important in global markets and America's trade position. Continued trade deficits, combined with the very visible efforts by some countries to confer a competitive advantage on their firms, lead some U.S. manufacturers to question the fairness of our trade agreements and the basic tenets of U.S. trade policy.

The United States has led the way in reducing trade barriers worldwide and has, in past negotiations, proved willing to cut its tariffs and limit other forms of its own intervention in the market to a greater extent than a number of America's trading partners. While noting that there are significant exceptions, including in the manufacturing sector, the average U.S. tariffs on a trade-weighted basis are now less than 1.7 percent.[31] While many major industrial trading partners have also reduced their tariffs to comparable rates, in other parts of the world U.S. exporters still face heavy tariffs. In addition, the United States is far less likely to subsidize its manufacturers directly than is the case in many other countries.

the United States has led the way in reducing trade barriers worldwide

Wholly apart from the basic regulation of trade or the imposition of specific protective barriers lies the question of costs imposed by government. U.S. manufacturers face considerably higher compliance costs in labor, environmental, and other regulatory areas than do many of America's trading partners, particularly in the developing world.[32] But there is little doubt that the disparities in certain highly visible areas drive the perception of unfairness that permeates many of the concerns of U.S. manufacturers about the current trade rules.

In today's global economy, a policy of protection simply does not work. A good example is the tool and die industry. While the U.S. tool and die industry has sought protection from import competition, particularly from China, the industry was also among the most vociferous opponents of President Bush's imposition of tariffs on imports of steel into the United States in 2002. What the tool and die industry's position reflects is that protection invariably involves costs and can injure other U.S. industries, including many manufacturers. Instead, what U.S. manufacturers seek is simply to ensure

that the rules that apply to U.S. manufacturers apply to their competitors as well, especially in the case of competition with companies that benefit from heavy state intervention.

Overall, the U.S. economy has benefited from import competition, which has helped maintain the competitiveness of many manufacturing enterprises and has dampened inflation considerably. At the same time, however, stronger import competition has put extraordinary pressure on manufacturing industries, including steel, furniture, tool and die, foundry products, textiles and apparel, and automotive parts, while touching advanced technology sectors as well.

what U.S. manufacturers seek is simply to ensure that the rules that apply to U.S. manufacturers apply to their competitors as well

Increasingly, competition in manufactured goods has been driven by the evolution of low-cost competitors in emerging Asian markets. In 1980, the United States, together with the European Community and Japan, dominated trade in manufactures, accounting for nearly 75 percent of the value of world manufactures exports according to WTO statistics. By 2001, however, that share had fallen by almost 15 percentage points, to 60 percent.

Emergence of New Competitors

The third powerful trend affecting the manufacturing sector globally is both political and economic. It involves the increasing reliance of other countries, notably China and the nations of the former Soviet Union, on market mechanisms, rather than government planning, as the principal means of structuring their economies.

Though not often thought of in trade terms, the economic consequences of the end of the Cold War may have had the most profound effect of all. The end of the Cold War marked the end of political and economic divisions that had split the world in one way or another since the onset of World War I. Even with the rapid changes in technology and the reduction of tariff and non-tariff barriers to trade, the global economy would not be possible if those divisions still existed.

The numbers bear this theme out. While the so-called Asian tigers' share of world trade grew rapidly over the past 20 years, the biggest gains in share of world trade in manufactures were captured by China. China's manufactured exports increased from only 0.8 percent of world shipments in 1980 to 5.3 percent in 2001. With the onset of economic reforms in 1979 and a heavier reliance on market forces, China has rapidly expanded its trade in manufactured goods. China now ranks fourth among exporters of manufactures worldwide.

It is worth underscoring that virtually all of the market share gains of China and other Asian nations have come at the expense of Japan and Europe, while the U.S. share of world exports of manufactured goods actually increased marginally between 1980 and 2001, from 13 percent to 13.5 percent.[33] That increase, in turn, is due to the ability of U.S. manufacturers to raise their productivity significantly over the same period. At the same time, however, U.S. manufacturers in a variety of sectors were seeing their share of the U.S. market eroded.

There is another side to the political and economic revolution that has taken place over the past two decades; any form of economic restraint has the effect of creating imbalances between demand and supply. Consequently, when those restraints are removed, capacity often exceeds demand, and the markets must adjust to bring supply and demand back into equilibrium.

The end of the Cold War and China's reentry into the world economy had a similar effect. A recent study of trends in manufacturing employment illustrates this. The study showed that manufactur-

ing employment has fallen not only in the United States, but also around the world.[34] In fact, China's manufacturing employment has actually fallen faster than that of the United States in percentage terms in recent years.[35]

This decline in employment largely reflects the gradual privatization of China's many state-owned enterprises and the subsequent reduction in employment as they adjust to competing in world markets. But it also underscores the effect of rising global productivity and the extent of the excess capacity in manufacturing that continues to put downward pressure on the price of manufactured goods worldwide.

Shift toward Global Outsourcing

The practical effect on U.S. manufacturers of the three trends described above has been to increase the availability of new sources of low-cost labor and manufacturing capacity. Indeed, the trends have not only made it available, they have also made it an important competitive issue. In a global economy in which both goods and capital are mobile, but labor is not, manufacturers' tapping of lower-cost labor by importing it in the form of lower-cost parts, components, and—increasingly—finished goods is simply a function of trying to stay competitive in a global economy.

Hence, the trend toward sourcing parts and components globally is driven by powerful competitive forces and is here to stay. Manufacturers now have the ability to manage global supply chains effectively, which allows them to source from the lowest cost supplier globally and, as a competitive matter, forces them to do so in order to remain competitive themselves.

In an increasingly global market for manufactured goods, competition will largely take place among supply chains, rather than between individual manufacturers. That implies an entirely different concept of manufacturing. Rather than focusing on what traditionally defined manufacturing—that is, the process of turning raw materials into components or finished products—manufacturers today think of manufacturing as a system designed to perform the activities required to deliver the end-product to the customer and meet the customer's needs, from design to finance to production to sales and marketing to after-sales service.

Thought of in that way, the structure of manufacturing no longer implies that all of those processes need take place in a single enterprise. Manufacturers increasingly see themselves as system integrators, managing a supply chain or "virtual network" that may consist of any combination of the activities mentioned above, whether or not provided by the "manufacturer" itself.

Adapting to this changing competitive environment has forced U.S. manufacturers to adopt new production, marketing, and management methods, from "lean manufacturing" techniques, to quality assurance programs that guarantee zero defects, to international product standards so their goods can be incorporated in other firms' global supply chains. It also means an increasing demand to reach out to customers worldwide in order to show how a manufacturer can add value to the customer's product and its supply chain.

competing in a global marketplace puts a premium on government getting the economic fundamentals right to create an environment in which U.S. manufacturing can flourish

The automotive sector provides a case in point. Whereas U.S. automobile manufacturers once provided a ready market for many domestic suppliers of parts and components, the manufacturers now operate on a global basis. Thus, automotive parts suppliers must now find niches in the global supply chains of U.S. auto companies or their foreign competitors to succeed in today's market. That brings

U.S. auto parts suppliers into head-to-head competition with parts suppliers worldwide. The possibility of relying on increased auto sales in the United States that automatically translate into increased orders for parts and components for U.S. suppliers simply no longer exists. Competition now takes place on a global basis, and that fact will continue to shape the prospects for the manufacturing sector in the future.

The Government's Role: Getting the Fundamentals Right

The changing nature of competition requires, correspondingly, a different way of looking at government policy. This means fostering an economic environment, both domestically and internationally, that encourages growth, rewards sound investment, controls costs, and fosters innovation and rising productivity. It also means an aggressive international economic policy that ensures a level playing field by reducing barriers to trade and investment and vigorously enforcing the trade rules when violated.

Competing in a global marketplace puts a premium on government getting the economic fundamentals right to create an environment in which U.S. manufacturing can flourish. It means examining whether the U.S. government's actions and the structure of the U.S. market improve or hinder the ability of American firms, in manufacturing and throughout the economy, to compete in an increasingly global marketplace.

Notes:

[1] Bureau of Economic Analysis, U.S. Department of Commerce (2002). Calculations based on total requirements matrix from the BEA Web site, *www.bea.doc.gov*. Considered on an aggregate basis, total manufacturing shipments in the most recent 12-month period were $4 trillion, but only roughly 40 percent of this was value added in the manufacturing sector. The rest was either duplicate shipments as goods were shipped from one manufacturing processor to another, or inputs from other sectors-agricultural products into food manufacturing, crude petroleum into petroleum refining, and iron ore into steel manufacturing, as well as contributions from the transportation, financial, and business services sectors.

[2] Productivity is defined as the amount of goods and services produced, adjusted for inflation, per hour of work.

[3] See, for example,William J. Baumol, *The Free-Market Innovation Machine—Analyzing the Growth Miracle of Capitalism* (Princeton, N.J.: Princeton University Press, 2002); see also Michael E. Porter, "Building the Microeconomic Foundations of Prosperity: Findings from the Microeconomic Competitiveness Index" in *The Global Competitiveness Report* (Geneva: World Economic Forum, 2003).

[4] Michael E. Porter, *The Competitive Advantage of Nations*, 1st ed. (New York: The Free Press, 1990).

[5] Gregory C. Tassey, *R&D and Long-Term Competitiveness: Manufacturing's Central Role in a Knowledge-Based Economy*, Planning Report 02-2 (Gaithersburg, Md.: National Institute of Standards and Technology, February 2002).

[6] R. McGuckin and B. van Ark, *Productivity, Employment, and Income in the World's Economies* (New York: The Conference Board, 2002).

[7] Thomas J. Duesterberg and Ernest H. Preeg, eds., *U.S. Manufacturing: The Engine for Growth in a Global Economy* (Westport, Conn.: Praeger, 2003).

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Two

Identifying the Challenges Facing American Manufacturing

This chapter highlights the challenges facing the U.S. manufacturing sector, as expressed by manufacturers themselves through the Department of Commerce roundtables. It also seeks to capture the priority issues that manufacturers believe need to be addressed in a comprehensive strategy to ensure the competitiveness of U.S. manufacturing. The views reflect a common understanding of the trends outlined in Chapter 1 that likely will shape the competitive environment for manufacturing. Manufacturers also recognized the basic strengths of the U.S. manufacturing sector as it meets the challenge of competing in a global economy.

If there was one underlying theme that emerged in the roundtables, it was the understanding that fundamental adjustments are under way throughout the global manufacturing sector. Manufacturers asked for an increasing focus by government on these adjustments and wanted to ensure that government was taking the steps necessary to create an economic environment in which U.S. manufacturers could succeed.

Toward that end, manufacturers attending the Commerce Department's roundtables outlined six areas that require immediate attention:

1. Manufacturers perceived a lack of focus within government on manufacturing and its competitiveness. Manufacturers are looking for a commitment to understanding the challenges that the sector faces in competing in a rapidly globalizing economy. They want government to take the steps needed to foster the manufacturing sector's ability to adjust to that new competitive reality.

2. Manufacturers want the government to focus on encouraging stronger economic growth both at home and abroad. There is a broad understanding that the recent recession was led by a sharp drop in business investment and that both monetary policy and fiscal policy have worked to set the economy on the route to recovery. But there are still steps that manufacturers feel are necessary to encourage business investment, and to reinforce the recovery under way in the economy as a whole and in the manufacturing sector in particular.

3. Manufacturers see the need for government to match the effort that they have made in controlling manufacturing costs. As manufacturers have focused on reducing costs to improve productivity and ensure their competitiveness, they often find their efforts eroded by costs they cannot control—costs that result in

part from government policy. Manufacturers seek a commitment on the part of government to reduce those costs and, in the process, create an economic environment that is attractive to investment in manufacturing within the United States.

4. Manufacturers emphasized that enhancing America's technological leadership was critical to their future. There is widespread recognition that the United States remains the world's leader for investment in research and development, and that U.S. investments in technology have paid significant dividends in current manufacturing competitiveness. It is also understood by U.S. manufacturers that technology is now more widely diffused throughout the world economy and that this trend risks eroding what has become the principal competitive advantage of the United States. What manufacturers seek is a commitment to encourage research and development and to ensure that the government reinforces, rather than creates obstacles to, the process of bringing innovations to the marketplace.

5. Manufacturers regarded education as crucial. Manufacturers are extremely interested in addressing the shortcomings of the U.S. educational system. Roundtable participants underscored that the evolving nature of the manufacturing sector relies on individuals entering the workforce with greater problem-solving abilities. These workers must continually sharpen their skills through lifelong learning. In addition, roundtable participants expressed concern that the United States risks losing an innovation infrastructure if the nation fails to produce scientists and engineers. Manufacturers seek a renewed emphasis from all levels of government to invest in educational and training institutions.

6. Manufacturers also focused on the need for international trade and monetary policies that ensure that global competition in manufacturing is free, open, and fair. Many manufacturers expressed concerns regarding China. What manufacturers seek is not protection from competition, but the ability to compete on equal terms. Toward that end, they strongly support leveling the playing field internationally by lowering barriers to trade and eliminating efforts by foreign governments to confer unfair competitive advantages for their manufacturers.

The following discussion explores each of those themes.

Focusing on Manufacturing and Its Competitiveness

At every roundtable, U.S. manufacturers made the point that, although the manufacturing sector represents a cornerstone of the U.S. economy, manufacturing receives scant attention from the public or government. To many manufacturers across the country, it appears that the public and government have lost sight of a simple truth: you cannot have good jobs if you do not have strong businesses.

That thought was articulated by Phyllis Eisen of the National Association of Manufacturers at a roundtable held in Washington, D.C. She summed up her conversations with "teachers, educators at all levels, with kids from seventh grade through university, with their parents, with politicians, and with our own manufacturers," with this statement:

The information we got is not good about manufacturing. It is invisible to most people. They don't equate the table and the spoon they use and the glass they use . . . with this extraordinary industrial strength that we've had for so many years and that we have to maintain.

Some roundtable participants went further, describing what they saw as a pervasive bias against manufacturing, based on an old assembly-line image, causing the best and the brightest to pursue careers outside the manufacturing sector. At the roundtable in New Britain, Conn.,

Bruce Thompson of Projects Incorporated noted that manufacturing had evolved in ways most people did not know or appreciate. He emphasized that "people need to get out and see that it's not a dirty, oily, old mess anymore. It's technicians running high-precision equipment."

The roundtable participants attributed some of the public's misperception about manufacturing to the lack of focus in government on manufacturing. They pointed out that there was no single advocate for manufacturing within the executive branch departments. "I think the United States is the only country in the G8 which doesn't have a very-high level department of manufacturing," said Bob Brunner of Illinois Tool Works at the Rockford, Ill., roundtable. "I think that [establishing such a department] would be a real positive development in terms of supporting us manufacturers."

Manufacturers expressed frustration that there was no focal point for the many programs that government supports at the federal, state, and local levels to assist manufacturers. Bruce Thompson pointed out that there was no "seamless interface." What was needed, in his view, was "a one-stop shopping mentality," so that manufacturers do not have to call on a lot of different organizations to get the information and assistance that they need. As Von Hatley of the Louisiana Department of Economic Development put it at a roundtable in New Orleans, "We really need a concerted effort between federal and state [governments] to do what it takes to save manufacturing." To ensure accountability, manufacturers sought the establishment of a single office within government with responsibility for implementing the Manufacturing Initiative.

Historically there has been little institutional focus on manufacturing in the federal government. Although various agencies take into account elements of manufacturing competitiveness, in practice there is no mechanism to coordinate these efforts. While it is widely understood that the Commerce Department serves as the principal advocate for manufacturing's interests, there is no office in the Commerce Department that is solely responsible for looking out for the competitiveness of U.S. manufacturing.

Many roundtable participants thus requested the establishment of a manufacturing-related position within the Commerce Department at the assistant secretary level or higher to focus on manufacturing competitiveness and the health of the manufacturing sector in general. Manufacturers also urged stronger coordination both within the federal government and with state and local governments to foster investment in manufacturing, as well as requesting a regular dialogue between government and the manufacturing sector on its competitive challenges.

manufacturers sought the establishment of a single office within government with responsibility for implementing the Manufacturing Initiative

The administration has therefore proposed creating an assistant secretary for manufacturing and services who would develop and implement a comprehensive strategy on manufacturing. While maintaining a focus on manufacturing, strategic planning must include the service sector, which both influences and benefits from the manufacturing sector's competitiveness.

This new position would provide the focus within the Commerce Department needed to respond to manufacturers' concerns. The assistant secretary's office would be able to provide regulatory economic analysis essential to assessing the costs and benefits of government action on manufacturing competitiveness. This office would be charged with establishing a mechanism for coordinating manufacturing-related initiatives among the various executive branch agencies and would

enhance the Commerce Department's ability to ensure that focus on a government-wide basis.

The Need for Stronger Economic Growth at Home and Abroad

Manufacturers attending the roundtables indicated that the single most important economic policy objective from their perspective was encouraging economic growth. Stewart Dahlberg of J.D. Street & Co. described the reality of the global marketplace at the St. Louis, Mo., roundtable:

The world is a very big place. There are lots of customers out there and lots of niche customers to find. What we would . . . simply ask [is] that every possible opportunity to open up every single possible market be investigated and called out anywhere you can.

American manufacturers, both large and small, understand the value of promoting economic growth worldwide and reducing the barriers to global trade

Although many of the specific concerns raised by manufacturers focused on the effect of indirect costs on the supply side of the economic equation, no one disagreed with the notion that the first and most pressing issue was sufficient demand, domestically and globally, to stimulate purchases by consumers and businesses of the goods that U.S. manufacturers produce.

Manufacturers recognized that the most recent recession was one driven by a sharp decline in business investment, rather than a drop in consumer spending. They also understood that policies designed to encourage business investment were essential to any recovery in manufacturing. Most manufacturers indicated that recent efforts to stimulate the economy were paying off, even though they had not fully filtered through to the manufacturing sector. As Mustafa Mohatarem of General Motors put it at the roundtable in Washington, D.C., the recent passage of the Jobs and Growth Tax Relief Reconciliation Act was a "significant achievement," and the resulting recovery in the U.S. economy would "create sufficient or significant demand for investment in the industry" to put the manufacturing sector on the right path.

Despite the reductions in capital gains and dividend taxes, as well as expensing provisions, many manufacturers believed that the recent tax cuts did not go far enough. They underscored the need to create greater certainty under the tax code to encourage business investment. They also emphasized their desire for government to address longer-term issues: specifically, manufacturers highlighted the need to reform the tax code to eliminate the penalties they believe it imposes on their businesses, such as outmoded depreciation schedules and the overall impact of the alternative minimum tax.

They also sought simplification of the tax code, which in its present complexity raises the costs of compliance—particularly for smaller manufacturers. Manufacturers further focused on reforms in the tax code that they believe would yield a broader and deeper pool of investment capital to the benefit of U.S. manufacturers, particularly for small and medium-sized businesses. Murry Gerber, former chair of NAM's Small and Medium Manufacturers Group, explained the need at the New Britain, Conn., roundtable:

They [small and medium-sized manufacturers] haven't kept up to date with new equipment, and you can't blame them. They have had falling sales, their margins are decimated, they don't have the wherewithal. . . . An offer of investment tax credits . . . would drive companies to put on this additional equipment that's consistent with the high-tech manufacturing in the future.

There is little doubt that reducing complexity and making the recent tax

cuts permanent would encourage business investment. Greater certainty as to the tax treatment of earnings is one of the basic components in any firm's investment plans.

The other salient point reflected in the comments of manufacturers was a clear understanding of the implications of slower growth abroad. Roundtable participants focused on the need to use both international monetary and trade policy to promote growth internationally. They cited issues such as exchange rates, based on their understanding of the economics affecting the value of the dollar. They made the point that, in addition to doing everything possible to restore growth at home, the United States needs to press its major trading partners for stronger growth abroad.

Encouraging international economic growth requires consistent advocacy of growth-oriented economic policies abroad. Not only must the United States promote growth through its own economic policies, but it also must be willing to "preach what it practices."

In practical terms for policy-makers, promoting economic growth abroad means action on two fronts. The first is focusing discussions with U.S. trading partners, whether bilaterally or multilaterally, on policies that will foster growth. That means continuing to advocate growth in G7 finance ministers' meetings, the G8 summit, and the annual meetings of the International Monetary Fund and the World Bank, since growth is not an issue for the larger, industrial economies alone. But it also means, most particularly, encouraging the largest economies in the world to pursue policies that stimulate their growth, since they make up a significant share of the world economy.

Growth-oriented economic policies start with the basics, such as promoting respect for private property and observance of the rule of law, which are essential to all market transactions. It means ensuring monetary stability, reducing taxes, and reducing the costs and inflexibility of heavy regulations that impose limits on growth. Every country, including the United States, has room for improvement in terms of the steps it could take to foster growth and a rising standard of living.

Another aspect of growth involves trade liberalization. From the perspective of U.S. manufacturing, reducing trade barriers and opening markets abroad has manifold advantages. Liberalization promotes economic growth in foreign markets, which raises the demand for manufactured goods worldwide. It offers the prospect of higher exports, and the resulting greater efficiencies for American manufacturers and exporters. It also eliminates the implicit subsidy that tariff protection extends to foreign competitors.

Significantly, U.S. manufacturers continue to stand behind the effort to open markets abroad at the negotiating table. That is true of virtually every industry and business large and small. Matthew Coffey, of the National Tooling and Machining Association, which represents many small and medium-sized metalworking firms across the United States, put it this way in an NTMA policy paper:

The NTMA believes in the free-enterprise system . . . whether it is in the United States, the Americas, or the world as a whole. That leads us to the conclusion that competition should be open. The NTMA is in favor of open markets and getting rid of trade barriers and tariffs and has, therefore, generally supported free trade initiatives as long as there was a prospect of fairness over time.[1]

In short, American manufacturers, both large and small, understand the value of promoting economic growth worldwide and reducing the barriers to global trade. They are more than willing to compete in that environment as long as the competition is open and fair, and as long as the same rules governing competition apply equally to all.

Reducing the Costs That Erode Competitiveness

One of the most consistent themes expressed by manufacturers attending the roundtables was the need to "keep our side of the street clean." For manufacturers mean that government, at all levels, must understand that it does not have the luxury of making domestic economic policy choices in a vacuum. Every regulation, every additional form to be filed, every increase in litigation, and every increase in healthcare costs can impose unwarranted costs on American manufacturing.

Manufacturers expressed concern that, too often, fundamental decisions about taxation, government spending, environmental regulation, workplace reforms, energy policy, personal injury compensation, and trade policy are made in isolation. They stated that legislatures, administrative agencies, and courts make decisions without understanding the multiple burdens that those decisions impose on manufacturers.

Rising Healthcare Costs

Curt Magleby of the Ford Motor Company underscored this most frequently cited concern at a roundtable in Washington, D.C.: "Where we really need help for U.S. manufacturing is some stability in healthcare." Most manufacturers indicated that they want to continue to provide healthcare benefits, because such benefits made for a motivated and more productive workforce that contributed to the success of their firms.

Rapidly increasing healthcare costs directly affect the bottom lines of U.S. manufacturers and steadily erode their competitiveness. John Vaught of Tri-Cast noted at the Columbus, Ohio, roundtable that, while the cost of the healthcare he provides to his employees had been "skyrocketing," he was only able to raise prices less than 1 percent a year.

Keith Guggenberger of Starkey Labs summed up the perspective of many U.S. manufacturers, at the roundtable in Minneapolis, Minn.:

Healthcare is a big part of the concerns of policy that we have in keeping us competitive. . . . At Starkey, we spend almost $8,000 per employee on healthcare in the U.S., and when half of our people make under $28,000 a year, it is hard to make those sorts of ends meet.

The problem is becoming particularly acute in the automotive industry, which is central to the health of so many other manufacturers, particularly in the Midwest. At a Washington, D.C., roundtable, Mustafa Mohatarem of General Motors underscored that point:

American companies also face two other challenges that are related to their legacy costs. The first is pensions, which over time is most likely to be equalized. That's something we have negotiated and we're trying to address within that context. The one we don't have as good of control on is the medical side of it. As you know, the cost of medical care has been rising much more rapidly than other costs in our economy. So the traditional American companies that have large healthcare obligations to retirees are being really harmed by this rapid increase in healthcare costs.

This statement is not merely anecdotal: there is no doubt that healthcare costs have risen sharply. A 2002 report by PricewaterhouseCoopers noted that in 2000, the share of U.S. GDP devoted to healthcare was 13.2 percent, up from 8.8 percent in 1980, and, according to forecasts, that share will continue to rise and reach 16 percent of GDP during the next five years.[2]

The rising cost of healthcare is the biggest barrier to health coverage. The annual family health insurance premium increased to $9,068 in Spring 2003, according to a survey of 2,808 companies by the Kaiser Family Foundation and the Health Research and Educational Trust.[3] Further,

between Spring 2002 and Spring 2003, monthly premiums for employer-sponsored health insurance rose 13.9 percent—the third consecutive year of double-digit premium increases and the highest premium increase since 1990. Small firms, with three to nine workers, faced the largest increase of all: a 16.6-percent surge in premiums.[4]

Rising healthcare costs are not unique to the United States. While overall spending on healthcare is higher in the United States, the growth rate of spending is similar to that of other nations. The average real annual rise in healthcare spending in this country was 3.2 percent from 1990 through 2000, which is comparable to the 3.3-percent rate in OECD countries, and the 3.1-percent growth rate among countries in the European Union.[5]

However, what is unique to the United States is the extent to which it relies on businesses as the primary providers of healthcare coverage and the burdens they bear as a consequence.[6] Employer-sponsored health insurance is a cornerstone of healthcare financing in the United States. Three out of every five Americans receive some type of employer-sponsored health benefits.[7]

According to the National Association of Manufacturers, 97 percent of its members continue to voluntarily support employer-provided healthcare in spite of the growing cost of these benefits and the sluggish economy for manufacturing.[8] The percentage of employers providing coverage has not declined substantially, and in spite of rising costs, employers have not increased the percentage of the premium paid by the employee.

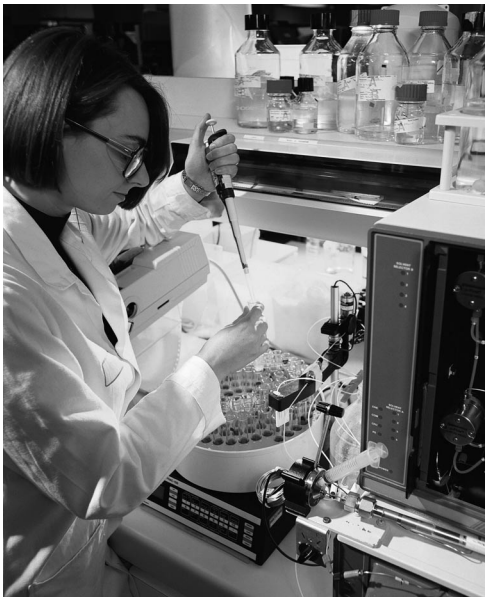
To avoid shifting more of the costs to the actual consumers of healthcare services, employers, particularly those in small and medium-sized manufacturing firms, have to find ways to contain costs or they become less competitive. However, cost containment may not be an avenue open to small manufacturers, which face special problems in obtaining health insurance. They commonly must pay higher premiums and, thus, are less likely to offer health insurance as a benefit.

Employers, both large and small, have responded to these rising costs in a variety of ways. Firms are less likely to offer retiree health coverage; the percentage of large firms offering retiree health benefits has decreased from 66 percent in 1988 to 38 percent today.[9] And many firms increasingly rely on cost sharing as a way to increase awareness of cost and value in healthcare. Tiered reimbursements, often used for drug benefits, have become a common approach to encouraging the use of generic and lower-priced medications. Some companies have begun offering consumer-driven health plans, which combine high-deductible insurance with health spending accounts.

Commerce Secretary Donald Evans, Labor Secretary Elaine Chao, and Treasury Secretary John Snow discuss U.S. manufacturing with factory workers at Harley Davidson headquarters in Milwaukee, Wisconsin.

What these facts suggest regarding policy is that there is economic and competitive value for reducing the growth in healthcare costs that U.S. manufacturing companies face, particularly for the small and medium-sized manufacturers that are the foundation of the U.S. manufacturing

sector. One means of addressing their needs, as well as those of larger firms, would be to encourage the development of association health plans and other joint purchasing arrangements that would increase firms' bargaining power in the market for health insurance and healthcare services.



The historic Medicare reform legislation, which was enacted following the roundtables, provides assistance to firms offering health insurance to retirees and is an important step in controlling healthcare costs. This legislation also established health savings accounts to help employees pay for their healthcare expenses by combining the purchase of a high-deductible health insurance plan with tax-free savings accounts. Employees will use the accounts to pay for their healthcare needs, with any remaining balances rolled over from year to year. HSAs ensure that workers have the health insurance coverage they need plus the money to pay for day-to-day medical care, all while providing them with an incentive to save for their future health care needs.

Addressing the underlying causes of rising healthcare costs would, of course, complement the effort to improve cost containment. In that regard, tort reform, discussed below, is vital. Current malpractice litigation often fails to compensate people who should be compensated and rewards those who do not experience malpractice. In the process, it also dramatically raises the costs of all doctors and healthcare providers, regardless of their records, by increasing liability insurance premiums. Equally important, it raises the cost to the consumer and to the employer in manufacturing by encouraging costly and wasteful "defensive" medicine.

Need for Tort Reform

Perhaps no single issue drew more heated comments from manufacturers than the need for tort reform. Manufacturers pointed to a system that drove insurance costs higher even for firms that had never had lawsuits filed against them or had never put hazardous products on the market. Rick Kelly of Pellerin Milnor Corp. explained at a roundtable in New Orleans, La., that his firm had recently renewed his product liability insurance and was obliged to pay an annual premium worth 30 percent of the coverage itself. As Kelly put it:

We need tort reform real bad. We just recently had our insurance renewed for the following year. A $1-million product liability insurance premium gives you $3 million in coverage. That's insane. That's absolutely insane.

These comments only begin to describe the ways that tort costs debilitate businesses. Manufacturing firms pay "tort taxes" in several ways. First, manufacturers pay significantly higher costs for employee healthcare benefits, due to increasing medical liability costs. Second, manufacturers pay as product liability and other tort claims increase the cost of general liability insurance. And third, manufacturers pay in the form of legal fees even

when there is no merit to claims and manufacturers ultimately prevail in litigation—a problem that is only exacerbated by the growth of frivolous shareholder class-action suits.

The indirect costs of tort litigation are also significant—particularly the time spent by managers and employees, who would otherwise focus on improving operations, raising productivity, and expanding sales. Giff Kriebel of BAE Systems put that part of the tort system in perspective at the roundtable in Manchester, N.H. He said, "I can think of nothing that is more non-value-added than all the litigations that all of us have to go through. . . . The time it takes and distraction that it causes is absolutely huge."

The basic reason for manufacturers' concern about the civil liability system is the dramatic increase in tort claims and awards. Manufacturers have become outsized targets, as plaintiffs' lawyers consider operating companies' "deep pockets" of insurance and capital. From a personal injury lawyer's perspective, manufacturers represent desirable defendants because juries can more easily sympathize with a claimant by assigning blame to a seemingly impersonal corporation regardless of fault, assumption of risk by the plaintiff, or contributory negligence.

The tort system significantly undermines the competitiveness of U.S. manufacturers. The awards have driven insurance premiums higher and, in instances when liability insurance proved cost prohibitive, the insurance premiums have driven firms out of business.

The examples of tort claims cited by manufacturers attending the Commerce Department's roundtables were striking. In many instances, the connection between the plaintiff's injury and the product put on the market by the defendant manufacturer was dubious or nonexistent. From these types of tort claims, it is difficult to reach any conclusion other than that the company in question was targeted simply because the plaintiff's counsel identified it as the deep pocket from which the lawyer could maximize the award.

Consumers, workers, and investors all pay for excessive claims of the current tort system. Tort costs amount to a tax on consumption, wages, and investment. Clearly, tort costs make U.S. manufacturers less competitive, increase the risk of bankruptcy, and are a significant drag on the American economy.

Just as important is the fact that the current system also fails to deliver for those who are injured and deserve compensation. Only 20 percent of direct tort costs actually go to claimants for economic damages, such as lost wages or medical expenses.[10]

the basic reason for manufacturers' concern about the civil liability system is the dramatic increase in tort claims and awards

The U.S. tort liability system is already the most expensive in the world; its cost is more than double the average cost of such systems in other industrial nations, as measured in GDP share. The consulting firm of Tillinghast-Towers Perrin published findings that in 2002, the U.S. tort system cost $223 billion—approximately 2 percent of the nation's GDP.[11] Similarly, the U.S. Chamber of Commerce recently released a study showing that a state's tort liability system has a "statistically significant" impact on its economic development, which in plain terms means slower economic growth and fewer jobs, particularly in manufacturing.[12]

It is crucial to understand that none of these studies capture anything more than the direct outlays of existing firms, such as the payment of liability insurance premiums. Although those costs continue to rise dramatically, they understate the impact on manufacturers and the cost to

the U.S. economy as a whole. These studies do not capture the value of the products that otherwise would have been developed or other opportunities that manufacturers have forgone because of litigation risk.

Manufacturers stated that commonsense legal reforms are crucial to bolstering manufacturing competitiveness. Although tort liability is most often a function of the common law of each state, a better balance needs to be struck. In fact, individual states are already developing models of tort reform in an effort to maintain their manufacturing bases.

Wisconsin's efforts at reform were touted at the Commerce Department's roundtable in Milwaukee as one of the reasons for manufacturing firms staying despite higher taxes and relatively broad regulation. As explained at the roundtable, the reforms in Wisconsin did no more than restore some of the balance that previously existed in U.S. tort law, as opposed to the strict liability standards enacted in many jurisdictions.

One particular issue on the legal front dwarfed all others: the ongoing asbestos litigation, which continues to create a great deal of uncertainty for manufacturers in the marketplace. The point raised by many manufacturers was hard to dispute. When asbestos was first installed as a safety device to retard the spread of fire in many factories, no one knew the potential danger of long-term exposure to asbestos. The product was not subject to regulation by the government, nor was there any warning to manufacturers regarding the risks inherent in its use.

But now, many years later, the multiple class-action lawsuits filed over the use of asbestos have created a legal and financial quagmire. While the litigation continues, affected individuals in American society are not receiving any assistance to cope with the medical bills they face. And the continuing litigation remains a cloud over the entire manufacturing sector.

The comments of Dow Chemical's Gene Reinhardt at a New Jersey roundtable put the problem in context:

Asbestos litigation that continues after so many years . . . is a problem for society in that . . . the victims of asbestos are not the ones getting the help. We'd like to see that we get some legislation that would protect the victims now and in the future and make the system fair. It is chaos now, with litigation coming from all directions that is damaging the economy and undermining the security of jobs and pension systems.

Tort reform should focus on three areas. The first is the critical need to cap medical malpractice awards in ways that ensure that those deserving compensation get compensated. The second is the need to restore the balance that previously existed in tort law: meaningful reforms are required that would hold individuals accountable for their own actions in the use of products, rather than holding manufacturers strictly liable for any injury suffered in proximity to their products. And the third area is the need to resolve the litigation over asbestos-related injuries by ensuring that those deserving compensation receive it. Such class-action suits remain a contingent liability for U.S. manufacturers, making it hard to attract capital and liability insurance for their current operations.

Reducing Regulatory Costs

At the roundtables, manufacturers frequently mentioned the issue of regulatory costs and the relative burdens they place on U.S. firms versus their competitors. An OMB study found that regulatory costs were 3.7 percent of GDP in 1997.[13]

Since manufacturing tends to bear a greater share of regulatory costs than other sectors, it is safe to assume that roughly 4 percent of manufacturing GDP goes to compliance. Of this, about half of

the cost is for compliance with environmental regulations; the remainder is for compliance with workplace safety and product safety requirements, as well as for the time spent filling out government paperwork and keeping records.

One measure of the economic cost of compliance is the cost to government of managing regulatory programs and the consequent drain on tax revenues which that effort represents. Total federal budget outlays for regulatory compliance activities have almost doubled in the past 13 years, from $13.7 billion in 1990 to $26.9 billion in 2003 in real terms.[14] Those costs cover all regulatory activities, from trade and customs, to consumer safety, to securities laws. They do not include the cost to the private sector of compliance, which can be many times greater.

From a manufacturer's perspective, particularly that of a small or medium-sized business, the most common compliance costs are related to environmental regulation, workplace safety, and tax compliance/employment rules. The Small Business Administration's Office of Advocacy has conducted the most comprehensive study of those costs.[15] The study found that the total cost of complying with regulations in those areas in 1997 amounted to $147 billion annually, or a cost per employee of $7,904. Of the individual categories that made up that total, environmental compliance costs took the largest share. Environmental costs accounted for nearly 50 percent of the total: $69 billion in 1997, or a cost per employee of $3,691.[16]

Significantly, the cost of compliance with such rules falls hardest on businesses with fewer than 20 employees. According to the SBA study, small manufacturing businesses reported that compliance with workplace rules amounted to a cost of $16,920 per employee. For larger firms, that cost dropped by more than half, to $7,454 per employee.[17]

Further, taken together, all compliance costs appear to have increased significantly since the SBA's study of 1997 data. According to a recent NAM study, the total burden of environmental, economic, workplace, and tax compliance is $160 billion on manufacturers alone, equivalent to a 12-percent excise tax on manufacturing production. This reflects an increase of about 15 percent over the last five years.[18] In short, regulatory compliance costs are rising faster than income in the manufacturing sector, which implies a loss of cost competitiveness or, at a minimum, a negative offset to the benefits of the extraordinary productivity gains and efforts by manufacturers to cut costs under their direct control.

Rising Energy Costs

Another point of concern for manufacurers is the rising cost of energy, particularly natural gas. Manufacturers depend on affordable, reliable energy. Industry uses more than one-third of all the energy consumed in the United States, the majority of which is natural gas and petroleum, followed by electricity. In all sectors, energy prices have a significant effect on operations and product prices.

Manufacturers uniformly criticized the failure to enact the legislative aspects of a comprehensive and coherent energy plan that would increase America's energy independence while yielding energy prices that would help ensure manufacturers' long-term competitiveness. Don Wainwright of Wainwright Industries put it in straightforward terms at a roundtable in St. Louis, Mo., explaining that manufacturing is "one of the biggest users of energy." He emphasized that, in his view, the biggest challenge facing his industry is "energy policy, which is before the Senate right now."

As it stands, America "faces the most serious energy shortage since the oil embargoes of the 1970s," directly attributable

to a "fundamental imbalance between supply and demand."[19] From 1991 to 2000, Americans consumed 17 percent more energy than they had in the previous 10 years. During that same period, U.S. production rose only 4.9 percent; the difference accounted for by imports.[20]

America's energy challenge will continue to grow as the U.S. economy grows. Energy consumption in the United States is expected to rise "by about 32 percent by 2020."[21] While the Bush administration has pursued successful executive actions to increase domestic access and production, there is no prospect, in the absence of congressional action, for significant new U.S. production.

Conservation and efficiency can help, and U.S. manufacturers lead the way in producing and implementing technologies designed to foster efficiency and reduce costs. Those efforts pay big dividends. Today, it takes only 56 percent of the energy required to produce a dollar of GDP as it did in 1970. The nation's "energy intensity" (the amount of energy required to produce a dollar of GDP) has declined in recent years and is expected to decline further, at a rate of 1.5 percent yearly, through 2020.[22] With appropriate capital investments, conservation could reduce that figure even further. Yet in the short run, rising energy prices and disruptions in energy supply reduce profits, production, investment, and employment for U.S. businesses. In practical terms, absorbing the cost of high and rising energy prices means deteriorating profit margins. And by reducing a manufacturing company's cash flow, high energy costs restrict a firm's access to capital needed for new plants and equipment.

rising energy prices and disruptions in energy supply reduce profits, production, investment, and employment for U.S. businesses

The impact of high energy costs on the demand side also negatively affects manufacturers. With rising energy costs taking a greater percentage of consumers' budgets, consumer spending slows, lowering demand for manufactured goods. That contraction in demand feeds back into the manufacturing sector in the form of lower sales, lower use of capacity, and an inability to take advantage of the economies of scale that manufacturers' existing capital investments would otherwise afford.

For energy-intensive industries such as paper products, plastics, and chemicals, the impact of rising energy costs, particularly the cost of natural gas, is compounded. At the Commerce Department's roundtable in Trenton, N.J., Gene Reinhardt, of Dow Chemical Company, explained:

Those of us in the chemical sector are getting a double hit with natural gas, since we use it both for our fuel and as raw material for our chemicals. . . . Natural gas prices are the highest in the world and drain all of the industry. Consumers are spending $70 billion more in natural gas costs in 2003 than they did last year in 2002. So it is not only an emergency or an emergent issue for Dow Chemical; it is really an issue for all of the industry in America.

Additionally, energy supply disruptions can pose a significant problem even in industries in which energy is not an important component of the total cost of the goods or services produced. Many businesses require a high-quality, reliable source of power. Even a brief loss of power can impose significant costs on technology firms. Products or product inputs may be damaged or destroyed, or production runs may be interrupted.

The effects of the blackouts in California several years ago illustrate this. A survey of small businesses, which was conducted by the National Federation of Independent Business in February 2001, found that more than half of the firms surveyed that had experienced blackouts in California were forced to reduce or shut down business operations altogether during the blackouts. About one-third of the firms surveyed lost sales. Roughly one-fifth

said materials were aged or destroyed. And nearly two-fifths absorbed additional costs, such as in wages and benefits, for work that was not completed.[23]

Plainly, the problems manufacturers face because of rising energy costs and disruption have been a long time in the making. They are the product, like many of the other issues manufacturers raised during the roundtables, of nearly a decade of neglect. To put it in perspective, it helps to understand that not a "single major oil refinery has been built in the United States in nearly a generation." By some estimates, the United States needs "38,000 miles of new gas pipelines, along with 250,000 miles of distribution lines" to match the demand for natural gas with supply.[24]

It will take a comprehensive, long-term strategy to address the energy challenges facing America's manufacturing sector, and an equal attention to modernizing the U.S. energy infrastructure, increasing energy supplies, and improving energy conservation and efficiency. And it will require a multifaceted approach. The nature of the problem requires first that government ensure that energy markets work well; for example, by moving ahead with the restructuring of electricity markets where necessary to ensure that energy savings are passed on to the consumer. The problem may also merit a hard look at increased federal funding for research and development of renewable energy resources and energy-saving manufacturing techniques and products, tax incentives for the development of new technologies, and greater coordination among the various levels of government involved in the approval and development of new energy supplies and infrastructure.

Taxes

Manufacturers pointed to federal, state, and local taxes as one of the key factors inhibiting future investment in American manufacturing. Manufacturers attending the roundtables stressed the importance of cutting taxes in a way that would stimulate consumer demand and business investment, which has lagged even during the recovery from the recent recession.

The other frequently made point is the need for certainty. What manufacturers attending the roundtables see in the marketplace is an unwillingness of their

customers to make the investments that will lead to purchases of capital equipment and a strong recovery throughout the manufacturing sector. That unwillingness is inconsistent with the strong consumer demand that continues to pull the economy along through the recession and into a stronger recovery.

Manufacturers explained that the other forces inhibiting investment are related to the general uncertainty regarding the strength of the recovery, concerns regarding the effect of the events of September 11, 2001, the rising cost of security in their aftermath, and to the more uncertain international economic environment. But the one concern manufacturers identified that is entirely within the control of

the federal government is the uncertainty created by frequent changes in the tax code and the often-conflicting policies that the tax code represents. U.S. manufacturers put a premium on getting the right rules and rates in place and then making them permanent so businesses can invest with greater certainty in terms of the treatment of income earned on their investments.

Interestingly, the most salient but least-understood tax issue involves the international provisions of the Internal Revenue Code. Far from encouraging companies to move offshore, manufacturers believe the IRC contains significant penalties on income derived from foreign investment that sometimes lead to the double taxation of foreign-source income. In a global economy, manufacturers understand that their successes will increasingly depend on their ability either to export (which often requires investment abroad in marketing) or to sell to U.S. firms that compete in global markets (which also increasingly depends on the ability to invest, produce, source, and sell abroad). In short, manufacturers recognize that the government should not impose penalties on those American companies that are the best U.S. competitors in world markets, even when the exact penalties imposed by the Internal Revenue Code are not always apparent to purely domestic producers.

manufacturers attending the roundtables stressed the importance of cutting taxes in a way that would stimulate consumer demand and business investment

The basic point in support of tax reform was made by Curt Magleby of Ford Motor Company at a roundtable in Washington, D.C.:

Our tax code internationally was developed in the 1940s and 1950s [and] updated in the 1980s and represented a completely different environment. For us to be competitive domestically, we've got to update the tax code on the international side.

In addition to the IRC's outdated international provisions, manufacturers identified numerous ways in which the code may distort investment decisions. They cited the alternative minimum tax, which imposes significant extra costs on manufacturers and results in almost no additional revenue for the federal government. In addition, depreciation schedules in some sectors may not reflect high rates of innovation.

Assessing the full impact of the investment distortions contained in the current IRC requires an understanding of how the IRC's impact reaches well beyond the federal system of taxation. Because many state tax codes are ultimately based on definitions of income that flow from the federal tax code, the distortions of the IRC perpetuate themselves at the state level.

Several manufacturers went considerably further with respect to state and local taxation, suggesting changes to the most prevalent forms of state and local taxation. Many states and localities rely more heavily than the federal government on property and other taxes that are fixed in dollar amounts or in the form of a fixed percentage of asset value. Those taxes become far more regressive in an economic downturn; although revenues and income fall, the liability for tax does not. The net effect is an increase in tax on manufacturing firms as a percentage of income. The manufacturers' comments suggested a need to shift from taxes based on fixed values to those tied to income, and to rely more heavily on consumption as the basis for defining income subject to taxation.

Lastly, with respect to taxes, there is broad recognition of the advantage conferred on foreign manufacturers by the interrelationship between the current U.S. tax system and international trade rules. American manufacturers are well aware that most of their competitors are located in countries that rely more heavily on consumption, rather than income, as the basis

for taxation. In practical terms, foreign governments apply taxes solely to income earned on sales in their jurisdictions and will rebate any taxes that apply to exports.

By relying more heavily on income as the basis for taxation, and in taxing U.S. manufacturers on their worldwide income, the U.S. system contains no simple means of ensuring that U.S. exporters receive comparable treatment. The international trade rules reinforce that disparity because they allow the rebate of indirect taxes (that is, taxes on consumption such as value-added taxes) but prohibit the rebate of any direct taxes on income, on which the U.S. system relies so heavily. Although manufacturers believe recently passed changes in federal tax law have helped, manufacturers maintained that those changes do not go far enough to offset the underlying inequity between the tax treatment of most foreign manufactured goods and those produced in the United States.

The basic lesson to draw from the roundtables regarding tax is the need for both short- and long-term efforts to reduce the cost and uncertainty that the IRC creates for American manufacturers in their operations and their pursuit of investment capital needed to maintain their competitiveness. In the short term, the most significant step would be to make the recent tax cuts permanent in order to increase the certainty of the business environment in which manufacturers operate and the relative attractiveness of investing in manufacturing in the United States. In the long run, manufacturers called for an intense focus on tax reform—reform that reduces rates, reduces investment distortions, and simplifies the IRC to reduce the cost of compliance.

Reinforcing America's Technological Leadership

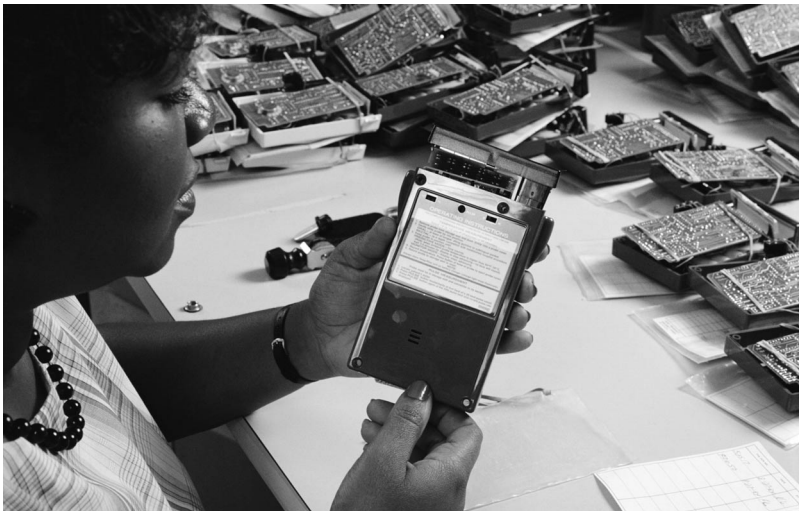
At every roundtable, American manufacturers expressed their concern for America's contined leadership in technology and its ability to produce the workforce needed to maintain U.S. excellence in manufacturing. Manufacturers continually emphasized the important role that technology plays in serving customers and ensuring cost competitiveness. Lou Auletta of Bauer, Inc., made that point at the New Britain, Conn., roundtable:

We're in the process of developing new technologies that are going to save our customers money, and also technologies and enhancements that are going to make us more efficient in production, both from the design aspect and the manufacturing side.

Manufacturers understand that leadership in innovation and technology are key to their future competitiveness. William Fee of Magnesium Elektron, Inc., at the Trenton, N.J., roundtable spoke for many in describing the process that his company had gone through to remain competitive, and the extent to which it increasingly depends on investment in technology:

Our response has been to shift our business towards more technically sophisticated applications, for example, catalysts, high-tech ceramics, and water treatment. To achieve competitive advantage in these new markets, we corner a strong commitment to research and development and ongoing innovation in products and the processes needed to manufacture them. To be successful, this strategy requires significant investment in scientific talent, laboratories and analytical equipment, intellectual property patents, and following the pursuit of same information technology to control manufacturing processes, and even the most difficult of all is step change in the level of detail engineering support necessary to manufacture products to ever-tightening specifications and consistency demanded by our customers.

From the perspective of manufacturers, there is a need for continuing investment in research and development of new products so that manufacturers remain one step ahead of the competition. The fact that technology and innovation are key to the future of manufacturing simply reinforced the concern many manufacturers had for the declining investment in research and development as a percentage of GDP, both in industry and in government. Mike Mauer of Sikorsky Aircraft Group made that point at the roundtable in New Britain, Conn., noting that U.S. manufacturing's competitive edge depends on "great new technology . . . that's a result of some of the investments that were made 20, 30 years ago." Mauer described the decline in investment in research and development as "worrisome," recognizing that future competitiveness is "really about the technology and the investment up front and . . . the engineering and development that ends up leading" manufacturing toward a more competitive future.



Many of the comments focused on making the Internal Revenue Code's research and experimentation credit permanent. At the roundtable in New Britain, Conn., Murry Gerber, former chair of NAM's Small and Medium Manufacturers Group, stated what was a uniform opinion among manufacturers:

One is the R&D tax credit, which should be made permanent. We've been arguing about this for years and years, and it's critically important because if you want to know where manufacturing is going to be in 20 years; it's going to be involved with the highest-tech work that's possible in the world that can't be done in other nations where they pay 80 cents a day or whatever to lesser skilled workers.

As noted at the outset, U.S. manufacturers continue to invest in innovation and technology, accounting for the majority of R&D dollars spent in any given year. The roundtable participants also emphasized the importance of government's investment in the basic sciences that lead to later innovations in manufacturing. They view government's role as catalytic—sparking many of the ideas that manufacturers later transform into consumer products.

Manufacturers expressed concern over the declining commitment of federal government funds for directed basic or generic technology research of the sort that drives innovation in manufacturing. At the Washington, D.C., roundtable focused on the future of manufacturing, many of the attendees highlighted the well-known role that the Defense Department and the National Aeronautics and Space Administration played in research on electronics, computing, and communications. What manufacturers seek is focus within the government's budget on research that would yield the same spillover effects that the earlier work on defense applications and the space program provided.

U.S. manufacturers suggest that the federal government's ability to provide the means necessary to maintain the technological edge of the United States needs to be strengthened. At the roundtable in Minneapolis, Minn., which focused on manufacturers in the medical device industry,

many of the participants commented on the need to improve the responsiveness of the Food and Drug Administration to the requirements of a rapidly evolving industry. Currently, the FDA is grappling with the question of how best to regulate the introduction of biotechnology into the marketplace. In the view of some manufacturers, the inability to match the speed of innovation in industry with innovation in government is becoming a drag on what provides the United States its primary advantage in the manufacturing sector—continuing innovation.

Education and Skills

The President's Council of Advisors on Science and Technology (PCAST) recently completed the first phase of a study gauging the health of U.S. high-tech industries. The PCAST report emphasizes a concern that motivated many of the participants in the Commerce Department's roundtables: with continued outsourcing of manufacturing functions to lower-cost alternatives outside the United States, the United States risked losing the "innovation infrastructure of design, research and development, and the creation of new products and industries."[25]

George Scalise, president of the Semiconductor Industry Association and chairman of the PCAST subcommittee that drafted the report, put it this way:

Foreign governments—and especially China—have done an effective job of creating a rich environment for the manufacture of electronics and semiconductors, and the implications are that U.S. high-tech leadership is not guaranteed. That is all there is to it. We have it. We enjoy it. We have been here forever, but it is not guaranteed going forward. If we lose that leadership and if we don't have that as a driving force in our economy, it will have an impact on our ability to maintain and further improve our standard of living in the future. That is a reality.[26]

The numbers bear out that other countries are increasing their technological sophistication. The United States, until recently, consumed 40 percent of the world's semiconductor production, meaning that American firms were manufacturing goods containing 40 percent of the world's semiconductors. In the past two years, the U.S. share has dropped to 20 percent, whereas Asia now represents 40 percent of the world's semiconductor consumption.[27]

One of the principal advantages Asia now holds is a very well-educated technical workforce. Both China and India are graduating high numbers of talented scientists and engineers. In 2002 alone, 58 percent of all the degrees awarded in China were in engineering and the physical sciences, compared with 17 percent in the United States. China's 219,600 engineering graduates accounted for 39 percent of all college graduates, whereas U.S. engineering graduates, a total of only 59,500 engineers, represented a mere 5 percent of all college graduates in the United States.[28]

Particularly troubling is that comparative advantage in today's manufacturing sector has less to do with physical endowments, such as natural resources, than it has to do with human capital. According to some U.S. firms' estimates, by 2010, as much as 90 percent of their research and development, design, and manufacturing will be conducted in either China or India. There is frankly little government can do through tax, cost reduction, and other policies to prevent this shift toward Asia if the United States is not at the same time providing the talent pool necessary to continue spurring innovation.

The discussions of education, training, and workforce needs in manufacturing at the Commerce Department's roundtables raised the same concerns. Beyond the incentives needed for investment in

research and development, manufacturers stressed the importance of a skilled workforce in maintaining America's technological leadership. Chris Bollinger of Bollinger Shipyards, Inc., at the roundtable in New Orleans, La., identified the "biggest problem that we see" as the "lack of qualified labor." He indicated that this observation was true even during the recent recession. He expressed concern about what that meant as the manufacturing sector recovered, calling the lack of qualified labor "our biggest issue and our biggest . . . roadblock to continuing to grow."

From the perspective of most manufacturers, the effort to maintain America's leadership in innovation and technology must begin with improvements in the basic education delivered by U.S. public schools. Many manufacturers now spend a considerable amount of time and resources simply training their workers to meet the basic skill levels that workers in other countries have attained by the time they enter the workforce.

General Motor's Mustafa Mohatarem identified the problem at a Washington, D.C., roundtable, noting, "the auto industry was always considered a high-wage industry that would hire people without much education. Your physical skills were much more important than your mental skills. That clearly has changed." To meet the challenge that this change presents will require continuing improvement in the basic education America gives all students through high school.

Most manufacturers recognize, however, that even a solid high school-level education is not enough to remain relevant in today's manufacturing sector. Tim Timken of the Timken Company made that point at a roundtable held in Washington, D.C., concerning the future of manufacturing. He emphasized that his company, the world's leading manufacturer of roller bearings, was increasingly looking for workers who had training beyond high school, up to and including four years of college, for entry into the company's workforce. The reason for that shift is the increasingly complex capital equipment involved in today's manufacturing processes.

Manufacturers stressed the need to concentrate increasingly on readying students for the requirements of modern manufacturing and the modern marketplace. They emphasized the potential threat to U.S. technological leadership from declining numbers of engineering graduates and high school graduates with adequate technical skills to qualify for even entry-level jobs in manufacturing today.

Phyllis Eisen of the National Association of Manufacturers captured the views of many when, at a Washington, D.C., roundtable, she offered the following perspective:

We are in a highly competitive state with other countries that have taken education very seriously for a very, very long time—from small countries like Denmark, [which] have been at the peak of pushing kids in the educational world, to China, [which] graduated close to 40 percent of engineers as undergraduates last year. We graduated less than 6 percent. Now this should be a frightening thought to all of us. Manufacturing is an engineering-based industry, and whether we're training technicians at a very high scale or high performance production workers or engineers and chemists or whatever . . . we're not doing it fast enough or good enough, and we have to put as much pressure on the education community and ourselves to work with them.

The role of talent is critical to the future viability of America's manufacturing sector. The 2001 *U.S. Competitiveness Report,* published by the Council on Competitiveness and co-authored by Professor Michael Porter, stated that "the priorities for sustaining U.S. economic growth and competitiveness center on strengthening the nation's innovative capacity and skills of the American workforce."[29] The report

further stated that "the nation's ability to commercialize innovation—and further productivity growth—rests on the skills of its workers. But, the bar for skills is rising-and demand for higher skills is outstripping supply."[30] Higher-level skills are essential to enable productivity and commercialize innovation.

Worker skills and education will be a dominant, if not decisive, factor in America's ability to compete in the global economy. The United States' ability to engage in the world economy must be accompanied by a commitment to boost the skills of every worker. Educational institutions must respond by giving every American the tools to prosper in the global economy.

The final component that manufacturers focused on in their comments about workforce needs and training was the need to ensure lifelong learning. Nowhere is that need more acute than in the case of workers faced with a layoff because of changes in the underlying economics of their industry.

Traditional trade adjustment assistance programs, though helpful in those specific instances, may not actually address the circumstances faced by most workers laid off during the recent recession who have yet to be called back to work simply because the manufacturer has learned to produce the same quantity of output with fewer workers. That drive to innovate and raise productivity may or may not be spurred by competition from imports, but that debate is increasingly irrelevant in light of the changes under way in the manufacturing sector. There are a number of federal as well as state programs directed at training and retraining workers. The Workforce Investment Act, passed in 1998, has gone a long way toward streamlining and consolidating the efforts of a wide variety of federal job-training initiatives. However, more change is needed to make the system more responsive in a dynamic and rapidly changing economic environment. As a part of that effort, it would also be helpful to work toward programs that actually encourage re-employment. It is widely understood that the most valuable training and retraining occur on the job. Being out of work, even briefly, means that an individual's skills are eroding. Programs that put a premium on helping individuals find new employment may be the most important form of adjustment assistance.

Communities and Economic Development

A separate topic is the adjustment of communities. Recent stories of plant closures in the hard-hit textile mill towns throughout the Southeast reinforce the need to ensure closer linkages between community economic-development initiatives and workforce development programs. As a practical matter, job training programs are useful only if there are jobs available for those pursuing the training.

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Consistent with the need to upgrade the skills of existing and dislocated workers is the need to ensure that there is a diversified economy capable of employing those workers. Areas with diversified economies are more stable and generally provide for a higher standard of living for their citizens. Communities that are overly dependent on a single industry are at greater risk for economic dislocation.

There is considerable room for communities to engage in thoughtful and proactive economic-development planning. Establishing a comprehensive strategic plan for economic development is a critical element in maintaining a community that can grow, thrive, and endure changes in the economic environment. Coordinated economic development programs can help build a more

favorable business climate to attract private investment.

Economic development planning is, furthermore, not just a strategy for adjustment in a particular industry. A sound approach to economic development can help promote competitiveness, innovation, and increased productivity among existing businesses or industries in the community as well.

One of the development concepts manufacturers highlighted is the concept of clustering. Economically healthy regions can often foster competitiveness and innovation by focusing on industry clusters—groups of interrelated firms and industries. America's ability to produce high-value products and services that support higher-skill and higher-wage jobs largely depends on the creation and strengthening of these competitive clusters. Significantly, the concept of clusters both draws on and reinforces the benefits of funding for research universities, which often form the core of such clusters.

In general, there is a need for a more aggressive look at how existing economic development programs could best reinforce a community's development of a sound approach to building a more diversified and strengthened local economy. Reinforcing the focus of communities on building more diversified economic bases is one means of both attracting and retaining manufacturing companies.

Leveling the International Playing Field

Perhaps the key short-term demand of U.S. manufacturers is for a level international playing field. They stressed the importance of international economic policies, on both finance and trade, which ensure that U.S. manufacturers have a fair opportunity to compete.

Disparities in the Cost of Doing Business

According to manufacturers attending the roundtables, one key reason for leveling the international playing field is to address the differences in the cost of doing business within the United States to the costs of doing business in other countries. Steve Prout of Alpha Q at the New Britain, Conn., roundtable cited the earlier discussed issue of rising healthcare cost as contributing significantly to increased indirect costs that affect competition. "Many of our companies have seen medical healthcare cost increases of 20 percent or greater. You cannot sustain that year after year . . . it's just impossible."

Those and other cost differences confront U.S. manufacturers with stark choices and create an incentive to shift manufacturing abroad. As Joe Fusco, of Novus Fine Chemicals, put it at the roundtable in Summit, N.J., "I could throw up my hands. I could shut my factory. I could turn my factory into condominiums . . . and then just ship my manufacturing overseas, and—guess what—I can make . . . more money."

What Fusco added was also representative of most American manufacturers. While acknowledging the differences in costs that are driving many manufacturers offshore, Fusco also stressed:

I don't think that that's the right way to go. That's just my opinion. I'd like to think that we can be creative and innovative. . . . It's really about just . . . doing a good job and being productive and [competitive]. And we do . . . But the only thing I'm complaining about is this uneven playing field that I see.

Economic and Trade Policy and Manufacturing Interests

Roundtable participants raised the issue of exchange rates, in particular China's peg of its currency, the yuan, to the dollar. Many manufacturers expressed

concern that exchange rates with a number of trading partners are set by government intervention rather than market forces, leading to lower U.S. exports and stronger import competition. American manufacturers pressed for the market to set the terms of competition, not governments.

Manufacturers attending the roundtables made the same basic point about trade. What most manufacturers asked for was not for protection from international competition, but to level the playing field by lowering trade barriers abroad. As Jay Jackson of Stuller, Inc., a privately held jewelry manufacturer and wholesaler, pointed out at the New Orleans roundtable:

Mexico went to zero percent [tariffs] on precious jewelry in January of 2002. And first quarter of this year, we actually had an 8 percent-plus balance of trade surplus of greater exports going to Mexico than were actually imported, and that's the first time. So we can compete if we're allowed to compete where we have the competitive edge, and we can compete with the low labor cost, but we just have to have that level playing field.

There were serious criticisms of U.S. trade policy. Some manufacturers expressed continuing concerns about the impact of trade agreements, such as NAFTA, and questioned whether continued U.S. participation in the World Trade Organization is warranted.

Other criticisms reflected dissatisfaction with the terms of the agreements themselves, particularly the extent to which they opened the U.S. market to goods made with low-cost labor. Those criticisms were offset, to an extent, by the recognition that, in today's manufacturing, direct labor costs in the form of wages actually represent a small portion of the total cost for most manufacturers, with certain exceptions such as apparel manufacturers.

Further, most manufacturers argued that the global marketplace is here to stay and that the United States is better off using the tools available to ensure that competition in that global marketplace is on even terms. For most, it was clear that one of those tools is trade negotiations, and many applauded the U.S. initiative within the WTO to eliminate tariffs altogether as the most direct route to ending the current disparity.

Stephen Collins of the Automotive Trade Policy Council, which represents U.S. automakers on international trade issues, echoed that basic point at a roundtable in Washington, D.C.:

The greatest levels of growth are going to be outside of the United States. That's where the U.S. government does have an extremely important role in helping to open those markets through the WTO, through bilateral negotiations, and through regional negotiations. And the reason it's so important is because those governments will try to protect their markets and try to protect the development of their markets during that same period.

That basic point is worth underscoring. Manufacturers understand that tariff protection abroad is not only a barrier to its exports, but it also represents a means of subsidizing foreign manufacturers by limiting the competition they face. In fact, the disparity in tariff rates applied by foreign countries compared with the tariffs applied on goods entering the United States was, apart from the difference in operating costs, the most common example that U.S. manufacturers pointed to in terms of the lack of a level playing field.

many manufacturers expressed concern that exchange rates are set by government intervention rather than market forces

Kimberly Hayden of Supreme Tool & Die at the roundtable in St. Louis, Mo., expressed her strong dismay at the disparities

in tariff rates, stating what many others voiced at roundtables across the country:

In 2020, if things don't change, we may not be here. That playing field needs to be evened out in order for us to compete globally. I can compete in the United States. I can't compete with the Chinese imports, and I can't import or export my product over there. . . . Bringing a die cast tool into the United States, the total taxes equal 3.9 percent. Bringing a die cast tool from the U.S. into China, the taxes equal 30 percent.

Tariffs are not the only trade barrier that U.S. manufacturers face. Another salient example is the lack of adequate intellectual property protection and enforcement in the markets of some of America's major trading partners. For U.S. manufacturers, protection of intellectual property is not an abstract concept. America's competitive edge ensues directly from innovation and rising productivity. Intellectual property protection is the best means for ensuring that American manufacturers enjoy the benefits of their investments in research and development and of their efforts to raise productivity. It is also the means best calculated to ensure that they can enjoy the investment they make in customer service and creating a brand name that distinguishes them from other manufacturers.

As Frank Johnson of the Manufacturing Alliance of Connecticut underscored at the New Britain, Conn., roundtable:

We understand what free trade was designed to be, but free trade isn't free. We want free trade. If there is a tariff on tea going into China and not coming into the United States, that's not fair. If a manufacturer in China can steal pictures from a Connecticut manufacturer's advertising brochure and put them on their Web site and use the company's trademark name to sell products in China, that's not fair. We want fair trade. We understand free trade, but we want it to be fair. We want to level the playing field in every place that we can. We want the Chinese and other competitors to honor trademark laws. We want them to respect . . . to show the same respect to U.S. manufacturers that we show to them.

Indeed, U.S. manufacturers indicated a willingness to compete in a global market, but they want to make sure that the ground rules are the same for everyone and that those ground rules are enforced.

Toward this end, the administration has undertaken a number of significant initiatives to address this issue: an increased focus on intellectual property rights enforcement, heightened efforts to promote the adoption of U.S.-developed technical standards, focused efforts on enforcement and compliance, particularly with respect to China, and expanded export promotion activities.

The rapid globalization of world markets presents American manufacturers with new challenges and opportunities. Falling trade barriers create opportunities in two forms. First, lower barriers to trade open markets for American exports. The United States is already one of the most open economies in the world.[31] Lowering barriers to trade largely means lowering barriers to trade abroad, where significant barriers still exist.

Second, increased trade brings stronger competition, which represents a double-edged sword for U.S. manufacturers. Although it can place stiff demands on U.S. manufacturers, competition in trade also ensures that American manufacturers remain competitive. Increased competition demands higher productivity, greater efficiency, and greater innovation. In today's global economy, the industries that engage in the constant process of innovation—lowering costs, creating new products, and serving new markets—represent market leaders.

Global competition represents an opportunity for American manufacturers in one other respect as well. Opening mar-

kets abroad allows U.S. manufacturers to take advantage of economies of scale that they would not enjoy if they were limited to the U.S. market alone. It also delivers high-quality, low-cost inputs that are necessary to maintain the competitiveness of American manufacturing in many sectors.

In many industries, particularly those in which American manufacturers maintain a significant technological or other competitive advantage, there is growth in exports. During the roundtables in Chicago and Minneapolis, several firms indicated that more than 50 percent of their sales are now offshore. That trend holds true for firms throughout the high-technology sector of the American economy.

Most of the manufacturers with whom Commerce Department officials met understand the benefits of trade and indicated that much of what they produce is destined for foreign markets. However, some manufacturers believe that the federal government is not aggressive in defending the interests of American manufacturing in its international economic and trade policy. They argued that the broad opening of U.S. markets through NAFTA was evidence that federal government officials did care about U.S. manufacturing or its competitiveness.

Instead of the terms of the deal, critics of NAFTA focus on Mexico's subsequent devaluation of the peso, which had a far more significant impact on the terms of trade between Mexico and the United States than did cuts in tariffs or quotas. That fact is reflected in the movement of U.S. trade with Mexico from surplus to deficit in the years immediately following the implementation of the agreement.

The lesson many in manufacturing drew from that experience is that the U.S. government, following the implementation of the trade agreement, failed even to acknowledge the implications for American manufacturing of the agreement and the subsequent peso devaluation. The balance of payments adjustment assistance provided to Mexico after the peso devaluation simply reinforced that impression.

In fact, NAFTA has proved to be a boon economically to all parties by making the U.S., Canadian, and Mexican economies more efficient. Indeed, most critics ignore the actual terms of the agreement under which Mexico had to undertake far more significant reforms and was obliged to remove more trade barriers than Canada or the United States, simply because the U.S. and Canadian markets were already largely open to Mexican products.

opening markets abroad allows U.S. manufacturers to take advantage of economies of scale that they would not enjoy if they were limited to the U.S. market alone

Even the most ardent critics of U.S. trade policy, however, were not advocating protection from import competition, nor were they looking for subsidies. Rather, they were looking for a level playing field—an equal opportunity to compete for business both at home and abroad.

Manufacturers showed support for an aggressive trade policy intent on opening markets. Such a policy does not require backing away from current trade negotiations in the WTO or in bilateral, multilateral, or regional free trade agreements. It does, however, require that the interests of American manufacturers, as well as U.S. farmers and service providers, be served by those negotiations and that the U.S. government be vigilant in ensuring that the benefits of the bargains reached at negotiating tables are, in fact, delivered.

It also requires an understanding that trade policy does not take place in a vacuum. During the latter part of the 1990s, trade policy was in a rut because of a debate about the extent to which future trade negotiations should be conditioned on labor or environmental standards. That debate prevented the previous administration from vigorously pursuing,

much less obtaining, trade negotiating authority. The debate was also one of the many reasons that the WTO conference in Seattle in 1999 failed to launch a new round of multilateral trade talks.

From U.S. manufacturers' perspective, the politics of the trade debate largely ignore the need for an ongoing effort, without the threat of coercion, to improve labor and environmental standards. There is little doubt that there is much to be gained by encouraging economic growth in the developing world. As countries develop, they tend to choose higher labor and environmental standards for themselves. Trade liberalization is one of the most promising means by which to achieve those higher standards.

Concerns Regarding the Trade Deficit

Many manufacturers point to the trade deficit, including the rising bilateral trade deficit with China, as a major concern. While the trade deficit has changed little over the past year and exports have been rising, America's trade and current account deficits reflect broad economic forces, strong U.S. growth relative to growth in America's major trading partners, and a low-inflation environment. Sustained, strong U.S. performance relative to performance abroad has also served to attract substantial capital to the United States to finance the current account deficits. At the most fundamental level, the current account deficit is related to developments in U.S. national saving relative to U.S. investment. When investment is higher in the United States than domestic saving, foreign investors make up the difference, and the United States has a current account deficit. Increased private saving and deficit reduction in the United States will work to reduce the current account deficit.

growth in the trade deficit has been driven by relative rates of economic growth and consumption, rather than the competitiveness of American goods and services

The Bush administration's international economic strategy aims for high economic growth throughout the world. At the core of this strategy are the growth-oriented economic policies being implemented within the United States. But working with U.S. trading partners to encourage pro-growth and pro-stability policies is also a central part of the administration's strategy. Good economic policies in other countries benefit the United States and the rest of the world. It is widely recognized that free markets are best able to allocate scarce resources to their most productive uses. The United States believes that the goals of raising growth and increasing stability can best be accomplished in an international financial system that relies on the principles of free trade, free capital flows, and market-based exchange rates among the world's major economies.

The world economy has strengthened over the past year. Outside the United States, growth in Japan has resumed, and prospects for the euro area brightened in the second half of 2003. The United Kingdom and Canada, as well as many emerging market countries, are also growing more strongly. Rising U.S. exports reflect this greater vitality in America's trading partners.

However, what the broader trend of weak export performance should not obscure is the fact that certain industries have faced, and continue to face, a surge in imports that, in particular sectors, has a stronger impact than the decline in exports. Textiles and apparel are primary examples. The most significant feature shaping those sectors has been the gradual removal of quotas on textile and apparel products that have protected the two sectors since the textile agreements of the early 1960s. Quotas had the effect of maintaining a relatively high level of investment and productive capacity, as well

as supporting higher price levels. They also allowed for the existence of sectors characterized by a large number of firms producing a wide variety of products. In addition, they provided an incentive for the establishment of outward processing arrangements to try to maintain industry competitiveness.

As quotas were removed pursuant to the Uruguay round of GATT negotiations, increased competition lowered prices, dampened profitability, and placed much of the previous investment in apparel under pressure from competition from abroad. In response, apparel manufacturing, which is labor intensive, began to move offshore. Meanwhile, U.S. textile manufacturing, which encompasses increasingly capital-intensive enterprises, began to see its primary customers move offshore or enter bankruptcy. The resulting decline in demand for U.S. textile production has placed the fabric makers in the same difficult financial position that apparel makers faced earlier.

The rise in the trade deficit does not necessarily indicate that American manufacturing is uncompetitive. As mentioned above, growth in the trade deficit has been driven by relative rates of economic growth and consumption, rather than the competitiveness of American goods and services. Many American manufacturers see the playing field being distorted by foreign government intervention.

Most discussions of trade begin and end with a survey of the most recent round of trade talks and what they mean for particular sectors of the U.S. economy. In the past 15 years, a dynamic has unfolded that has complemented and reinforced the impact of trade negotiations in lowering the barriers to trade worldwide as well as the opportunities and challenges lower barriers create for American manufacturers.

U.S. leadership within the context of post-World War II international economic institutions was an important component of the overall effort to ensure the future of freedom, democracy, and a market-based economic system in the midst of the Cold War. Unilateral trade liberalization toward the developing world formed an essential element of American foreign assistance strategy, which was also a tool in achieving broader foreign policy goals. In the long run, however, multilateral trade liberalization by both developing and developed countries would provide the greatest overall benefit.

But some manufacturers expressed concern that the United States has "given more than it has gotten" out of the world trading system and that foreign policy, rather than U.S. commercial interests, drives trade policy. Those views are based on the visible difference between the average tariffs in the United States and those in many markets abroad and on the obvious point that the United States has proved willing to open its market faster than the vast majority of its trading partners. Although the broader reach of U.S. foreign policy certainly was one of the motivating reasons for pursuing trade liberalization, it is difficult to point to a specific area where, as a result of foreign policy concerns, American negotiators put more on the table than they otherwise would have done. The argument also tends to ignore the active role that Congress has played in oversight of the trade negotiation process in defense of particular manufacturing industries' interests. That oversight alone has ensured that trade policy has normally been driven by commercial considerations.

It is also worth reiterating what those views ignore: the benefits of an open trading environment and the competition it brings. There is little doubt that open economies grow faster than closed economies and that competition is essential. The United States itself has, because of its openness, grown considerably faster than it otherwise would have.

Notes:

[1] Matthew B. Coffey, "NTMA Manufacturing Policy" (paper adopted by NTMA Executive Team, July, 16, 2003).

[2] PricewaterhouseCoopers, "The Factors Feeding Rising Healthcare Costs" (April 2002).

[3] Kaiser Family Foundation and the Health Research Educational Trust, *Employer Health Benefits; 2003 Annual Survey* (Washington, D.C.: Kaiser Family Foundation, 2003).

[4] Ibid.

[5] Alliance for Health Reform, *Covering Health Issues: A Sourcebook for Journalists* (Washington, D.C.: Alliance for Health Reform, 2003).

[6] That is not to say that the total cost of healthcare does not take a toll on manufacturers elsewhere. Even in systems like Canada's or Great Britain's, where the government actually provides the healthcare, taxpayers, including manufacturing companies, end up paying for it in the form of higher taxes. To the extent that those taxes take the form of value added or similar taxes that are rebated upon export of a manufactured good, the price of the good on international markets may not fully bear the cost of the healthcare system in a way that U.S. goods must, since they are built into the cost base of the U.S. manufacturer itself.

[7] National Association of Manufacturers, *Health Care Costs at the Crossroads: Manufacturers' Agenda for Lower Costs and Higher Quality* (Washington, D.C.: The Manufacturing Institute, 2002).

[8] Ibid.

[9] Kaiser Family Foundation, Employer *Health Benefits 2003*.

[10] Jeremy A. Leonard, *How Structural Costs Imposed on U.S. Manufacturers Harm Workers and Threaten Competitiveness* (Washington, D.C.: National Association of Manufacturers, 2003).

[11] Tillinghast-Towers Perrin, *U.S. Tort Costs: 2003 Update; Trends and Findings on the Costs of the U.S. Tort System* (New York: Tillinghast-Towers Perin, 2003).

[12] Todd Buchholz and Robert Hahn, *Does a State's Legal Framework Affect Its Economy?* (Washington, D.C.: U.S. Chamber of Commerce Institute for Legal Reform, 2002).

[13] Office of Management and Budget, Office of Information and Regulatory Affairs, *Report to Congress on the Costs and Benefits of Federal Regulations* (Washington, D.C.: Office of Management and Budget, September 1997).

[14] Leonard, *Structural Costs*.

[15] Thomas Hopkins and W. Mark Crain, *The Impact of Regulatory Costs on Small Firms*, report no. PB2001–107067 (Washington, D.C.: U.S. Small Business Administration, Office of Advocacy, 2001).

[16] Ibid.

[17] Ibid.

[18] Leonard, *Structural Costs*.

[19] National Energy Policy Development Group, *Reliable, Affordable, and Environmentally Sound Energy for America's Future* (Washington, D.C.: National Energy Policy Development Group, May, 2001).

[20] Ibid.

[21] Ibid.

[22] Ibid.

[23] National Federation of Independent Business, "NFIB Poll Reveals Initial Effects of Deregulation on California Small Businesses" (press release, Feb. 26, 2001).

[24] National Energy Policy Development Group, *Energy for America's Future*.

[25] President's Council of Advisors on Science and Technology, "Report on Information Technology Manufacturing and Competitiveness" as reported in *Manufacturing and Technology News* (Oct. 3, 2003).

[26] Ibid.

[27] Ibid.

[28] Ibid.

[29] Michael E. Porter and Debra van Opstal., *U.S. Competitiveness 2001: Strengths, Vulnerabilities and Long-Term Priorities* (Washington, D.C.: Council on Competitiveness, 2001), p. 37.

[30] Ibid.

[31] On a trade-weighted basis, the U.S. average tariff is less than 1.7 percent; the current U.S. simple average tariff is 3.6 percent on a legally bound basis under the WTO. Average tariffs throughout much of the world are significantly higher, with simple average WTO legally bound rates of 31.4 percent in Brazil, 37.2 percent in Egypt, 49.8 percent in India, and 39.5 percent for WTO members overall. The manufacturing sector of the U.S. economy is also largely free of non-tariff barriers to trade, such as quotas and trade-distorting subsidies. In addition, because of requirements of the Commerce Clause of the Constitution, there are few barriers to trade within the United States. Taken together, that makes the United States the most open and contestable market of any major economy in the world.

Three

Recommendations and Next Steps

The recommendations that follow are designed to address the challenges identified by U.S. manufacturers over the course of the Commerce Department's roundtable discussions. These recommendations represent a step toward building the comprehensive strategy called for by Secretary Evans to ensure "that the government is doing all it can to create the conditions" that would enhance U.S economic growth and manufacturing competitiveness.

These recommendations start from the premise that it is manufacturers and their actions in the marketplace that will define their success, spur economic growth, and create jobs. The government's role is not to interfere with that process, but rather to foster it. For government, creating the conditions for success in the marketplace means focusing on economic fundamentals, such as encouraging economic growth and innovation in the private sector and reducing the cost of government policies on U.S. manufacturers. It also means regulating only when absolutely necessary and then with a view toward minimizing unwarranted costs.

This same basic approach informs the recommendations on international economic policy and trade. The recommendations are designed to encourage governments to open markets and eliminate trade practices that distort markets for goods, capital, and labor. They are also designed to foster compliance with the rules governing the international trading system so that it is competition in the marketplace, rather than government intervention, that determines success.

The recommendations include proposals that demand immediate action by Congress and new activities that can be pursued under existing authority to strengthen current efforts to support U.S. manufacturers. A number of recommendations also provide direction for broad-based reforms that will require coordinated effort over the long term. The new Assistant Secretary of Commerce, called for by President Bush in his September 4, 2003, Labor Day address, will be responsible for coordinating the administration's efforts to implement these recommendations.

The recommendations are divided into the following six sections:

- Enhancing Government's Focus on Manufacturing Competitiveness
- Creating the Conditions for Economic Growth and Manufacturing Investment
- Lowering the Cost of Manufacturing in the United States
- Investing in Innovation
- Strengthening Education, Retraining, and Economic Diversification
- Promoting Open Markets and a Level Playing Field

Enhancing Government's Focus on Manufacturing Competitiveness

One of the major concerns registered by manufacturers was the long-standing lack of focus and accountability within government on manufacturing and its competitiveness. The following recommendations are intended to sharpen that focus and to ensure accountability for implementing the recommendations that make up the Manufacturing Initiative.

Beyond providing greater focus and accountability, the recommendations are also designed to enhance coordination within the federal government and with state and local authorities to improve the domestic economic environment for manufacturing. These steps would establish a mechanism for ongoing dialogue with the manufacturing sector on the implementation of the President's Manufacturing Initiative.

These activities would further the work begun by this report. One of the first steps that the newly established assistant secretary should take is to conduct a study of the cost competitiveness of U.S. manufacturing relative to its principal competitors. This should include an assessment of the business environment in terms of supporting innovation, not just in terms of products and services, but in manufacturing process and business organization. This work will help determine whether there are additional steps the government could take to reduce costs and to enhance competitiveness.

Create an Assistant Secretary of Commerce for Manufacturing and Services

As President Bush called for in his Labor Day address, the federal government should establish an assistant secretary-level position at the Department of Commerce to serve as the principal point of contact with the U.S. manufacturing sector. The assistant secretary would be responsible for implementing the recommendations contained in this report and for supporting the Secretary of Commerce in his role as the federal government's chief advocate for the manufacturing sector.

Specific responsibilities of the assistant secretary would include:

Lead a Benchmark Analysis to Measure Progress toward Achieving the President's Goals

One of the key components of any strategy is a means of measuring progress toward a defined goal. That requires both a baseline that sets a starting point for analysis and the tools to measure progress. To establish a baseline against which to measure progress toward improving the economic environment for manufacturing in the United States, the newly established assistant secretary would work with the Council of Economic Advisers, the U.S. Treasury and Labor Departments, and other relevant agencies, to initiate a benchmark analysis of the U.S. environment for manufacturing.

The study would identify and prioritize those areas of public policy that have the most impact on manufacturing competitiveness. The findings should be subject to further analysis to determine what, if any, actions could be taken. In addition, the study would review initiatives to improve manufacturing competitiveness underway at the state and local level or abroad.

Create a New Office of Industry Analysis

Through a new Office of Industry Analysis, the assistant secretary would be responsible for assessing the cost competitiveness of American industry and evaluating the impact of domestic and international economic policy on U.S. competitiveness, particularly in the manufacturing sector. This effort would require developing the analytical tools and expertise within the Commerce Department

to assess the impact of proposed rules and regulations on economic growth and job creation before they are put into effect.

Establish a President's Manufacturing Council to Provide Oversight and Advice on the Implementation of the President's Manufacturing Initiative

To ensure that the government responds to the challenges facing U.S. manufacturers and remains focused on what matters to their competitiveness, Congress should establish a Manufacturing Council under the chairmanship of the Secretary of Commerce. The assistant secretary would serve as the executive director of the council. The council would provide a means of ensuring both regular contact between government and the manufacturing sector and effective counsel in the implementation of the President's Manufacturing Initiative. The council's membership should reflect the diversity of American manufacturing in terms of industries and the size of the enterprise, particularly small and medium-sized businesses.

Create an Interagency Working Group on Manufacturing Chaired by the Secretary of Commerce

Implementing the recommendations outlined below will require coordination among a number of agencies within the federal government. Toward that end, the administration should establish an interagency working group modeled on the Trade Promotion Coordinating Committee. This manufacturing competitiveness interagency working group, chaired by the Secretary of Commerce, would be responsible for coordinating the implementation of the recommendations, as well as developing new initiatives that would carry President Bush's Manufacturing Initiative forward.

Foster Coordination and Cooperation among Federal, State, and Local Governments

Not all of the steps needed to foster an economic environment helpful to manufacturing reside in the jurisdiction of the federal government. However, the federal government could serve as a coordinator of activities designed to foster a healthy manufacturing sector throughout the United States. The states have traditionally served as laboratories for a wide variety of initiatives that have shaped economic policy throughout the country. The administration should create an intergovernmental coordinating committee on manufacturing, with the assistant secretary serving as the coordinator, to ensure that sound ideas on regulatory reform or economic development strategies are widely available to all state and local governments.

Creating the Conditions for Economic Growth and Manufacturing Investment

Creating an economic environment designed to foster manufacturing competitiveness begins with establishing the conditions for strong economic growth at home. Congress has already taken several significant steps toward that goal by enacting President Bush's proposals reflected in the Economic Growth and Tax Relief Reconciliation Act of 2001, the Job Creation and Worker Assistance Act of 2002, and the Jobs and Growth Tax Relief Reconciliation Act of 2003.

By acting decisively to lower the tax burden on American manufacturers, particularly for small and medium-sized businesses, President Bush and Congress helped to keep the recession short and start the process of economic recovery. According to the U.S. Treasury Department, had President Bush and Congress failed to enact those measures, by the end of 2004, 3 million fewer jobs would have been created and a deeper recession and a far slower and more uncertain recovery would have resulted.

Nevertheless, there remains an enormous amount that government can still do to increase the certainty of the business environment in which U.S. manufacturers operate. The following steps would ensure that the government makes progress toward that goal.

Make Recent Tax Cuts Permanent to Enable Manufacturers to Attract Capital and Invest for the Future with Confidence

One of the key features of the recent recession was the sharp drop in business investment. Consumer spending, which makes up two-thirds of U.S. GDP, remained strong throughout both the recession and the subsequent recovery. Business investment, which accounts for the other one-third of GDP, has gained strength but has yet to reach pre-recession levels.

Fostering a climate for strong business investment, particularly in manufacturing, requires a stable economic environment that reduces risk. Reducing risk requires greater certainty. Congress should increase certainty and foster a healthier climate for investment in manufacturing and other sectors of the economy by making the recent tax cuts permanent.

The elimination of the estate or "death" tax, the temporary increase in expensing limits, and the new incentives for small business investment are among the most significant business-related features of the recent tax cuts. In addition, the reductions in individual marginal tax rates aid those businesspeople whose incomes flow through directly to individual returns, such as sole proprietors and partnership members. Congress should act to make the elimination of the death tax and the investment incentives for small businesses permanent to ensure that manufacturers, particularly small and medium-sized businesses, are able to attract the investment capital needed to ensure their future competitiveness.

Reduce the Costs of Tax Complexity and Compliance

U.S. tax laws have become unnecessarily complex. Complexity increases the cost of compliance and creates a drag on the economy, with businesses spending more time and resources on compliance and diverting talent and resources away from productive activities. Small business owners are particularly unprepared to deal with this complexity and do not have the resources to hire sophisticated tax counsel to advise them. It is time to make a serious effort to simplify the tax rules. The Treasury Department should undertake a study of tax simplification, focusing on those provisions that are particularly complex for manufacturers, including

depreciation, the corporate alternative minimum tax, and the research and experimentation tax credit.

Make Permanent the Research and Experimentation Tax Credit

While public investment in research and development is a critical component in the development of new technologies, the private sector bears the burden of the research and development needed to bring those technologies to market.

To reinforce the existing incentive available under the Internal Revenue Code, Congress should make the research and experimentation (R&E) tax credit permanent.[1] Making the R&E credit permanent has been a consistent, long-time priority for advanced manufacturers. Doing so will increase the certainty associated with the tax treatment of research expenditures and thereby reduce the risk and cost associated with attracting or allocating capital expenditures to such activities.

Deepen the Pool of Investment Capital Available to Manufacturers by Introducing Incentives for Saving

Another key element for encouraging investment is deepening the pool of investment capital available to U.S. business. To do so, Congress should adopt tax incentives to increase the savings rate of American taxpayers.

Increasing U.S. savings and investment would also address the growing U.S. trade deficit. By providing incentives for savings and investment, the United States would reverse one of the main causes of the trade deficit, as well as expand access to, and lower the cost of, capital available to U.S. manufacturers.

Lowering the Cost of Manufacturing in the United States

As manufacturers made clear in every roundtable discussion, to make the United States an attractive place to invest in manufacturing, government must reduce the costs it imposes on manufacturers. The following recommendations outline steps that the government should immediately take to bring down the cost of manufacturing in the United States, including regulatory, energy, legal, healthcare, and pension costs.

Reduce the Cost and Improve the Availability of Healthcare

Healthcare costs represent the largest and fastest rising costs faced by U.S. manufacturers. These costs are also least within their control to manage. Manufacturers have a vested interest in the health of their employees. Building on the historic Medicare reforms signed into law by President Bush, the following actions would help reduce the burden of providing this care:

Establish Association Health Plans

As President Bush has endorsed, Congress should pass legislation to create and fund association health plans. Such plans would afford small business manufacturers greater leverage in negotiating the cost of health insurance with providers. That leverage would translate into lower healthcare costs and improved cost competitiveness.

Promote Health Savings Accounts

Health savings accounts (HSAs) were established in the Medicare prescription drug bill signed by the President on December 8, 2003. HSAs combine high-deductible health insurance plans with tax-free savings accounts that can be used to pay for medical expenses incurred by employees and their families. Under HSAs,

year-end balances can be rolled over, encouraging employees to be more cost-conscious and giving them both an incentive and the means to save for future healthcare needs.

Accelerate the Food and Drug Administration's Review of Generic Drugs

In addition to the FDA's broad efforts to speed the development of safe, innovative, and low-cost new health treatments, the FDA continues to expedite the review of generic drugs in order to make lower-cost prescription drugs available to consumers. The administration has increased funding for generic drug reviews by over 35 percent over the past two years, allowing the FDA to establish ambitious new performance targets for reducing review times for generic drugs. Continued FDA performance improvements will allow generics to reach the market more quickly, resulting in lower prices for prescription drugs available under employer health plans.

Implement New Technologies to Prevent Costly Medical Errors

To ensure medical treatments are being used as effectively as possible and to prevent costly adverse events, the healthcare industry should adopt and implement 21st century technologies such as bar coding of medical products and electronic prescribing.

Enact Medical Liability Reform

Congress should enact legislation making the medical liability system fair, predictable, and timely. Reforms should include the adoption of standards that ensure that injured patients are compensated fully and quickly for their economic losses, while limiting recoveries for non-economic damages to a reasonable amount.

Taken together, these steps would significantly reduce the current burden that high healthcare costs impose on U.S. manufacturers, particularly those small and medium-sized businesses that make up the bulk of the U.S. manufacturing sector.

Modernize the U.S. Legal System to Eliminate Disincentives to Invest in Manufacturing

The U.S. legal system discourages investment in manufacturing by raising the risk and cost associated with manufacturing. There are three steps Congress should immediately take to lift the disincentives for investment in manufacturing that the current system of tort liability creates:

Enact Class-Action Reform

Congress should enact a common sense class-action system through the passage of a consumer "class-action bill of rights" that would, among other provisions, require notice of a lawsuit to class members in understandable terms, require judicial review of settlements that give class members only non-cash benefits, and prohibit a court from approving a settlement that discriminates among plaintiffs.

Enact Asbestos Reform

Litigation is an enormously expensive means of compensating those injured by the use of asbestos in construction prior to the 1970s. Because asbestos is no longer being used in construction, class-action lawsuits no longer serve even a deterrent purpose. Congress should enact legislation resolving the current class-action litigation on asbestos. The asbestos litigation continues to dampen investment in manufacturing. Passage of legislation that will ensure compensation for those actually injured and stop litigation that destroys jobs is critically important.

Make the Medical Liability System Fair, Predictable, and Timely

The most significant step government should take to improve the medical liability system and reduce its costs to U.S.

manufacturers would be to adopt standards that ensure injured patients are compensated fully and quickly for their economic losses, while limiting recoveries for non-economic damages to a reasonable amount.

In addition, the administration and Congress should undertake a long-term effort to ensure an appropriate balance in the tort system between plaintiffs' and defendants' interests. As questions of tort liability are frequently adjudicated at the state level, any such effort would ultimately require close cooperation with the states to ensure the best approach and a higher degree of consistency.

Reduce the Costs of Regulation and Legislation

The cost of regulation on the U.S. economy has been the subject of ongoing reviews since the late 1970s. OMB reviews of proposed regulations, and statutes such as the Paperwork Reduction Act, have contributed to that effort. In addition, the Bush administration has slowed the increase in regulatory costs produced by new regulations reviewed by OMB by 70 percent compared with the previous administration.

Nonetheless, overall, the cost of regulatory compliance has risen significantly over time. To combat these rising costs, OMB should lead a comprehensive three-step process to reduce the burden of regulation on manufacturing enterprises:

Establish an Inventory of Potential Regulatory Reforms that Would Lower the Cost of Manufacturing

To establish an inventory of potential reforms that would reduce the cost of compliance on the manufacturing sector, OMB should seek public comment on existing rules and afford the opportunity to propose particular reforms. The request for public comment and the nomination of reforms should address existing regulations, guidance documents, and paperwork requirements.

Conduct an Analysis of the Inventory

OMB should, in coordination with the Council of Economic Advisers, the Commerce Department, and other agencies, evaluate the proposed reforms and, where appropriate, implement those reforms on a priority basis. This evaluation should include an assessment of the cost of compliance and the economic impact of current rules, particularly on small and medium-sized businesses, as well as the cost to the taxpayer and to the consumer of administering those regulations. The objective of the review should be to determine whether there might be a less costly means of achieving the benefits Congress intended by authorizing such regulations. That analysis should extend to the agencies that implement the rules as well. This effort could involve broadening the analysis done under section 610 of the Regulatory Flexibility Act, which currently applies to small businesses.

Conduct a Regulatory Impact Analysis of New Rules

Lastly, OMB should rigorously apply its recently developed guidance on regulatory impact analysis to any proposed rules that would influence the costs imposed on the manufacturing sector, particularly as they affect small and medium-sized businesses. As a part of this effort, the newly established assistant secretary for manufacturing and services should task the new Office of Industry Analysis to work with OMB and other agencies to refine the analytical tools needed to assess the impact of proposed rules and regulations on economic growth and job creation in the manufacturing sector and other areas of the economy.

Enact a Comprehensive Energy Plan That Encourages Conservation, Improves Infrastructure, and Expands Domestic Production

According to the National Association of Manufacturers, about one-third of the United States' energy, including 40 percent of the natural gas and 30 percent of the electricity, is consumed by manufacturers. Energy shortages, price spikes, and blackouts disrupt the economy; discourage investment in energy-dependent manufacturing industries, such as chemicals and plastics; and inhibit manufacturers in those sectors from planning with confidence and hiring new workers.

Given the significant increase in U.S. energy costs, enacting a comprehensive plan to encourage conservation, improve infrastructure, and expand domestic production is fundamental to the future of American manufacturing. Adopting a comprehensive energy plan, particularly one that addresses the need for expanded natural gas production and distribution, would help reduce the cost in some manufacturing sectors considerably. Such action would offer a particular benefit to those manufacturing industries, such as plastics, that depend on natural gas both as a source of power and as an input into their manufactured goods.

President Bush has proposed a comprehensive national energy policy that would, if enacted by Congress, modernize and expand our electricity infrastructure, modernize and increase conservation and energy efficiency, ensure a clean and affordable diversity of fuels for producing electricity, increase domestic energy supplies, and increase the development and deployment of new technology.

In short, Congress should pass President Bush's energy plan to reduce the cost of energy to U.S. manufacturers. From the perspective of U.S. manufacturers, the most important steps that President Bush has proposed and on which Congress should act are:

Increase Electricity Supply and Modernize the Legal Framework Governing Electricity Production

Congress should modernize the legal framework governing electricity production and transmission to lessen the chance of disruptive blackouts and ensure the delivery of ample and affordable supplies of electricity. The provisions should establish mandatory and enforceable reliability standards, encourage expanded investment in transmission and generation facilities, eliminate transmission bottlenecks, reform outdated laws, promote open access to the transmission grid, promote regional planning and coordination, protect customers, and help develop new technologies.

Facilitate Adequate and Economical Supplies of Natural Gas

Congress should facilitate adequate and economical supplies of natural gas by eliminating the regulatory obstacles to the development of natural gas resources on federal land and to the construction of liquefied natural gas terminals and other infrastructure, simplify the permit process and facilitate the construction of an economically viable natural gas pipeline from Alaska, and encourage additional deep-well gas development on the outer continental shelf.

A Clean and Affordable Diversity of Fuels for Electricity Production

Congress should moderate future demand growth for natural gas by ensuring a future for clean-burning coal and nuclear power, and providing tax incentives to increase the production of electricity from renewable sources such as wind, solar, biomass, and landfill gas.

New Technology

Congress should encourage further research and development in new energy technology, particularly the funding of President Bush's hydrogen fuel initiative to develop technology for commercially viable hydrogen-powered fuel cells and a new generation of hydrogen powered vehicles to help reduce U.S. dependence on foreign oil.

Promote Pension Reform

The administration will work with Congress to make fundamental changes in the funding rules that will put underfunded plans on a predictable, steady path to better funding. Improvements in the funding rules should set stronger funding targets, foster more consistent contributions, mitigate volatility, and increase flexibility for companies to fund up their plans in good economic times. The administration will continue to work with Congress and the private sector to address this issue.

Investing in Innovation

The discussion above and the views of manufacturers highlight the need to bolster further the development of new technologies that fuel productivity gains and improve U.S. security and the U.S. standard of living. The following recommendations are designed to ensure that the United States remains the most competitive and productive economy in the world.

Review Federal R&D Funding for Generic Technologies, Engineering, and the Physical Sciences to Encourage Better Coordination and Focus on Innovation and Productivity-Enhancing Technologies

Since taking office, President Bush has provided a renewed focus on federal research and development funding. For fiscal year 2004, he proposed a record $123 billion, which represented an increase of more than 34 percent over funding levels that existed when he took office.

Continuing this effort to enhance government funding of research and development activities is crucial to the continued U.S. success in manufacturing.

Also needed is a review of current federal R&D programs important to manufacturing, to ensure that there is an appropriate focus on innovation and productivity-enhancing technologies. The Commerce Department's Technology Administration, in coordination with the Assistant Secretary for Manufacturing and Services should conduct this review with other affected agencies, through the National Science and Technology Council's Interagency Working Group on Manufacturing R&D, and the private sector.

The review should consider the need for additional investment in core R&D programs for generic technologies, engineering, and the physical sciences, especially in interdisciplinary scientific endeavors. The model followed should be

the same one that has been used over the past 50 years to develop the major technologies influencing the U.S. economy today (semiconductors, computers, network communications, biotechnology, and now nanotechnology). This model is based on government funding of basic science and early-phase generic technology research, followed by massive investment in applied R&D by the private sector.

Identify Priorities for Future Federal Support for Advanced Manufacturing Technology—Create an Interagency Working Group on Manufacturing Research and Development

To improve the effectiveness of federal investment in manufacturing research and development, a new interagency working group should be established within the National Science and Technology Council. This interagency working group would serve as a forum for developing consensus and resolving issues associated with manufacturing R&D policy, programs, and budget guidance and direction.

The working group should identify and integrate requirements, conduct joint program planning, and develop joint strategies for the manufacturing R&D programs conducted by the federal government. Among the responsibilities of this group would be to review all federal manufacturing R&D programs and establish priorities designed to improve U.S. manufacturing technology.

The review would be aimed at identifying the timely and critical early-stage developments needed to provide a fundamental foundation for industrial research and development and the commercialization of related applications. The review would be comprehensive, covering a wide breadth of manufacturing innovation technologies, such as supply chain integration, interoperability technologies, measurements and standards, and manufacturing information technologies. It would also address the need for new industry-university-government research dedicated to high-priority manufacturing R&D needs, knowledge diffusion, and education of the next generation of manufacturing technologists and leaders.

Strengthen the U.S. Patent and Trademark Office

Patents have always been key to rewarding manufacturing innovations, but their importance has been magnified by the fact that the application of new technology has become one of the key ingredients in successfully competing in manufacturing globally. Delay in the issuance of a patent can mean the difference between success and failure in today's marketplace.

The USPTO currently runs the risk of seeing its processing times erode. The administration has proposed legislation that would significantly enhance the ability of the USPTO to meet the needs of U.S. manufacturers. Congress should pass this legislation to ensure that the USPTO can continue to serve the needs of manufacturers by protecting their intellectual property and increasing the availability of new products and services in the marketplace.

Strengthen Partnerships to Promote Manufacturing Technology Transfer

Robust research and development activities are essential steps in reinforcing the process that has provided U.S. manufacturing with its competitive edge. These activities, however, should be matched with an equally vigorous effort to ensure that the technology developed is diffused broadly throughout the manufacturing sector, particularly to small and medium-sized manufacturers, which will benefit most because of their own limited capacity for independent research and development.

The PCAST report on technology transfer of federally funded R&D, released in May 2003, provides 10 recommendations for strengthening technology transfer.[2] These recommendations will provide valuable insight for strengthening technology transfer to the manufacturing community.

Implementing these recommendations will require a comprehensive effort, led by the National Institute of Standards and Technology. As a part of that effort, NIST should take the lead in identifying and promulgating best practices in intellectual property management, cooperative R&D agreements, and partnering arrangements needed to enhance the benefits and delineate the obligations associated with such cooperative efforts. Participation from existing groups such as the Federal Laboratory Consortium, the Interagency Working Group on Technology Transfer, and others should be solicited in this comprehensive effort.

Expand Cooperative Technical Assistance Programs on Standards

In an increasingly globalized economy, the capacity to compete successfully will depend on the ability of individual manufacturers to satisfy global as well as U.S. standards. Most U.S. manufacturers understand the importance of achieving these goals and have invested heavily in satisfying not only product standards, but quality and environmental standards as well.

The importance of standards in manufacturing will only increase with the demands placed on manufacturers hoping to compete for a place in global supply chains. Indeed, in many respects, international standards will define access to the global marketplace. To ensure that standards with a potential to affect the access of U.S. manufacturers to markets around the world are set objectively, based on sound science, NIST should expand the reach of programs designed to provide technical assistance to standards agencies, national metrology institutes, and regional metrology organizations in the developing world, particularly in significant potential export markets.

Ensure the Reliability of the Critical Infrastructure That Is Vital to Manufacturers

The United States' most advanced manufacturing industries and the infrastructures that they depend on—power, communications, and transportation in particular—are increasingly dependent on sophisticated, distributed automated control systems. Typical of these are the control systems that manage the electric power grid; similar systems control the production and distribution in critical infrastructure industries such as oil and gas, water, chemicals, pharmaceuticals, metals and mining, pulp and paper, and durable goods manufacturing. Protecting these critical control infrastructures from failure, either by accident or by malicious intent, is essential to the long-term security of the manufacturing sector—and the nation as a whole. Therefore, the following steps should be taken:

Promote Standards to Better Protect Industrial Control Systems

The federal government should work vigorously and hand-in-hand with the private sector and state and local agencies to encourage and enable standards development organizations in the United States to establish needed security standards for industrial control systems.

Support the Research and Development that Underpins Critical Infrastructures—and Quickly Transfer the Results of That R&D to the Private Sector

As part of the administration's emphasis on improving homeland security, the federal government today is providing

dramatically expanded support for the research and development that is necessary to protect the nation's critical infrastructures that U.S. manufacturers and the U.S. economy and society at large depend upon so heavily. In addition, the administration should ensure that the manufacturers and users of industrial control systems are involved with—and are kept informed about—the latest research advances from the Department of Homeland Security, the Commerce Department, and elsewhere.

Support a Newly Coordinated Manufacturing Extension Partnership and Create a National Virtual Network of Centers of Manufacturing Excellence

Since its inception as a pilot program in 1988,[3] the Manufacturing Extension Partnership (MEP) has provided many small U.S. manufacturers with useful business services to become more competitive and productive. MEP's nationwide network serves to promote lean manufacturing techniques such as zero-defect quality programs. The program makes it possible for even the smallest firms to tap into specialists from across the country with manufacturing and business expertise in plant operations and on manufacturing floors. MEP clients have experienced more growth in labor productivity over a five-year period than similar non-client firms.[4]

MEP was originally intended to be comprised of 12 federally supported centers, with federal funding ending after six years. In its 15 years of operation, the program has expanded away from this original design to include 400 locations, and Congress has removed the sunset provision.[5] Given advances in manufacturing and technology, it is appropriate to evaluate MEP operations and take steps for continuous improvement. The administration proposes to coordinate MEP fully with other Commerce Department programs that are helping manufacturers to be more competitive and expand markets.

Through this coordination, the Commerce Department can more closely link the technical and business staff employed by the MEP centers located around the country with trade promotion specialists in the Commerce Department's International Trade Administration who are working with the proposed new Assistant Secretary for Manufacturing and Services. In addition, the ITA has experts with in-depth knowledge of and connections with various sectors of industry—automotive, textiles and apparel, energy, aerospace, machinery, metals, and microelectronics, to name a few. With a direct teaming of MEP field agents and these sector experts, the program can be a more effective national resource to help small manufacturers compete and succeed in the global marketplace.

Additionally, MEP should hold a recompetition for all MEP centers, with a focus on effectiveness and cost-efficiency. MEP should also explore methods, with Congress, for statutory authority to receive direct programmatic funding from private sector entities.

Wherever possible, MEP should also encourage applicants to identify areas of sector-specific expertise that could qualify them as a "center of excellence." MEP should encourage co-location with universities, community colleges, and ITA assistance centers to foster cooperation, knowledge transfer, greater efficiency, and manufacturing exports. The Technology Administration would lead the establishment of these centers by partnering with other organizations—including government at all levels as well as private sector organizations.

Encourage the Small Business Innovation Research and Small Business Technology Transfer Programs to Focus on Manufacturing

Two federal programs in particular exist to provide funding to small businesses to pursue R&D: the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. While results to date have been unclear, these programs can be a catalyst for greater innovation within small manufacturing enterprises. SBIR and STTR should place a higher priority on manufacturing R&D topics that would greatly leverage innovation in small and medium-size manufacturing companies.

Explore New Avenues for Leveraging the Unique Capabilities of U.S. National Laboratories and Universities for the Benefit of Small and Medium-sized Manufacturers

The National Institute of Standards and Technology, in collaboration with other federal agencies, and national laboratories, should explore the opportunity for establishing cooperative research programs on innovative manufacturing technologies among national laboratories, universities, the SBIR program, community colleges, and state and local technology-development associations. The objective should be to develop a working model of such arrangements that would provide the rapid diffusion of research successes into the private sector, provide access for small entrepreneurial businesses to sophisticated research tools, and provide training opportunities, such as for future nanotechnologists and nanomanufacturers. The current pace of technological change places a premium on expediting such initiatives. NIST should report its findings to the Secretary of Commerce in 2004.

Strengthening Education, Retraining, and Economic Diversification

To remain globally competitive, education and worker training strategies must be at the top of the national priority list. The administration successfully passed the No Child Left Behind Act in 2001, and is now working to fully implement this landmark education reform. The administration is also investing $1 billion over five years to improve math and science education.

In addition, under President Bush's leadership, the Departments of Commerce and Labor have worked together throughout the country to link workforce development efforts with economic development efforts. Important initiatives include the Department of Commerce's Economic Adjustment Program and the Department of Labor's new 21st Century Workforce Initiative, which strive to strengthen retraining systems that maintain the U.S. skills advantage in manufacturing. The Department of Labor's Employment and Training Administration invests approximately $10 billion a year in an array of workforce investment programs.

Building on that record should take the form of the steps set out below.

Enhance Workforce Skills Essential for Employment in Manufacturing Enterprises of the Future

Manufacturers across the country raised significant concerns about whether America was training the next generation of workers required to meet the needs of an increasingly high-tech workplace as well as to develop the manufacturing industries of the future. There was clear support for the development of improved vocational/technical training at both the secondary and post-secondary level, as well as for programs designed to improve

the skills of career-changing adults interested in manufacturing jobs. There was also support for improvements in basic math and science education, such as the current five-year, $1-billion initiative for a new math and science partnership program that will strengthen math and science teaching and education at all levels.

It is important to define the starting point for improving the skills and preparation of the U.S. workforce. Toward that end, the Department of Labor, in conjunction with the Departments of Commerce and Education, should undertake a benchmark analysis of the existing skills of the U.S. workforce and the future needs of the U.S. manufacturing sector. The effort should be designed to inform both programmatic changes at the federal level and suggestions for curricula at the local level.

The analysis should address ways that federal programs that support basic education for elementary and secondary students will prepare them to enter the workforce without the need for significant remedial education. The analysis should catalog the basic academic skills needed for individuals entering the manufacturing workforce and assess the extent to which primary and secondary education in the United States provide those skills.

The second step in the analysis goes to the specialized training needed to succeed in the manufacturing environment of the future. Historically, U.S. schools, particularly in secondary education, provided a number of opportunities for vocational training. Over time, these opportunities have declined, and the educational system has relied more heavily on specialized vocational-technical schools, at both the secondary and post-secondary level, to fill in the gap. The analysis should examine whether the existing system of vocational-technical education is sufficient to meet the needs of the U.S. manufacturing sector and should propose recommendations for change where needed.

In the near term, Congress should enact the Secondary and Technical Education Excellence Act to provide high-quality technical education at the community college level. This law would ensure that students learn the necessary skills to make successful transitions from high school to college and from college to the workforce. It would provide funding, through the Department of Education, for states to identify technical programs of study linked to high-wage, high-skill careers that could be adopted by community colleges in cooperation with local high schools.

Establish a High School and Technical Education Partnership Initiative

Congress should pass legislation creating a coordinated high schools and technical education improvement program, utilizing secondary and technical education state grants, as proposed in the president's budget for fiscal year 2004. This program would provide high-quality technical education through partnerships between high schools and postsecondary institutions. Such an initiative, administered by the Department of Education, would support secondary and postsecondary career and technical education programs in high-demand occupational areas. The high school component would include a challenging academic core to ensure that students in the program meet state achievement standards and obtain a clear pathway to further education beyond high school, through apprenticeship or postsecondary technical certificates and associate or baccalaureate degree programs. Such an initiative will ensure that students are being taught the necessary skills to make successful transitions from high school to college and college to the workforce.

Establish Personal Reemployment Accounts

In any period of economic adjustment, the most significant challenge is how best to ensure that workers who lose their jobs can successfully re-enter the workforce. The federal and state governments provide a number of programs designed to help workers find new jobs with training and re-employment assistance.

Toward that end, President Bush has proposed a Personal Reemployment Account initiative to assist Americans who need the most help getting back to work. This innovative approach to worker adjustment would offer accounts of up to $3,000 each to eligible individuals to purchase job training and key services, such as child care and transportation, to help them look for a job and get back to work quickly. As a further incentive, recipients would be able to keep the balance of the account as a cash reemployment bonus if they become reemployed within 13 weeks. The Bush administration has included Personal Reemployment Accounts in its legislative proposal to reauthorize and reform the Workforce Investment Act.

Coordinate Economic Adjustment for Manufacturing Communities

Communities are hard hit when local manufacturing declines, particularly when a local factory accounts for much of the employment in a city or town. Just as individuals may need retraining to reenter the workforce, communities must, at times, develop alternative bases of economic development.

The federal government already has a number of programs available that can be used to develop the competitiveness of communities and support innovation in manufacturing. The challenge for communities often involves sorting out the purposes and requirements of those federal programs and how they might best be employed or tailored to local circumstances.

What is needed is an interagency federal task force, chaired by the Assistant Secretary of Commerce for Economic Development, to coordinate the efforts of relevant federal agencies, particularly the Departments of Labor and Education, in addressing the structural economic challenges faced by manufacturing-dependent communities. The task force would ensure that all federal agencies work together, coordinating resources and strategies to best provide a range of assistance to eligible communities. More specifically, the task force would provide a means of rapid response, identifying communities where the employment base is substantially dependent on only a few manufacturing companies and the communities that are at a significant risk of economic dislocation.

Given that early intervention and planning are critical for communities at risk, the first step the task force should take is to identify criteria for determining when a rapid response is needed. The task force would then work with the communities identified under these criteria to develop market-based development policies that seek to retain manufacturing jobs in a community, while beginning the efforts to diversify the economic base of the community.

Improve Delivery of Assistance for and Retraining of Displaced Workers

The challenges unfolding in manufacturing and in the job market represent a significant change from years past. Instead of individual industries facing particular adjustment issues due to stronger import competition, the U.S. economy in general is adjusting to fundamental changes underway in the world economy. While that process is particularly acute in the manufacturing sector, it extends broadly throughout the U.S. economy.

Current worker adjustment programs, in general, take one of two forms. The first involves the traditional suite of unemployment insurance and related programs that are designed with the individual worker in mind. That individual's employment prospects may or may not be related to more fundamental changes underway in the economy. The alternative form is the suite of trade adjustment assistance programs that fund extended unemployment and retraining for eligible workers. Here, eligibility is defined in terms of whether the employee can point to some direct trade impact that has displaced him or her from a job.

Neither of the current programs fully addresses the sort of adjustment underway in today's economy. What that calls for is a fundamental reassessment of both types of programs to see how they might best be integrated into a coordinated approach to adjustment, reemployment, and retraining. Toward that end, the Commerce and Labor Departments, with the assistance of the Department of Education, should review the existing programs and provide recommendations on how best to integrate them into a coherent program that is dedicated to addressing the needs of workers affected by the ongoing adjustment in the rapidly changing economic environment.

This effort should build on the work currently underway through the Labor Department's High Growth Job Training Initiative. That initiative facilitates collaboration among employers, industry leaders, business associations, educators, community and technical colleges, and the public workforce system to tailor training programs to meet local workforce needs.

As part of this initiative, the Department of Labor is working with the manufacturing industry and others to conduct a nationwide review of workforce challenges. Key manufacturing sectors include electronics, motor vehicles, communications equipment, aerospace, plastics and pharmaceuticals. These sectors, and the manufacturing industry in general, are undergoing a transformation as a result of technological advances, requiring workers to adopt and perform new skills. Through collaborative efforts, the High Growth Job Training Initiative will identify those skills and work with institutions to develop successful training models.

In addition, Congress must pass the Bush administration's plan to strengthen the Workforce Investment Act. Annually, the Department of Labor spends $15 billion on the nation's "One-Stop" employment and job training system. Over 3,800 One-Stop centers provide services that enable workers to transform their skills in order to gain employment in emerging and growing industries. The administration is seeking to strengthen this system through the re-authorization of the Workforce Investment Act. Among the changes sought are to make funding more accessible through consolidation, to make the system more responsive to business needs, and to strengthen accountability.

Promoting Open Markets and a Level Playing Field

American manufacturers support an open trading system in which both they and their competitors face the same rules. Leveling the playing field internationally will require a three-part strategy:

1. It will require the encouragement of economic growth and the pursuit of trade agreements that eliminate barriers to exports of U.S. manufactured goods.

2. The strategy should include the aggressive enforcement of current trade rules, particularly in the context of the World Trade Organization, to ensure compliance.

3. It should reinforce current efforts to promote exports of U.S. manufactured goods and services in growing foreign markets. Increasingly, those efforts must be adapted to the needs of U.S. manufacturers and service providers, particularly small and medium-sized businesses, by focusing on their ability not just to enter foreign markets, but also to become a part of global supply chains.

The following recommendations build on President Bush's strong commitment to ensure free and fair trade. They represent a further step toward fulfilling the three-part strategy outlined above.

Encourage Economic Growth and Open Trade and Capital Markets Abroad

One of the key features hampering both the prospects for a stronger recovery in U.S. manufacturing and ensuring a better balance in U.S. trade is the slow economic recovery among many major U.S. trading partners. The United States should encourage the adoption of growth-oriented economic policies as a means of spurring growth and expanding markets for U.S. manufacturers.

President Bush has taken the lead in promoting economic growth and open trade among America's trading partners. The coming year presents a number of significant opportunities to reinforce that effort, including G7 finance ministers' meetings, the G8 economic summit that the United States will host in June 2004, and the prospect of concluding trade agreements with a number of significant U.S. trading partners.

As President Bush has indicated, the goals of raising growth and increasing stability can best be accomplished in an international financial system that relies on the principles of free trade, free capital flows, and market-based flexible exchange rates among the major economies.

In addition, the following steps should be taken:

Encourage the Growth and Development of Foreign Capital Markets

Efficiently functioning capital markets are key to promoting economic growth. The United States should promote market-based prices and interest rates, including the phase-out of government subsidies and directed lending, in order to allocate capital more efficiently, raise productivity, and encourage economic growth.

Negotiate Liberalization of Markets for Financial Services in All Trade Agreements

Consistent with the Bush administration's proposal in the ongoing WTO negotiations, the United States should press for the elimination of all barriers to trade in financial services within the WTO and as a part of any bilateral or regional free trade arrangement, subject to prudential measures. Removing such barriers and introducing competition to the markets for financial services not only creates new market opportunities for U.S. services companies that serve U.S. manufacturers,

but also serves as a necessary predicate for efficiently functioning capital markets that are key to economic growth.

Negotiate Trade Agreements That Benefit U.S. Manufacturers

Most manufacturers believe that the most effective step that the U.S. government can take to promote a level playing field is to eliminate the barriers that inhibit market access for U.S. exports and to discipline the unfair trade practices that other countries use to afford their firms an unfair competitive advantage in the global marketplace. They also understood that doing so means strengthening engagement in the process of trade negotiations with America's trading partners.

The following steps would ensure that such negotiations focus on what counts for U.S. manufacturing:

Pursue the Elimination of Foreign Tariff and Non-tariff Barriers to Exports of U.S. Manufactured Goods

Among the highest priorities established by Congress in passing trade promotion authority was the elimination of tariff and non-tariff barriers to the export of U.S. manufactured goods through bilateral, regional, and multilateral agreements. The Bush administration's proposal on non-agricultural market access in the context of the ongoing WTO negotiations represents a model to be pursued in all negotiations. It would ensure the elimination of all tariffs on manufactured goods worldwide, thereby eliminating the current disparity between U.S. tariff levels and higher tariffs imposed by major trading partners on manufactured goods. Pursuing a counterpart strategy for non-tariff barriers is essential, particularly in industries like the automotive sector, where tariff barriers are already relatively low and non-tariff measures have become a significant means of barring U.S. access to foreign markets.

Negotiate the Elimination of Trade-distorting Subsidy Practices

Current international trade rules prohibit export subsidies, but they do not limit the means by which governments can confer a competitive advantage by subsidizing production at home. In future trade agreements, the United States should pursue the approach adopted by the administration in the context of WTO negotiations that seek to expand the existing prohibitions to include a broader range of subsidies as well as strengthen the rules against government financing of the private sector, including government involvement in, or distortion of, capital markets that insulate foreign firms from competition. In particular, future negotiations should pursue the elimination of the border adjustability of indirect taxes to address the disadvantages to countries relying primarily on direct taxes.

Enhance the Effectiveness of Trade Enforcement Tools

As the Bush administration has done in the context of the WTO negotiations, the United States should seek improvements in the tools available for the enforcement of trade agreements. Dispute settlement procedures should encourage the prompt resolution of disputes, as well as a reading of trade agreements that is consistent with the negotiators' intent. The administration should also pursue (within the WTO, bilateral or regional free trade arrangements, and other fora such as the current steel negotiations underway in the Organization for Economic Cooperation and Development) stronger mechanisms for countering trade practices that are not subject to existing or future trade disciplines.

Enforce U.S. Trade Agreements and Combat Unfair Trade Practices Affecting U.S. Manufacturers

American manufacturers are entitled to the benefits of the agreements that U.S. negotiators reach at the negotiating table. They are also entitled to the aggressive investigation of unfair trade practices that undercut those agreements, even where such actions are not subject to specific trade disciplines.

There are a variety of ways in which U.S. trade agencies could improve their approach to the enforcement of trade agreements and their response to foreign unfair trade practices. They include the following steps:

Reinforce the Efforts of the National Intellectual Property Enforcement Coordination Council

To the extent that U.S. investment in research and development provides a competitive edge in the marketplace, the protection of the intellectual property developed by U.S. manufacturers, which embodies the product of that research, becomes critical to the future of the manufacturing sector. The National Intellectual Property Enforcement Coordination Council—made up of the Commerce Department (including the USPTO), the United States Trade Representative, the Bureau of Customs and Border Protection, and the Department of Justice—is responsible for ensuring a coordinated approach to such efforts. It is time to reinforce the council's mission in two important respects. The first should be to promote the protection of U.S. intellectual property abroad by expanding cooperative efforts with developing country trading partners to encourage the full implementation of their obligations under the WTO's Agreement on Trade Related Aspects of Intellectual Property (TRIPS). One measure could include the placement of U.S. intellectual property experts within certain countries to provide in-country support. The second would involve the aggressive investigation of allegations of theft of intellectual property that would violate commitments made under TRIPS or similar provisions of bilateral or regional agreements, particularly allegations in which American manufacturers are compelled to divulge intellectual property as a condition of market access or investment.

Establish an Office of Investigations and Compliance within the Commerce Department

Congress created the position of Assistant Secretary of Commerce for Market Access and Compliance in order to improve the Commerce Department's focus on compliance with trade agreements as well as on their negotiation. The Assistant Secretary works closely with the USTR and the Trade Policy Staff Committee agencies to identify and pursue the elimination of foreign trade practices that violate U.S. trade agreements or distort markets to the disadvantage of American manufacturers and other sectors of the U.S. economy. To improve the Commerce Department's ability to support the USTR and investigate allegations of trade agreement violations and market-distorting practices, the Assistant Secretary for Market Access and Compliance should establish an office of investigations and compliance. That office should be staffed with skilled investigators trained in the development of the factual basis for potential enforcement action, particularly in those areas that have a significant effect on market access for U.S. manufactured goods.

Establish a Task Force within the Commerce Department's Import Administration to Pursue the Elimination of Foreign Unfair Trade Practices

Foreign unfair trade practices that distort markets represent a unique subset

of trade barriers. Current trade arrangements have significantly reduced the visible tariff and non-tariff barriers to trade worldwide. They do not, however, in every instance, impose disciplines on other forms of intervention in markets, such as subsidies, that governments may use to confer a competitive advantage on their firms. Unchecked, such actions not only can injure U.S. manufacturers, but also can significantly undercut the benefits of the trade agreements for U.S. producers while undermining support for the global trading system in general.

The existing international trade rules, as well as their counterparts in U.S. law, generally require that an industry prove injury from unfair trade practices in the context of either an antidumping or countervailing duty action before the U.S. government can take remedial action on its behalf. Furthermore, antidumping and countervailing duties at best only act indirectly to help eliminate the underlying unfair trade practices at the heart of U.S. industry's complaints.

The Assistant Secretary for Import Administration should form a task force to investigate allegations of such trade practices and develop a strategy for pursuing their elimination. This would eliminate the underlying distortions and thereby reduce the use of anti-dumping and countervailing duty actions. As part of that effort, the task force should review the implementation of current trade remedy rules, such as the procedures governing new shipper reviews. The Commerce Department should further establish an office within Import Administration to coordinate cases involving non-market economies in order to develop an experienced core of investigators familiar with the facts of such investigations and to ensure consistency in terms of the methodological approach.

Reinforce Efforts to Promote the Sale of American Manufactures in Global Markets

U.S. exports of manufactured goods have fallen significantly in the past two years. Although the pace of economic growth abroad appears to be accelerating, an expanded export promotion strategy should help ensure U.S. manufacturers have access to foreign markets that U.S. negotiators have opened. The following steps are designed to both improve the coordination of and accountability for U.S. export promotion activities, as well as to focus those efforts in a way that is consistent with the current challenges facing U.S. exporters of manufactured goods. The recommendations include:

Enhance the U.S. Government's Efforts on Behalf of U.S. Manufacturing by Consolidating Commerce Department Export Promotion Functions

Consolidation of all Commerce Department export promotion functions under a new Assistant Secretary for Trade Promotion, who would serve concurrently as the director general of the Commercial Service, would represent a solid first step toward improving the promotion of exports of manufactured goods in global markets. That consolidation would improve coordination and ensure accountability for the implementation of the National Export Strategy.

Accelerate Implementation of the President's National Export Strategy

Consistent with the legislation creating the Trade Promotion Coordinating Committee (TPCC), the administration published a comprehensive approach to improving the delivery of government export promotion services. The National Export Strategy contains a series of innovations designed to improve the promotion of U.S. exports. Given the sharp decline in U.S. exports in the recent past, the Commerce Department, as chair of the TPCC, should accelerate the implementation of

those innovations to improve the prospects for American manufacturers seeking new markets abroad.

Implement a Global Supply Chain Initiative to Promote Access to the Global Marketplace

Manufacturers at every roundtable reinforced the importance of focusing on access not just to export markets, but to global supply chains that would take American manufactured goods into the international stream of commerce. The Commerce Department, in conjunction with the TPCC, should develop and implement a joint public-private global supply chain initiative to promote access by America's small and medium-sized manufacturers into global supply chains.

As part of the initiative, the Commerce Department should assess the benefits of establishing new venues in major foreign commercial centers to enhance the services offered to U.S. exporters while in the country and to provide for on-the-ground expertise, including market research capabilities.

Promote Global Recognition and Use of U.S. Technical Standards

One significant means of expanding the access of small and medium-sized U.S. manufacturers to global supply chains is to encourage the adoption of U.S. technical standards in world markets for manufactured goods. With U.S. standards in place, a small or medium-sized U.S. manufacturer is, in effect, already "export ready," saving the manufacturer from the expense of satisfying more than one technical standard. Recognition and use of U.S. standards would have the additional benefit of reducing the ability of foreign governments to use technical specifications as a means to bar access to their markets for manufactured goods. Secretary Evans launched a global standards initiative in spring 2003 that was designed to achieve these objectives and to promote a private-sector based approach to standards development in other nations. The initiative should be accelerated and given a high priority by the various Commerce Department offices involved.

Update and Reauthorize U.S. Export Control Laws

Manufacturers in some sectors identified U.S. export control laws as an impediment to their competitiveness in international markets. Although necessary, such controls should be focused on truly sensitive goods and technologies consistent with U.S. national security concerns. The United States should work to ensure that such controls are applied uniformly by our multilateral export control regime partners. The administration should continue its support for the early passage of a revised Export Administration Act that would take into account the changes in technology and the international marketplace, as well as defense-acquisition practices.

The administration should also review the existing structure of the U.S. foreign-trade zone program to determine how it could be enhanced to provide a greater incentive to manufacture in the United States. The Commerce Department, which is responsible for administering the existing program, should do a benchmark analysis of how other countries make use of their foreign-trade zone mechanisms to determine whether there are features of those programs that the U.S. government should consider implementing, particularly as a means of lowering the cost of such programs for small and medium-sized businesses in the United States.

Notes

[1] The research and experimentation tax credit is commonly referred to by manufacturers as the R&D tax credit.

[2] President's Council of Advisors on Science and Technology, *Technology Transfer of Federally Funded R&D* (Washington, D.C.: President's

Council of Advisors on Science and Technology, May 2003).

[3] The Manufacturing Extension Partnership was created with the enactment of the Omnibus Trade Act of 1988 (Public Law 100-418).

[4] Researchers at the Census Bureau's Center for Economic Studies found that manufacturing extension clients experienced between 3.4 and 16 percent more growth in labor productivity over a five-year period than similar non-client firms. The productivity growth of the 1,559 firms studied translates into $484 million in additional value-added at client firms.

[5] The Technology Administration Act of 1998 (Public Law 105-309).

Appendix

List of Manufacturing Roundtables and Participants

High Point, N.C., April 23, 2003

Industry focus:

TEXTILES AND FURNITURE

Participants:

Keith Crisco
Asheboro Elastics

Diane Howell
Kayser-Roth Corporation

Willis Moore
Unifi, Incorporated

Jerry Rowland
National Textiles

Anderson Warlick
Parkdale Mills

San Jose, Calif., May 8, 2003

Industry focus:

IT EQUIPMENT, TELECOMMUNICATIONS, COMPUTERS

Participants:

Bob Armistead
Aracor

Philip Fok
Solectron

Daryl Hatano
Semiconductor Industry Association

Greg Hines
Solectron

Cynthia Johnson
Agilent Technologies

Juri Matisoo
Semiconductor Industry Association

Fred Nichols
National Association of Manufacturers

Rockford, Ill., May 12, 2003

Industry focus:

HEAVY EQUIPMENT, TOOL AND DIE, MACHINERY

Participants:

Eric Anderberg
Dial Machine Corporation

Bruce Braker
Tooling and Manufacturing Association of Chicago

Bob Brunner
Illinois Tool Works

Thomas Burenga
Worksave, Inc.

Gerald Busse
Rockford Toolcraft, Inc.

Michael Cayley
MIDACO Corporation

Allan Curran
Royal Products

Lloyd Falconer
Seward Screw Products

Mary Rose Hennessey
NIU Biz Coalition for Manufacturing

Michael Hetzel
Americas for ProQC International

Bill Hickey
Lapp, Mickey Steel Corp.

Phil James
Ingersol Production Co.

John Kaminski
E.D. Etnyre & Company

Alan D. Kinsler
Sellstrom Manufacturing

Bill Lee
Navagation Consulting Group

Richard Lingus
Rockford Consulting Group, Ltd.

Mike Lynch
Illinois Tool Works

Howard Newel
Hammil Tool

Alan Petrucci
BA Die Mold, Inc.

Dan Provonsano
Teletool Manufacturing

James J. Zawacki
GR Spring & Stamping, Inc.

Washington, D.C., May 20, 2003

Industry focus:

MACHINERY

Participants:

Jay Carlson
G&R Manufacturing

Richard Demsey
Demsey Manufacturing Co., Inc.

Chris Gemino and Robert Heche
Gaynor Electric Co., Inc.

Bob Hawie
Hawie Manufacturing

Frank Johnson
Manufacturing Alliance of Connecticut

George LaCapra
Quality Rolling & Deburring

Rich Larkin
Brown Larking & Co., LLC

Wells Lindsey
Manufacturing Service Corp.

Nick Masi
Masi Associates

David Niven
Dohnam Craft

Steve Sasala
Greater Waterbury Chamber of Commerce

Mark Stuart
National Association of Manufacturers

Bruce Thompson
Projects Incorporated

Joe Vrabely
Atlantic Steel & Processing, LLC

Manchester, N.H., May 29, 2003

Industry focus:

IT EQUIPMENT, TELECOMMUNICATIONS, COMPUTERS

Participants:

Raymond Boissoneau
Electropac Company

Mark Buck
Hypertherm

Marc Giroux
Corning, Inc.

Kedar Gupta
GT Equipment Technology

James (Giff) Kriebel
BAE Systems

Gerry Letendre
Diamond Casting & Machine Company

Hong Yu
Metrobility Optical Systems

Milwaukee, Wis., May 29, 2003

Industry focus:

FOOD PROCESSING, PACKAGING, HEAVY EQUIPMENT

Participants:

James Buchen
Wisconsin Manufacturers and Commerce

Mark Hardwick
P&H Mining Equipment

Joe Morrissey
Conflex, Inc.

Rick Patek
Telsmith, Inc.

Steven Polonowski
Krones, Inc.

Steve Tyler
CNH

Mike White
Rite-Hite Corporation

St. Louis, Mo., June 13, 2003

Industry focus:

CHEMICALS, AVIONICS, BIOTECHNOLOGY

Participants:

Bill Bachman
Bachman Machine Company

Robert Burns
Patriot Machine

Stewart Dahlberg
J.D. Street & Co.

Gerald Daniels
Engineered Support Systems

Kimberly Hayden
Supreme Tool & Die

Ray McCarty
Missouri Chamber of Commerce and Industry

Mike Mittler
Mittler Brothers Machine & Tool Company

Len Poli
M. Carder Industries

Kenneth Shead
IDS Boeing

Don Wainwright
Wainwright Industries

Summit, N.J., June 30, 2003

Industry focus:

PHARMACEUTICALS, BIOTECHNOLOGY

Participants:

Joseph Cherry
CR Bard

Joe Fusco
Novus Fine Chemicals

Stephen Greene
G&W Laboratories

William Healy
Health Care Institute of New Jersey

Michael Katz
Cenogenics

Christian Schade
Medarex

Washington, D.C., June 24, 2003

Industry focus:

MANUFACTURING IN 2020

Participants:

Arden Bement
NIST, Department of Commerce

Ron Blackwell
AFL-CIO

Cary Crouse
Delphi, Inc.

Tom Duesterberg
Manufacturers Alliance/MAPI

Steven Empedocles
Nanosys, Inc.

Juan Enriques-Cabot
Harvard Business School

Terry Lisenby
Nucor Steel, Inc.

Martha Morris
IBM

Leo J. Reddy
National Coalition for Advanced Manufacturing

Ross E. Robson
Shingo Prize for Excellence in Manufacturing

George Scalise
Semiconductor Industry Association

Amram Shapiro
Pittiglio, Rabin, Todd & McGrath

William Strauss
Federal Reserve Bank of Chicago

Michael Tieman
Red Hat Software

Tim Timken, Jr.
Timken Corporation

Bruce Tompkins
Institute of Industrial Engineers

Frank Vargo
National Association of Manufacturers

Jim Zawacki
FR Spring and Stamping

John Zysman
University of California at Berkeley

New Britain, Conn., July 7, 2003

Industry focus:

AEROSPACE, MACHINERY

Participants:

Lou Auletta
Bauer, Inc.

Murry Gerber
National Association of Manufacturers, Small and Medium Manufacturers Group

Frank Johnson
Manufacturing Alliance of Connecticut

Bill Lee
The Lee Company

Mick Mauer
Sikorsky Aircraft Group

Ted Malkowski
Continental Machine Company

Al Mulvey
Pratt & Whitney

Steve Prout
Alpha Q

John Salce
Hygrade Precision Technologies

Bruce Thompson
Projects, Inc.

Los Angeles, Calif., July 7, 2003

Industry focus:

MINORITY-OWNED AND SMALL MANUFACTURERS

Participants:

Candance Chen
Power Clean 2000, Inc.

Maria de Lourdes Sobrino
Lulu's Dessert

Frank Villalobos
Barrio Planners, Inc.

Linda Wong
Community Development Technologies Center

Columbus, Ohio, July 8, 2003

Industry focus:

METALS, TIRES, PLASTICS

Participants:

Lowell Dunckel
Goodyear

Steve Giangiordana
RTI International Metals

Mitchell Hecht
International Steel Group

Robert Stevens
Impact Forge

John Vaught
Tri-Cast

Trenton, N.J., July 8, 2003

Industry focus:

CHEMICALS

Participants:

Ashok Balar
Clariant Corporation

Hal Bozarth
Chemical Industry Council of New Jersey

W. Dexter Brown
National Starch and Chemical Company

William Fee
Magnesium Elektron, Inc.

Ron Fenn
Polarome International

Charles A. Lynch
New Jersey Commerce and Economic Growth Committee

Roger Madden
Church & Dwight

Salvatore Monte
Kenrich Petrochemical, Inc.

Ron Munson
Church & Dwight

Gerald Pechulis
Valero Energy

Gene Reinhardt
Dow Chemical

Jeff Stoller
New Jersey Business and Industry Association

Ed Van Ek
C.J. Holt

Detroit, Mich., July 9, 2003

Industry focus:

AUTOMOTIVE PARTS SUPPLIERS

Participants:

Christopher Bates
Motor & Equipment Manufacturers Association

Jason Brewer
E&E Manufacturing

Ron Cutter
TRW Automotive

Neil DeKoker
Original Equipment Suppliers Association

Sylvia Vogt
Robert Bosch Corporation

John Voorhorst
Denso International

Washington, D.C., July 10, 2003

Industry focus:

FOUNDRY

Participants:

Michael Beyersdorfer
Sawbrook Steel Casting Company

G. Edward Curtis
Harrison Steel Casting Company

Shane Downey
American Foundry Society

Jim Lajeunesse
Bronze Craft

Jim Mallory
Non-Ferrous Founders Society

Bill Martin
Neenah Foundry

Joe Mayer
Copper Brass Fabricators Council

Raymond Monroe
Steel Founders Society

Russell Symmes
Aluminum Foundries

Fred Wilton
Wilton Armetale Company

Chicago, Ill., July 10, 2003

Industry focus:

HIGH TECHNOLOGY

Participants:

Shail Godambe
Motorola, Inc.

Anthony Hilvers
IPC

Richard Paullin
Illinois District Export Council

Candy Renwall
Chicago Software Association

Ramesh Seth
S.I. Tech, Inc.

Mike Skarr
Naperville Chamber of Commerce

Robert Weskamp
Wes-Tech, Inc.

Ray Willis
Zuchem, Inc.

Des Moines, Iowa, July 11, 2003

Industry focus:

GENERAL MANUFACTURING

Participants:

Ralph Burchfield
Firestone Tires

Daniel B. Garry
3M

Alan Oak
Goodrich

Bob Jennings
EFCO

Christopher Nelson
Kemin Industries

Minneapolis, Minn., July 14, 2003

Industry focus:

MEDICAL DEVICES

Participants:

Daniel B. Garry
3M

Keith Guggenberger
Starkey Labs

Stephen Oesterle
Medtronic Inc.

Marge Searing
Advanced Medical Technology Association

Phillip Vierling
EMPI

Paul J. Wagner
Minnesota Wire and Cable

New Orleans, La., July 22, 2003

Industry focus:

ENERGY, ELECTRICITY, OIL AND GAS EQUIPMENT

Participants:

Guy Barone
Xenetech, Inc.

Chris Bollinger
Bollinger Shipyards, Inc.

Murphy Bourke
Gulf Island Fabrication

William Coyle
Bilco Tools, Inc.

Leo Guidroz
Oil Stop, LLC

Von Hatley
Louisiana Department of Economic Development

Rick Kelly
Pellerin Milnor Corporation

Allen Porter
Allen Process System

Brett Reagan
Point Eight Power, Inc.

Rodder Russo
Stabil Drill Specialties

Arthur Zatarain
TEST Automation & Controls

Washington, D.C., July 24, 2003

Industry focus:

AUTOMOBILE MANUFACTURING

Participants:

Edward Cohen
Honda

Steve Collins
Automotive Trade Policy Council

Josephine Cooper
Alliance of Automotive Manufacturers

Marie Kissel
DaimlerChrysler

Curt Magleby
Ford Motor Company

Tim McCarthy
Association of International Automobile Manufacturers

Mustafa Mohatarem
General Motors

Harland Reid
Nissan

Doug West
Toyota

Washington, D.C., Aug. 14, 2003

Industry focus:

WORKFORCE AND EDUCATION

Participants:

Sandra Carney-Talley
Aerospace Industries Association

Edward Dooley
Air-Conditioning and Refrigeration Institute

Phyllis Eisen
National Association of Manufacturers

James Hughes
Northrop Grumman

Steven Mandes
National Institute for Metalworking Skills

Dan Meckstroth
Manufacturers Alliance

Branka Minic
Manpower, Inc.

Tony Raimondo
Behlen Manufacturing

Michael Smeltzer
Manufacturers Association of South Central Pennsylvania

Richard Walker
National Tooling and Machining Association

Ft. Lauderdale, Fla., Aug. 19, 2003

Industry focus:

AEROSPACE

Participants:

Carlon Aaron
Hialeah Metal Spinning

Dan Becker
Boeing

Reynaldo Blanco
Florida Air Transport

Stan Bodner
Greater Miami Aviation Association

Ken Cooksey
Enterprise Florida

Michael Fatig
Honeywell, Inc.

Ken Krauter
New Port Director

Bill Lewandowski
Aerospace Industries Association

Sam Plummer
GEAR Technologies

Jim Roubian
HEICO Corporation

Kenneth Sitomer
VHL Aircraft Inc.

Al Stimak
Metal Essence

James Swanson
Swanson Tool

Washington, D.C., Sept. 5, 2003

Industry focus:

FOREST PRODUCTS

Participants:

George Glatfelter II
Glatfelter Company

Donna Harman
American Forest and Paper Association

Kenneth Jastrow II
Temple-Inland, Inc.

John A. Luke, Jr.
MeadWestvaco Corporation

Henson Moore
American Forest and Paper Association

Arnold M. Nemirow
Bowater, Inc.