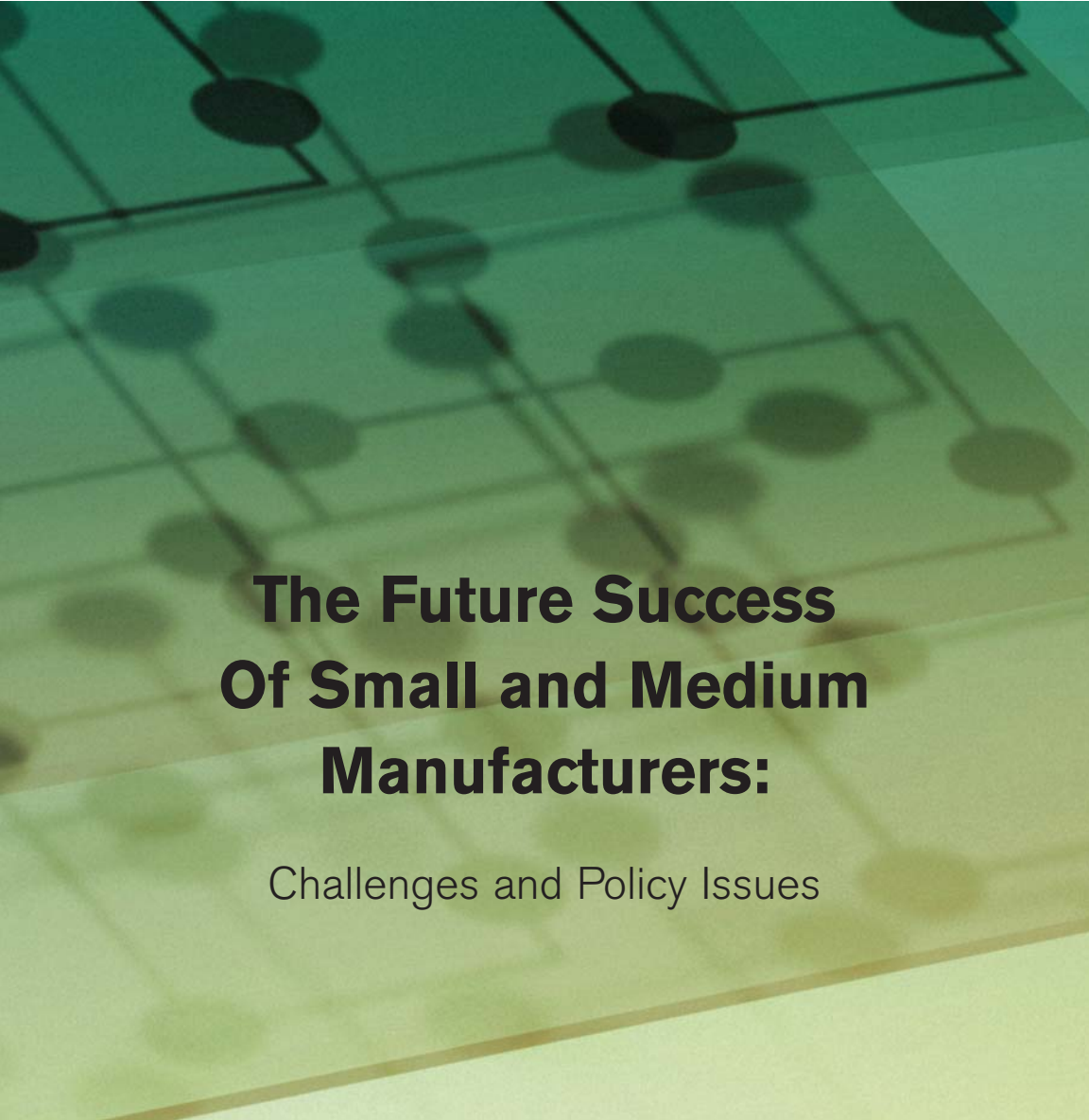


The **Manufacturing Innovation** Series



**The Future Success
Of Small and Medium
Manufacturers:**

Challenges and Policy Issues

RSM! McGladrey

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MANUFACTURING
INSTITUTE
MANUFACTURING MAKES AMERICA STRONG

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Foreword

It has been five years since the National Association of Manufacturers and The Manufacturing Institute last reported to its membership on the state and future of small and medium manufacturers (SMMs). Much has happened in these short intervening years: an unprecedented attack on our country, an economic implosion, a resurgence in the economy tempered by the shadow of new and powerful competition from overseas. What lies ahead is the subject of the booklet you hold in your hands.

RSM McGladrey is pleased to sponsor this special report: *The Future Success of Small and Medium Manufacturers: Challenges and Policy Issues*. In these pages you will learn more about the current challenges faced by SMMs, the policy changes and steps required for the United States to retain its place as the world's leader in manufacturing, the latest in best practices and more.

In the face of many challenges, the future for SMMs remains bright. SMMs hold the key to the U.S. manufacturing sector, the viability of our national economy and, just as importantly, to the communities in which they have established their businesses. This is evidenced by:

- 40 percent of the total value of U.S. production;

- 8 million employees—60 percent of U.S. manufacturing employment;
- 62,000 exporters with many more supplying other exporters;
- more innovations per employee than large manufacturers.

RSM McGladrey traces its roots back 80 years, starting in America's heartland and serving both small and medium manufacturers. Like many of you, we've expanded our scope, grown nationally and globally, and become more sophisticated offering a combination of complementary corporate and individual tax, audit*, accounting and consulting services. The one constant has been our continued dedication to serving SMMs. With nearly 6,000 manufacturing clients across the country, we have a clear understanding of the issues confronting SMMs and the environment in which you operate.

U.S. manufacturing remains second to none. But this is not a time for complacency—it's a time for action. Your guidepost and roadmap are within these pages. We are proud to be associated with the NAM, The Manufacturing Institute and its members. We all need to continue to work together to make it happen.



Thomas G. Murphy
Executive Vice President
Manufacturing & Wholesale Distribution
RSM McGladrey, Inc.

RSM! McGladrey

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Acknowledgements

The Manufacturing Institute, RSM McGladrey and the National Association of Manufacturers (NAM) want to thank and recognize the many individuals who helped develop and issue this report. We are grateful to NAM President John Engler and The Manufacturing Institute President Jerry Jasinowski for encouraging us to proceed with this publication and their own good ideas for improving the initial drafts.

We are fortunate that RSM McGladrey, a business services organization based in Bloomington, Minn., which works extensively with small and medium manufacturers (SMMs), partnered with us on this project. We thank McGladrey's Executive Vice President Thomas G. Murphy for his vision to see the importance of reissuing this booklet, for underwriting it and for his time and involvement in its writing.

We thank Henry A. Davis, our author, for his comprehensive proposal, diligence in interviewing so many business owners and extensive research. We very much appreciate the interview that Assistant Secretary of Commerce for Manufacturing and Services Al Frink provided for this report.

The Manufacturing Institute managed the writing and production of this report. We would like to thank Vice President Phyllis Eisen and Managing Director of the Center for Workforce Success Stacey Wagner for their advice and counsel.

At the NAM, many thanks to those who gave us their good ideas and suggestions from beginning to end: SMM Director Jeff Noah; Chief Economist David Huether; Art Director Irina Stepanova; Editors Patrick Connole and Marissa Gandelman; and all of the NAM's policy departments that know SMMs so well from their work with them on legislative and regulatory issues.

Last but by no means least, we want to thank the "baker's dozen" of manufacturers who are quoted in this report, for their insights and their willingness to help us shape a document that is highly relevant to today's SMMs:

Karla Aaron, Hialeah Metal Spinning,
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Gerry Letendre, Diamond Casting &
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Al Lubrano, Technical Materials,
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Dyke Messinger, Power Curbers, Inc.,
Salisbury, N.C.

Tony Moore, The Glove Corporation,
Heber Springs, Ark.

Ronald Moquist, Raven Industries,
Sioux Falls, S.D.

Bob Piazza, Price Pump, Sonoma, Calif.

Fletcher Steele, Pine Hall Brick
Company, Inc., Winston-Salem, N.C.



Bill Canis,
Vice President and Executive Director
The Manufacturing Institute

Introduction

Small and medium manufacturers (SMMs) have been a key part of the American economy for generations. About 1870, when Ulysses S. Grant was not even at the midpoint of his first term as president, Calculagraph Company was founded as a maker of watch parts. Decades later, the New Jersey-based company reinvented itself and helped usher in a new telecommunications era when it became a manufacturer of clocks used by the phone company to record the timing of long-distance calls.

This small company with 60 employees is still in business today under the name of Control Products. Like all successful SMMs, Control Products has innovated to stay ahead of the competition, now making sealed, waterproof switches and patented linear position sensors for industrial applications that were entirely unknown in Grant's day.

Innovation, flexibility, speed to market and closeness to the customer are characteristics of successful SMMs. These small company traits are critical components of the free enterprise economy that has made the United States the most successful industrial country in the world.

The NAM defines small manufacturers as companies with 500 or fewer employees and medium-sized manufacturers as those with 2,500 or fewer. SMMs have been the bedrock of NAM membership since our founding in 1895.

The NAM and The Manufacturing Institute published their first report on SMMs in 2001, in the twilight of the 1990s prosperity boom and before the major recession that engulfed most of manufacturing well into 2003. Some SMMs closed their doors in those years, the most severe manufacturing recession in decades. With the manufacturing economy beginning to recover, it is

time to take a new look at SMMs in America in 2006. The purpose of this report is to:

- Remind policymakers and the media about the vital role of SMMs in the economy;
- Discuss pending federal legislation impacting the future of SMMs;
- Describe the external and management challenges faced by SMMs;
- Highlight government programs that can be of help to SMMs;
- Showcase some of today's successful SMMs in their own words.

Today, America's economic position is being challenged by rapidly growing economies around the world. Once again, American ingenuity and drive must be summoned to retain manufacturers' competitive edge in the changing global marketplace of the 21st century.

SMMs are playing a vital role in responding to these competitive challenges and are an important part of the solution. Strengthening the hand of SMMs will enhance the nation's overall ability to adapt in order to compete and succeed in the decades ahead.

Two trends are increasingly shaping the future of SMMs. First, large manufacturers are increasing their dependence on suppliers of parts as they streamline their own operations. This has been a positive growth story for many SMMs as they have expanded businesses into areas formerly owned and operated by large manufacturers. But it has been a double-edged sword, as the pressure to reduce prices is passed down the supply chain with the burden for cost reduction and innovation increasingly falling on SMM suppliers.

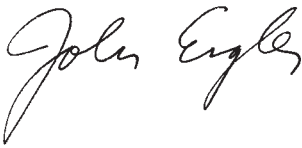
The second trend—the development of increasingly sophisticated production in developing countries—cuts the other way and has toughened the landscape for all

manufacturers, including SMMs. To stay in business, SMMs have to offer value to their customers that low-cost overseas competitors cannot match, such as proprietary, high-technology products; a willingness to customize; extraordinary service and parts support; short production runs; and fast turnaround time. These trend lines make clear that the performance of all of U.S. manufacturing is tied more than ever to the success of SMMs.

This report is also addressed in part to SMMs, with our hope that some of the 15 best practices shared here will strengthen their

business plans. Ultimately, SMM entrepreneurs take responsibility for their own success; and it is their inventiveness, dedication and daring that have helped make the U.S. economy the vibrant powerhouse that it is today.

Our report is written primarily for policymakers who may not appreciate the contributions and challenges faced by SMMs in their own states. Elected officials who want to see their SMMs prosper should heed the recommendations for better public policy discussed in this report.



John Engler
President and CEO
National Association of Manufacturers



Jerry Jasinowski
President
The Manufacturing Institute

Executive Summary

While small and medium manufacturers (SMMs) in the United States are being challenged as never before, they continue to make a vital contribution to the U.S. economy and exhibit numerous competitive strengths. This report identifies **15 best practices** that are followed by successful SMMs.

The SMM profile: small manufacturers are companies with fewer than 500 employees and medium-size manufacturers are those with fewer than 2,500 employees. While leading SMMs keep abreast of current legal, legislative, regulatory and other policy issues, they take responsibility for their own success in efforts to differentiate themselves and achieve competitive advantage in today's global economy. They —

- number more than 296,000;
- represent more than 99 percent of the nation's manufacturers;
- account for 40 percent of the value of U.S. production;
- employ more than 8 million men and women;
- increasingly export: 95 percent of all manufacturers that export are SMMs, responsible for 15 percent of the nation's manufactured goods exports.

SMMs, almost all privately owned, have important competitive strengths. They are close to the customer, responsive, flexible, innovative and entrepreneurial. As such, they offer attractive career opportunities for bright, ambitious employees who, in turn, reinforce their competitive strengths.

External challenges for SMMs in the United States today include:

- evolving technology;
- changing customer demands;
- competing in the global marketplace;
- high costs, especially energy and health care;

- educational and skill deficiencies at all levels from engineers and scientists to factory employees.

While the United States remains the world's leading innovator in terms of research and development and patents granted, other fast-growing economies are catching up, partly because more of their students are earning degrees in math, science and engineering. The combination of high energy and health care costs, retirement benefits, tort litigation costs, regulatory compliance costs and taxes add more than 22 percent to U.S. manufacturers' unit labor costs compared to our principal foreign competitors, and SMMs are hit disproportionately hard by these costs.

As foreign competitors, particularly from China, continue to drive world prices down and structural costs continue to increase, SMMs are suffering a profit squeeze.

SMMs also face a range of **internal management challenges**. Working with finite financial and human resources, principals of SMMs are constantly prioritizing among managerial challenges. While running day-to-day operations, the SMM owner or manager is also looking to the longer term, defining the company's competitive niche in terms of product and marketing strategy, developing export markets, keeping abreast of technology, choosing among capital investment opportunities, reducing waste through lean manufacturing techniques and demonstrating quality management through ISO certification.

Among the **NAM's current policy priorities most relevant to SMMs** are:

- increasing offshore natural gas development to relieve supply shortages and price increases;
- providing fuel flexibility during high energy seasons;

- finding qualified employees to replace high-skilled retiring employees;
- reining in health care costs;
- obtaining market-determined exchange rates;
- reducing the trade-distorting effects of high overseas tariffs and differing technical standards and testing;
- fostering adequate intellectual property protection;
- improving the nation's legal system;
- making recently enacted tax relief permanent, including estate tax repeal and lower tax rates.

Leading SMMs are moving toward defined contribution approaches such as Health Savings Accounts and Health Reimbursement Arrangements to contain their health care expenses. The NAM supports legislation to curtail frivolous lawsuits and to establish a privately sourced trust fund to rein in asbestos litigation. Public funding for workforce development in community colleges and

technical schools and business-education partnerships represent a joint government-business effort to narrow the skills gap.

Through a recently established Office of Manufacturing and Services, the Department of Commerce has taken numerous initiatives to coordinate various government agency regulations relevant to manufacturers. The report includes an insightful **interview with the first assistant secretary for manufacturing and services, Al Frink.**

SMMs are taking advantage of Commerce Department services for exporters, consulting Manufacturing Extension Partnerships (MEPs) on a full range of business management and technical issues, and Small Business Administration loan and R&D funding programs, while becoming involved in local Workforce Investment Boards to ensure that Department of Labor employment and job training programs are meeting their needs. **The appendix to this report is an SMM guide to many of these government resources.**

The 15 Best Practices of Today's SMMs

While there are many best practices followed by leading SMMs, there are 15 characteristics that are key to success in today's global market:

1. Stay in touch with customers, talk to them about their needs and look to them for new product ideas.
2. Differentiate products and services to better define and develop a competitive advantage.
3. Devote the necessary time and energy to marketing; develop a distinctive product and marketing strategy; expand and diversify your customer base.
4. Go global. Develop export markets.
5. Ensure that your activity-based cost system is helping your company contain cost increases, focus on which activities are consuming the most resources and highlight non-value added activities.
6. Look for a long-term relationship with a banker who is willing to take the time and effort to understand your company.
7. Invest at least 3 percent of your payroll in employee training; get involved with Workforce Investment Boards (WIBs), government-sponsored training programs and local educational institutions such as community colleges that offer training in manufacturing skills.
8. Explore how experts from a Manufacturing Extension Partnership (MEP) center can help you with your business.
9. Appoint a majority of outsiders with relevant and diversified business experience to your board of directors or board of advisers; look to those outside directors or advisers for opinions and advice; welcome their challenge.
10. Develop a plan for management succession. Start estate planning early and continually keep abreast of estate tax laws and regulations.
11. Monitor your company's viability and competitiveness on a daily, weekly and monthly basis with a set of key performance indicators (KPIs) tailored to your company's particular business challenges.
12. Weigh both quantitative and qualitative factors in making capital investment decisions. Strike a balance between staying on top of technology and making investments you can't afford; no company has unlimited resources.
13. Constantly look for opportunities to delegate, to empower your employees at all levels and to create the corporate culture for a high-performance workplace.
14. Speak out to your government representatives at the federal, state and local levels.
15. Stay abreast of legislative, regulatory and policy developments through the general media, business publications, and industry, trade and professional organizations such as the NAM (www.nam.org).

The Manufacturing Economy

According to government statistics, small businesses, defined as all non-farm, private-sector businesses with fewer than 500 employees, create two-thirds of all new private-sector jobs in the United States, employ more than half of all workers, and account for more than half of the output of the U.S. economy. Add in medium-sized manufacturers with 2,500 employees or less, and it is clear this segment of American business has a significant impact on the economy. Small and medium manufacturers (SMMs) account for 40 percent of the total value of U.S. production and employ more than 8 million people. That represents nearly 60 percent of U.S. manufacturing employment.

More than 218,000 small businesses export. That is nearly triple the number that exported 10 years ago; 62,000 of these exporters are SMMs. And many small businesses are indirect exporters, serving as subcontractors or suppliers for larger companies that export. Small businesses average more than twice as many innovations per employee as larger corporations.¹ However, there is a high risk factor as well. An estimated 10 percent of small businesses fold each year.²

It's well known that during the 2000–2003 recession more than 3 million jobs in manufacturing were lost, or about 15 percent of the total manufacturing workforce.

Less well known are Commerce Department data that show that between 1997 and the low point of the recession in 2002:

- The total number of manufacturing firms in the country dropped by 11 percent from 333,000 to about 298,000. Small manufacturers account for 294,000 of these firms and medium-size firms 3,000 with the remainder large manufacturers. A portion of the medium-size firms bore

the brunt of the recession, with 19 percent of those companies (with 1,000–1,499 employees) going out of business or merging, almost twice the average decline for all of manufacturing.

- The recession's impact on all manufacturing establishments was even more pronounced. "Establishments" include all plants and operations of manufacturing firms and, during this period, the number of establishments declined by 13 percent. A portion of the medium manufacturing category, however, declined by 26 percent. The data also show that the number of large manufacturing establishments declined by 26 percent.
- A similar picture emerges for employment, with the largest declines—28 percent—occurring in the same medium-sized and large manufacturing firms. Small manufacturers lost 16 percent of their workforce from 1997–2002.

Although the recession ended in 2003, the Commerce Department does not have reliable data to indicate how many manufacturing firms there are today. Based on the flat employment line in manufacturing, with few manufacturing workers being added to payrolls since 2003, it is unlikely that it has changed measurably since 2002. At least two conclusions can be drawn from this data:

- Policymakers in Washington and state capitals have not been tuned in to the impact that poor public policy is having on all of manufacturing, but especially the key medium-sized segment; and
- Smaller manufacturers weathered the recession better than larger firms, showing the resilience and flexibility that this report describes in detail.

Too few people realize that the United States is still the world's leading manufacturer, producing 75 percent of what it consumes. Manufacturing makes six important contributions to today's economy:

U.S. manufacturers produce more today than at any other time in U.S. history.

Standing alone, the U.S. manufacturing sector would represent the eighth-largest economy in the world, nearly equal to China's entire economy (see Chart 1 below).

Manufacturing is one of the primary engines of wealth generation in America, pumping out \$1.4 trillion in annual output, employing more than 14 million workers, and accounting for 12 percent of GDP and two-thirds of exports of goods and services. From 2002–2004, manufacturers contributed 15 percent of U.S. economic growth, larger than any other sector. Manufacturing's strength is partly the result of a multiplier effect. For every dollar of manufactured goods produced, an additional \$1.37 of economic activity is generated, as shown in Chart 2 on page 12.

The U.S. manufacturing sector leads in innovation, accounting for 57 percent of industrial R&D. The new products and processes developed in manufacturing contribute significantly to U.S. competitiveness, economic leadership and the current high standard of living.

Manufacturing is the workhorse that pulls the wagon of U.S. productivity. From 1994–2004, productivity in U.S. manufacturing grew by 4.5 percent per year, largely as a result of capital investment in increasingly automated equipment, while productivity in other non-farm sectors of the economy grew at a rate of only 2.7 percent per year. Increased productivity leads to higher returns on capital invested and enables managers to increase worker pay. The innovation and productivity growth stemming from the manufacturing sector over the past two decades has underpinned our success in international markets, helped drive productivity growth in the service sector, provided high-quality jobs and raised the standard of living throughout the country.

Chart 1. U.S. Remains the Global Leader in Manufacturing

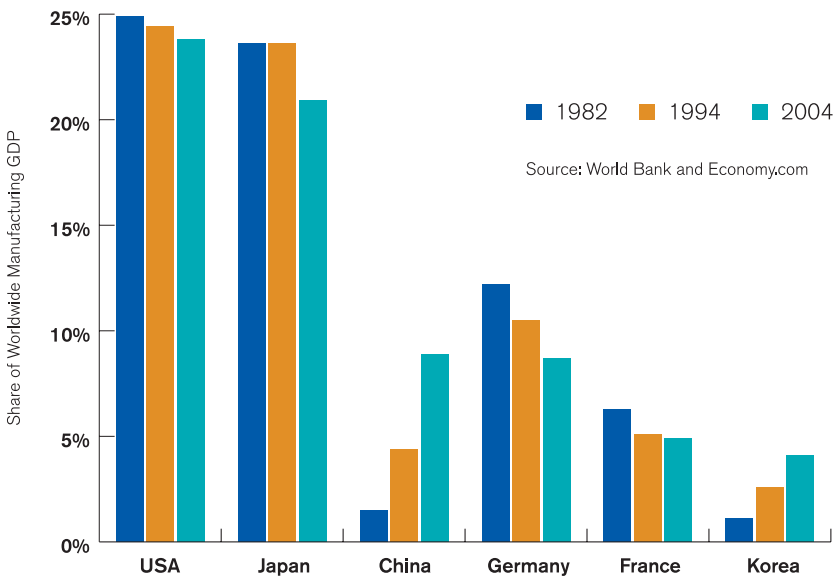
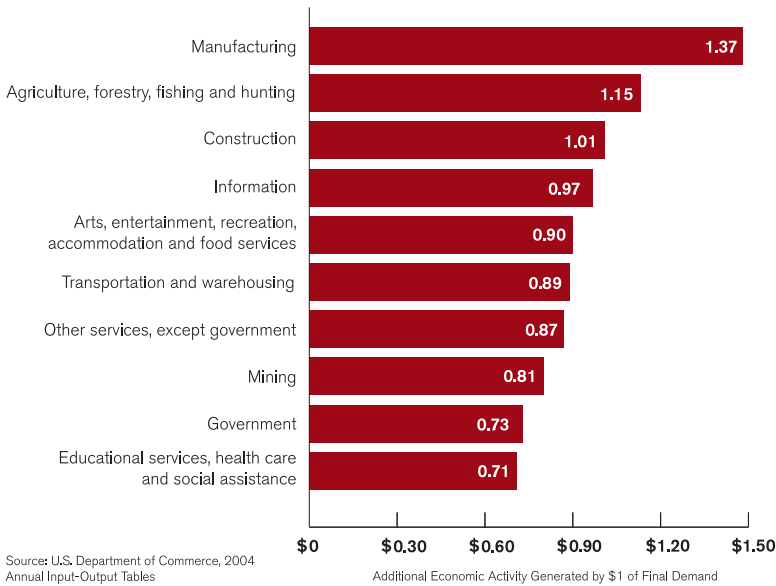


Chart 2. Manufacturers Generate More Activity Than Other Sectors (“The Multiplier Effect”)

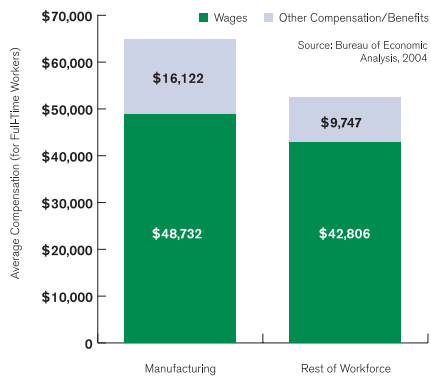


Manufacturers offer high-skill, high-wage jobs that pay an average of 23 percent more than the average wage earner in other sectors of the economy—as shown in Chart 3—and 50 percent more than retail salaries.³ A recent survey by the NAM, The Manufacturing Institute and Deloitte Consulting LLP shows that manufacturers value a high-performance workforce as the most important factor in their firm’s future success, followed by new production innovation and lower costs. The higher wages and benefits offered by manufacturers, when clearly understood by younger Americans, remain strong employment attractions.

Manufacturing is responsible for two-thirds of all U.S. exports of goods and services. That’s about \$50 billion a month exported, compared to agriculture, which exports that much in a year. Small manufacturers play a vital role in exports. Ninety-five percent of exporting firms have less than 500 employees, and those firms are responsible for 15 percent of the nation’s goods

exports, according to Department of Commerce and Small Business Administration data. The NAM’s annual Small and Medium Manufacturers Operating Survey shows that in 2005, exporting resumed its growth for SMMs after a fall off after 2000. Nearly 10 percent of SMMs report that their exports are more than 25 percent of sales, up from only 4 percent of companies reporting that level of exporting six years ago.

Chart 3. Manufacturing Pays Premium Workforce Compensation



Competitive Strengths of SMMs

While all small businesses face robust competition from domestic competitors, most small manufacturers also face intense competition from overseas as well. That's because manufacturing is more engaged in international trade than service businesses. More than 40 percent of manufacturing output is composed of combined exports and imports; double the level of trade engagement 20 years ago. That compares with only about 5 percent of the output of non-manufacturing being trade engaged. Large and small manufacturers alike are simply more competitively involved in the global marketplace than any other sectors.

Competition from so many sources makes it imperative that SMMs continually re-examine their competitive strengths. Indeed, SMMs have vital competitive strengths in being close to the customer, responsive, flexible, innovative and attractive places to work for the brightest and most ambitious employees. Most importantly, they are willing to take risks and have the entrepreneurial determination to succeed.

Close to the Customer. One SMM advantage is simply their location; their proximity to original equipment manufacturers (OEMs), large retailers, other SMMs and end users. Proximity to large buyers reinforces an SMM's position in the supply chain. All other factors being equal, it is more convenient for an American buyer to deal with a supplier or subcontractor within the United States than it is to cope with different languages and regulations, longer lead times and overseas transportation as required

with a foreign supplier—particularly one in Asia.

Responsive and Flexible. To be competitive, an SMM can offer fast turnaround time and often is willing to take orders for small production runs that would be uneconomical for a buyer to contract overseas. Flexibility of course can be both a competitive strength and a challenge for a small manufacturer. With just-in-time manufacturing, order sizes have become smaller and timely delivery is critical.

Furthermore, the parts an OEM outsources to SMMs can be the ones that are most difficult and costly to make.

Every year, the NAM surveys its SMMs. More than 80

percent of the SMMs responding to the NAM's 2005 Small and Medium Manufacturers Operating Survey are private, family or individually owned. They are often more flexible in their day-to-day operations than publicly traded companies. As a result, they can be more willing to invest for the long run and have more flexibility in managing their skilled workers during downturns.

"In the long run, we are subject to the same forces as a large, publicly held company, but in the shorter run, I think we can be more nimble," said Gerry Letendre, president, **Diamond Casting & Machine Company**, a 60-employee producer of aluminum components based in Hollis, N.H. "We don't have Wall Street people questioning us about our quarterly results. When our sales and profits dropped during the recession in 2000, we didn't lay off any of the employees; we had worked hard and spent

"In the long run, we are subject to the same forces as a large, publicly held company, but in the shorter run, I think we can be more nimble."

Gerry Letendre, president,
Diamond Casting & Machine Company

money to train. Instead, we postponed our plans to purchase a new, computerized drilling machine and reinvested our capital to introduce new products and build up inventory. During good times we set cash aside so we can sustain the not-so-good times comfortably.”

Innovative. SMMs have always found that the best long-term strategy is innovation and, in particular, exploiting the U.S. technological lead over trading partners. Despite recent efforts by competitors such as China and India to train scientists and engineers to move up the value chain, the United States is still the world’s leader in innovation and technology.

“Basically, if you are making commodity products, you can’t afford to do it in this country, especially if you are a small company,” observes Collie Hutter, chief operating officer and owner of **Click Bond, Inc.**, a Carson City, Nev., manufacturer of proprietary fasteners designed for adhesive bonding that are used primarily in the aircraft industry. “The one thing this country still has going for it is innovation. It is part of us, somehow, and it is what we do best. How long we can hold on to this leadership position, I don’t know. But to survive in manufacturing today, you have to keep bringing new, innovative products to the market.

“We sell not only innovation but also extremely high quality to meet the standards set for aircraft manufacturing. One of the reasons we can survive is that we sell on the basis of installed cost. We are not competing head to head with an ordinary nut or bolt that can be made in another country. We have a large engineering department for a company of this size, and just a week ago we had our 14th patent issued. We are not a job shop and we do not design to customer needs, but many of our new product and product-enhancement ideas come from observing what our customers are doing.

Our engineers are constantly studying current trends in aircraft manufacturing. They spend a lot of time on planes and as much time as they are allowed on the plant floor watching people build planes.”

Innovation is in Click Bond’s DNA. It is a subsidiary of a family-owned company that originally earned its revenue strictly from R&D: developing new products, getting patents and licenses, and doing the initial manufacturing before selling the licenses to other companies.

“To survive in manufacturing today, you have to keep bringing new, innovative products to the market.”

Collie Hutter, COO and owner, Click Bond, Inc.

Entrepreneurial. Never to be underestimated among SMMs’ competitive strengths is a uniquely American brand of entrepreneurial initiative, drive and determination. Small-business entrepreneurs are not interested in just making money; they are striving for a much broader sense of achievement. They are usually doing what they want to be doing and their identity and sense of self worth is tied up in their business. With confidence in their vision and personal stakes in the outcome, owners of SMMs are sometimes willing to take greater risks than managers of public companies.

“It is easier for entrepreneurs to come up with new ideas in the United States than in other countries because of the freedom they have,” Hutter said. “Whether by history, nature or both, this has always been a nation of innovators. You can still dream of going out to your garage, tinkering around, coming up with something, and building it into a nice company. It is done over and over again in this country; it is socially accepted

and it's expected. We are not expected to do things just as our fathers did, but rather to strike out and find our own fortune. And of course we have the educational system and the financial resources to support this entrepreneurial activity.

Attractive Places to Work. Manufacturers generally pay higher wages than other non-manufacturing small businesses. In addition, the benefits offered are generally more extensive, including health care, tuition reimbursement, 401(k) and other pension benefits. For SMMs who export, surveys have shown that they pay a premium wage above the regular manufacturing wage. In addition to wages and benefits, SMMs offer job advancement opportunities that may not be as readily available in larger companies. With lean staffs and minimal hierarchy, SMMs can give their employees a wider range of responsibilities than they could get elsewhere. In this way, an SMM owner who is willing to delegate and empower can attract the brightest and most ambitious employees, thereby enhancing the company's competitiveness.

A Positive Force in the Community.

In addition to the taxes that SMMs pay to support local governments and schools, they also support local programs that enhance communities across the country. SMM owners normally live and work in the same communities as their employees, so they often have firsthand knowledge of their employees and the needs of the local community. Through their philanthropy, they make a difference in improving the quality of life, the schools and the local cultural institutions.

Williams-Pyro in Fort Worth, Texas, a small manufacturer of electronic test equipment, founded the Williams-Pyro Firefighters Fund in 1999 when local firefighters died fighting a nearby church fire. The fund provides financial assistance to families when a firefighter is killed or injured and also helps volunteer fire departments buy new equipment. It also made a major contribution for new equipment to a Mississippi community ravaged by Hurricane Katrina.

External Challenges

No matter how great the opportunities are, every business faces challenges. Among the external challenges faced by SMMs in the United States today are long-term structural shifts in the industrial landscape, rapidly changing customer demands and technologies, foreign competition, unfair trade practices, worker skill shortages and interest rate and credit cycles. They also face a host of structural cost issues that put U.S. manufacturers at a competitive disadvantage compared with our principal trade partners, including, energy costs, employee benefit costs, tort litigation costs, regulatory compliance costs and high tax rates. All of these challenges affect manufacturing as a whole. We highlight the ones that are particularly relevant to SMMs and provide examples of how leading SMMs are responding to them.

Long-Term Changes

The face of American business has changed significantly over the past two generations, particularly in the older industrial cities that used to be the headquarters for major heavy-industry companies. Around each of those cities are hundreds of small manufacturers that serve the large ones. When a large manufacturer fails or is acquired, many small manufacturers lose their principal sources of business. And no SMM today can rest in the assurance that customers or the products they buy will stay the same for very long. To survive, SMMs often have to figure out new things to do, and sometimes that requires fundamentally changing the way they do business—acquiring new skills, investing in new equipment, and exploring new markets—both domestic and international. For SMM owners and managers, the transition can be expensive and risky, but often it leads

to new opportunities and far greater success in the long run.

Evolving Technologies and Customer Demands

As technologies continue to advance, customers expect more and more. No longer can a manufacturer produce a standard line of products with an occasional innovation and expect to hold on to its customer base. Manufacturers today must innovate continuously to remain competitive in the global market.

Innovation poses a particular challenge to small manufacturers. It isn't just a matter of budget allocation. Human capital resources, already stretched to meet daily business and production requirements, must be stretched even further to pursue new ideas. And there are no guarantees. Hundreds of hours and thousands of dollars can be invested in projects that encounter unforeseen difficulty and end up not contributing returns that were expected.

Innovation, of course, must have a source. Successful SMMs we interviewed develop new product ideas by diligently researching and keeping up with their industries and, most importantly, by keeping in constant contact with their customers.

“We talk to customers not only about product design but also about operating factors most crucial to them and how we can address those factors,” noted Mary Vermeer Andringa, co-CEO of **Vermeer Manufacturing Company**, a 2,000-employee, privately held construction and agricultural equipment manufacturer based in Pella, Iowa. Equipment reliability and commonality of platforms and parts are top customer concerns. Understanding customer needs requires not just talking to customers, but visiting job sites and talking to operators.

Andringa explains, “We have participated in weeklong programs with customers on their construction sites, watching how they are using our equipment, how much time they spend looking for things, and whether they are having problems with certain construction processes or with the equipment itself. Then we question what we can do to take some waste points out of their processes. These sessions with our customers are similar to kaizen events we have on our own factory floor.” In a kaizen event, a multifunctional team spends a day or several days focused on how to simplify, speed up and eliminate waste from a particular process like an assembly operation in a factory. (Kaizen events are an important part of Vermeer Manufacturing’s lean manufacturing program, discussed later in this report.)

Thousands of SMMs have turned to the Manufacturing Extension Partnership (MEP) in their state for help with market analysis, adapting modern technologies, adding workforce skills and developing a more strategic vision. The benefit of partnering with a nearby MEP is seen in the results that an Arkansas SMM experienced.

The Glove Corporation, based in Alexandria, Ind., handcrafts gloves for military, fire, utility and government use. Established in 1952, the company has 53 employees. Shortly after joining the company as general manager in 2003, Tony Moore saw opportunities to improve its the operation at its Heber Springs, Arkansas, facility. Through a Lean 101 event at Arkansas State University, Moore was introduced to Arkansas Manufacturing Solutions (AMS), a NIST-MEP network affiliate. After a review of the plant, AMS project managers recommended a plan for

lean manufacturing using cell production. Rather than processing multiple parts before sending them on to the next machine or process step, cellular manufacturing moves products through the manufacturing process one piece at a time determined by customers’ needs. Production work stations and equipment are arranged in a sequence that supports a smooth flow of components through the production process with minimal transport or delay. A typical work cell might have five or ten people and a similar number of workstations arranged in a compact layout. Using

“We talk to customers not only about product design but also about operating factors most crucial to them and how we can address those factors.”

Mary Andringa, co-CEO,
Vermeer Manufacturing Company

a tool called “value stream mapping,” a coded graphical analysis of the manufacturing process, Moore and his colleagues first implemented cell production with the Fireglove product line and then

moved on to other products. Customer delivery times have been reduced from 22 days to 3 days, a \$600,000 backlog is now built to order, Fireglove productivity has been improved by 40 percent and required floor space for production has been reduced by 40 percent.

Competing in the Global Marketplace

The global marketplace offers SMMs both great rewards and great challenges. On one hand, they are facing the most intense global competition in history, which has caused manufacturing product prices to decline while non-production costs continue to escalate. On the other hand, the reduction of tariff and non-tariff barriers in a growing number of markets affords SMMs excellent opportunities to expand their business and reach customers that might have been out of range only a few years ago.

The challenges are formidable. Foreign competition, notably from China, has cut into

U.S. manufacturers' market shares because many foreign-based companies enjoy lower labor costs and face less stringent environmental, workplace safety, health care and pension regulations (see Chart 4). Developing nations' ability to produce goods in bulk at low cost, combined with global overcapacity in many industries, have kept consumer prices stable or even declining despite higher operating costs in the United States. For example, as China has expanded production in textiles, apparel, metal products and furniture, U.S. producers find they cannot match the lower prices offered by their Chinese competitors.

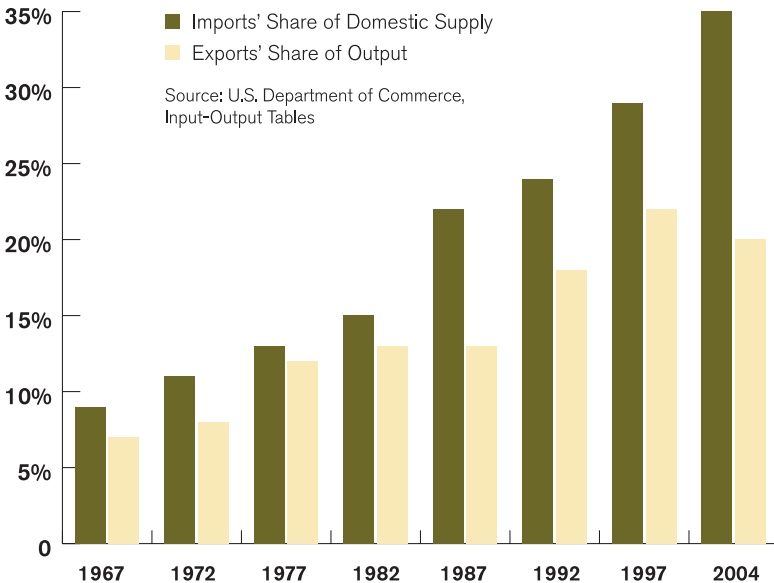
SMMs are affected by foreign competition both abroad and at home. They are competing with low-cost foreign producers both in their export markets around the world and in their domestic U.S. market. They also face increasing cost pressure from their large manufacturing and retailing customers, which have the option of sourcing overseas. To keep a large U.S. customer, an SMM often

must try to meet "the China price," which can be below the SMM's manufacturing cost.

Al Lubrano, president of 200-employee **Technical Materials** in Lincoln, R.I., testified on behalf of the NAM before a congressional committee in 2005 about competing with China. "As a result of fierce Chinese competition, fueled partially by the undervalued *yuan* and possible other unfair trade practices, I have seen many of our customers lose their business because their customers have sought refuge in one of two strategies: either simply moving production to China or forcing purchasing from lower-cost Chinese manufacturers. It is common for our customers to tell us that their customers will only pay the 'Chinese price.' And I am afraid we are just at the beginning of the process, with matters threatening to get much worse.

"On the other hand, we are not without distinct advantages in U.S. production. Right now, my company is selling high technology precious metal-plated material systems to

Chart 4. Import Competition Growth Faster Than Export Opportunities



“There is huge imbalance in tariff rates between industrialized and developing countries. We could sell a lot more if we could see these barriers eliminated or reduced substantially.”

Dyke Messinger, president and CEO,
Power Curbers Inc.

ing for about two-thirds of total U.S. exports of goods and services. But high tariffs and other foreign trade barriers are limiting the ability of U.S. manufacturers to sell their products abroad. That’s why the negotiation of new trade agreements like the Doha Round agreement in the World Trade Organization (WTO) and bilateral free trade agreements (FTAs) like the recent U.S.-Australia accord are so important for SMMs. These agreements reduce tariffs, or in the case of FTAs, eliminate most tariffs altogether.

Power Curbers Inc. is a North Carolina-based small manufacturer that sells its construction-related machinery globally. President and CEO Dyke Messinger said his company exports to more than 70 countries around the world, including places as far away as Australia, China, Japan and Malaysia and places as close to home as Canada, Mexico and Central America. “More than one-fifth of our production was exported in 2004 and our exports have doubled in the past three years. We have hired more employees over the years to keep up with the increased exports.

“There is huge imbalance in tariff rates between industrialized and developing countries, however. U.S. and other industrial country-bound tariff rates on imports of manufactured goods are now down to an average of about 3 percent, but the average bound industrial duties in the developing countries is over 17 percent—nearly six

times as high. My equipment faces duties of 14 percent in Brazil, 15 percent in India and 8 percent in China. We could sell a lot more if we could see these barriers eliminated or reduced substantially.”

SMMs are already reaping the benefits of trade agreements with Australia, Chile, Israel, Jordan and Morocco, and an agreement with the five Central American countries and Dominican Republic (CAFTA-DR) will go into effect later in 2006. Bilateral negotiations are underway with several other countries, including Thailand, Colombia, Ecuador, UAE, South African Customs Union, and several more are under consideration, including Egypt, Korea and Malaysia. In addition, the U.S. government hopes to complete a global trade liberalization agreement in the WTO (the Doha Round) before trade negotiating authority expires in 2007. So, SMMs can look forward to even more sales opportunities abroad in the next one to two years.

Addressing Other Challenges In the Global Marketplace

Overcoming tariff barriers in foreign markets is often a difficult challenge but there are others as well.

Counterfeiting. In many developing markets, particularly China, counterfeiting and other violations of intellectual property rights (IPR) are a common problem. Companies report counterfeiting and piracy of an increasingly wide range of products—apparel, personal care products, auto and truck parts, medicines, industrial equipment, tools, DVDs and computer software. U.S. companies have found counterfeits of their products sold not only in the target foreign market, but also in distant third-country markets so a comprehensive international strategy is often necessary. SMMs need to be proactive in protecting their intellectual property rights, for example, by seeking professional advice and registering their patents and

trademarks even before they enter foreign markets. The Department of Commerce, U.S. Trade Representative's Office and U.S. embassies have trained staff who can assist businesses in protecting their intellectual property and seeking redress of IPR violations. Also, the Department of Commerce is a member of the STOP! (Strategy Targeting Organized Piracy) Initiative to confront global piracy and counterfeiting, further described in the Appendix.

Non-Tariff Barriers. SMMs can also face a variety of non-tariff barriers, including differing technical standards and regulatory requirements that may affect product labeling and design. Conformity assessment procedures on products standards may differ as well and require the use of local testing bodies rather than testing bodies commonly used in the United States. Depending on the product, SMMs may need to obtain professional advice on meeting technical and regulatory requirements.

China. For many SMMs, China presents special challenges. An increasing number of SMMs are succeeding in the China market, particularly now that China has an official policy of welcoming foreign investment and adhering to international trade rules adopted by the WTO. Notwithstanding official policies, SMMs can experience a variety of difficult problems. Ineffective IPR protection, lack of regulatory transparency, uneven administration of law and arbitrary application of taxes, notably the value-added tax (VAT), are frequently cited as trade obstacles.

Undervalued Currency. SMMs also must overcome the hurdle of undervalued currencies in some countries. In the case of the China market, some economists estimate that its currency is about 40 percent below its real market value against the U.S. dollar. Currency undervaluation artificially raises prices on all U.S. exports to such countries and lowers prices on exports from these

countries to the United States. So SMMs are hurt on both the export and import side. In some sectors in China and other countries, direct and indirect subsidies to local industries give additional unfair advantage over foreign competitors.

Domestic Impediments. SMMs can also encounter trade obstacles here in the United States. Companies that manufacture products that have dual military and civilian uses or contain advanced technology with military applications may have to obtain an export license from either the Department of Commerce or State Department to sell abroad. Technology and products that might be used in making nuclear, biological or chemical weapons receive close scrutiny, particularly if they are destined for China or other countries of concern. The licensing process can be intrusive and time-consuming. Some U.S. companies have complained that the export licensing process is too cumbersome and is more restrictive than needed to protect legitimate national security interests.

Structural Cost Issues

While low labor costs and undervalued currencies in developing countries are a large part of the competitive challenge faced by U.S. manufacturers, there are unavoidable costs of doing business at home that also work to undercut SMM competitiveness. In a report titled *How Structural Costs Imposed on U.S. Manufacturers Harm Workers and Threaten Competitiveness*, the NAM, The Manufacturing Institute and the Manufacturers Alliance/MAPI demonstrated that costs for energy—particularly natural gas—health care, retirement benefits, tort litigation, regulatory compliance and taxes add more than 22 percent to U.S. manufacturers' unit labor costs relative to our major foreign competitors.

Taken together, they offset a large part of the 54 percent increase in U.S. manufacturing productivity since 1990. What's

Fletcher Steele, president of **Pine Hall Brick Company, Inc.**, in Winston-Salem, N.C., testified in November 2005 before the U.S. House Appropriations Subcommittee for Interior, Energy and Related Agencies concerning the devastating effect of natural gas prices on his company. Because of its convenience and reliability, natural gas is by far the most common fuel used in the brick industry, with 80 to 90 percent of kilns using it for drying and firing brick. After being cut off from gas for five days following Hurricane Rita in September 2005, Pine Hall Brick saw prices double, resulting in an unsustainable \$700,000 monthly cost increase. The company announced a substantial price increase as of early January 2006 and expected some homebuilders to use less brick and more siding and other cheaper materials. Steele foresaw a sales slowdown in January, when natural gas would be most expensive, and planned to suspend about half of production. With alternating work crews, the company expected to spread the required layoffs among its 375 employees.

Although the demand for natural gas has exceeded domestic production capacity in recent years, the United States actually has abundant reserves. The problem is that most of those reserves are in the Outer Continental Shelf (OCS), where about 25 percent of U.S. natural gas is currently produced. Exploration of the OCS is opposed by environmental groups and by coastal states that are concerned about possibly hurting tourism. For more information on the energy dilemma facing manufacturers, go to www.nam.org/energy.

The NAM supports legislative initiatives to allow drilling for natural gas in the OCS, to open the Alaskan Arctic National Wildlife Refuge (ANWR) for oil and natural gas

development and production, and to promote further use of nuclear power and coal.

Employee Benefits. Compared to our trading partners, businesses in the United States — and particularly manufacturers — play a much bigger role in the financing of health and retirement benefits. In many other countries, health care and retirement benefits are funded in large part by governments through general income taxes. More than 90 percent of Americans under 65 obtain their health insurance through their employers. The United States spends more as a percentage of GDP on health care than any other country — 16 percent of GDP based on current estimates — and health care expenditures have outpaced inflation

for years. Total health care spending has reached \$1.9 trillion per year or an average of \$6,280 for every man, woman or child.

In addition to health insurance, most U.S.

manufacturers provide pension or retirement savings benefits for their employees. Manufacturers both large and small historically have led the business community in providing pension benefits. Based on a recent NAM survey of SMMs, more than 80 percent of respondents said they provide defined contribution plans for employees and almost one-third provide a defined benefit, or traditional plan. Some companies provide both.

Health Care Costs. While health plans are often a competitive strength for SMMs compared to other businesses in attracting employees, their cost is becoming an increasing burden. In the 2005 NAM Small and Medium Manufacturers Operating Survey and in an informal survey the NAM conducted among its SMM board members in September 2005, the cost of health insurance for employees was ranked as the most seri-

Pine Hall Brick Company saw [natural gas] prices double, resulting in an unsustainable \$700,000 monthly cost increase.

ous concern. Over the past several years, respondents to the annual survey have indicated a steady increase in health care expenses that shows no sign of letting up.

If health care costs continue to increase along current trends, the great majority of respondents to the 2005 NAM Small and Medium Manufacturers Operating Survey (69 percent) plan to increase employees' share of coverage costs, while a smaller number (19 percent) will consider changing to a defined-contribution approach. Defined-contribution approaches include Health Savings Accounts (HSAs) and Health Reimbursement Arrangements (HRAs). They are both ways an employer can limit its health care expenditures to a set amount and then encourage workers to manage their expenses around that amount. Among the survey respondents, the most important new employee benefit initiative was starting new HSAs, with 20 percent indicating their intention to do so.

Leading SMMs are exploring a variety of approaches to deal with rising health care

costs. "I have long thought those benefiting from health care coverage should buy into the responsibility for their own health," said Kendig Kneen, CEO of **Al-jon, Inc.**, a manufacturer of car crushers, landfill compactors and scrap metal balers based in Ottumwa, Iowa. Starting in 1996, Al-jon required employees to bear a large part of the increase in annual health care expenses, but the amounts they were required to pay began to grow ominously. Then, fortunately, the local hospital began to offer a program called Healthy Choice in which participants are tested and evaluated and, if appropriate, agree to health improvement goals. Al-jon pays 25 percent of health insurance premiums for employees who go through the screening, 50 percent for those who work toward defined goals and achieve them, and 75 percent for those considered "well" by the hospital. "The health care industry tells you that every dollar in prevention comes back to you fourfold," Kneen noted.

Vermeer Manufacturing Company, also from Iowa, has self-insured health care

Table 1. SMM Health Care Expenses as a Percentage of Sales
(percentage of respondents for each category)

Fiscal Year	2003	2004
Less than 2 percent	3.3	6.4
2-5 percent	23.4	22.8
6-8 percent	27.1	26.1
9-10 percent	17.0	12.5
More than 10 percent	26.7	31.4
No Response	2.5	1.0

Table 2. SMMs' Increase in Health Care Expenses Over the Prior Year
(percentage of respondents for each category)

Fiscal Year	2002	2003	2004
More than 10 percent	87.9	80.9	70.4
More than 20 percent	39.9	27.7	17.6
More than 30 percent	16.6	8.6	4.7

expenses for the past 15 years and began to offer HSAs in 2005. The company's plan includes employee co-payments for health insurance premiums and services. "When they have to pay something themselves, they are going to be better health care users," said co-CEO Mary Andringa, daughter of founder Gary Vermeer. The company also maintains a small health clinic on its Iowa campus that does routine tests, provides health care counseling and conducts physicals for employees' children. For minor health care issues, having the clinic on-site is a time saver. And as of January 1, 2003, Vermeer's entire campus went smoke-free.

Health care expenses have increased 20 percent per year over the past five years for **The Bilco Company**, a manufacturer of specialty access doors based in New Haven, Conn., according to Roger Joyce, vice president of engineering. Management discusses this problem openly and shares the numbers with employees and the Ironworkers Union⁵ to which they belong. Together they work out the types of programs offered to employees, the level of employee cost-sharing, and how employees can minimize their costs while tailoring programs to suit their particular family needs. Because every program has a certain degree of employee participation, employees and management are in effect partners looking for a solution. There is not very much resistance from employees, said Joyce, because management discusses the issues with them openly.

Employees also bear a share of their health insurance premiums at **Al Lubrano's Technical Materials, Inc.** He believes the ultimate solution for American businesses will have to be some sort of high-deductible catastrophic insurance and perhaps an annual physical provided by the employer with other options such as prescription plans available for a fee. Lubrano believes a related approach could be to provide employees with

allowances that they could use for HSAs or optional coverage programs.

Tort Litigation Costs. To an increasing degree, manufacturers in the United States are exposed to the cost of actual or threatened litigation. The NAM/MAPI Structural Costs study noted that the U.S. tort system is notorious for its high cost, its inefficiency in compensating plaintiffs who have suffered losses and its inability to link damage awards to demonstrably negligent behavior. In today's competitive price environment,

"I have long thought those benefiting from health care coverage should buy into the responsibility for their own health."

Kendig Kneen, CEO, Al-jon, Inc.

it is difficult to pass those costs on to consumers, so most of them are borne by U.S. manufacturers, creating one more disadvantage for them compared to their overseas competitors. Tort costs as a percentage of GDP are twice as high for the United States as for its principal trading partners except for Germany.

Asbestos litigation has been particularly visible. To date, more than 8,400 companies have been named as defendants in asbestos cases, more than 70 companies have filed for bankruptcy protection—about one-third of them SMMs⁶—and more than 60,000 jobs have been lost. Many of the lawsuits have been filed by plaintiffs who show no symptoms of asbestos-related disease.

Frivolous lawsuits can be particularly costly in relative terms for SMMs that don't have in-house legal staffs and have to hire outside lawyers. In personal injury cases, settlements can be the only alternative to far most costly lawsuits and damage awards, but they become a form of extortion.

cost burden is proportionately even greater for small manufacturers than for small firms in other sectors such as trade, services and health care. In 2000, the cost of regulation for manufacturers was 67 percent higher than for all types of businesses. By 2004, the regulatory costs for manufacturers were 81 percent higher.

For **Al-jon** and other manufacturers, diesel engines must be Tier II or Tier III compliant. Soon they will need to be Tier IV compliant. This classification reflects varying degrees of decreased emissions, ending at Tier IV where the air that comes out of the diesel engine's exhaust system is actually cleaner than the air that enters the engine. CEO Kneen says, "While we all can recognize the benefits of this system, it does not come without great cost to manufacturers who must redesign their cooling systems to handle the increased heat that is generated by the hotter burn chamber that accomplishes the cleaner exhaust. For Al-jon, with 105 employees, that cost has run well above a six-figure number. The costs of regulatory implementation have a snowball effect throughout our economy that most fail to

realize. Rather than spending our valuable R&D budgets for new product development that results in revenue growth, we have had to spend it on regulatory compliance."

Taxes. U.S. manufacturers also face higher tax rates on their business income than many of their competitors overseas. The current top U.S. tax rates—combined federal and state—are much higher than the average 29.2 percent corporate tax rate in other OECD countries. This is true despite the recent tax relief enacted in the United States. Moreover, some of the recent rate relief for SMMs organized as S-corporations is temporary and, absent federal legislation, will expire in 2011.

Another temporary measure that benefits SMMs is repeal of the estate or "death" tax. Legislation enacted in 2001 gradually phases out the estate tax until 2010, when the tax will be completely repealed. Unfortunately, the tax law changes are only temporary. A "sunset" provision terminates all the tax relief at the end of 2010. Unless the sunset is repealed, the 2001 estate tax regime will resurface in 2011. The temporary nature of the phaseout creates significant complexity, confusion, and estate planning cost for SMMs. According

Table 3. 2004 Business Regulatory Costs in Small, Medium and Large Firms
(cost per employee in 2004 dollars)

	Firm Size (Number of Employees)			
	All Firms	< 20	20-499	500+
All U.S. Businesses	\$5,633	\$7,647	\$5,411	\$5,282
Manufacturing	\$10,175	\$21,919	\$10,042	\$8,748

Table 4. 2000 Business Regulatory Costs in Small, Medium and Large Firms
(cost per employee in 2000 dollars)

	Firm Size (Number of Employees)			
	All Firms	< 20	20-499	500+
All U.S. Businesses	\$4,722	\$6,975	\$4,319	\$4,463
Manufacturing	\$7,904	\$16,920	\$7,454	\$7,059

Tables' Source: W. Mark Crain, "The Impact of Regulatory Costs on Small Firms," 2004.

many jobs remain in this country that are rewarding and offer opportunities for career development. However, those high-skill jobs require more than just a high school education—they demand the education and skills acquired through post-secondary education. Most of today's jobs on the factory floor require some analytical and reasoning skills, for example.

Thirty years ago, less than half of manufacturing workers had a high school degree and less than 10 percent had an associate, bachelor, or engineering degree. By 2001, 80 percent of factory workers had a high school degree and 30 percent had post-secondary education. If current trends continue, more than 80 percent of factory jobs will require post-secondary education by 2012.

The growing talent shortage is evident beyond the need for more higher-skilled entry-level workers. To remain the world's leading innovator, the United States will need a more robust supply of scientists and engineers.

In the 2005 *Skills Gap Report*, 81 percent of respondents said they are currently facing a moderate to severe shortage of qualified workers. Most severe are shortages pertaining to the higher skill levels. Ninety percent of respondents indicated a moderate to severe shortage of qualified, skilled production employees and 65 percent (74 percent of respondents with more than 500 employees) reported moderate to severe shortages of scientists and engineers. Thirty-nine percent also indicated a current shortage of unskilled production employees.

Respondents were asked what types of skills they needed in their employees over the next several years. Technical skills were most important, mentioned by more than half, followed by the ability to work in teams, strong computer skills, the ability to read diagrams and translate flow charts, and strong supervisory and managerial skills. Along with these

work-specific skills, employers were also concerned with basic employability skills, such as attendance, timeliness and work ethic, as well as reading, writing and communication skills.

The causes of the current skill shortage aren't "stand alone"—each factor is intertwined with others:

Basic Education Deficiencies. Countless manufacturers who screen applicants to fill entry-level positions are finding that high school graduates lack the reading, writing and mathematical skills that should be expected, and many of them enter the workforce without basic employability skills as well. Companies often have to provide employees with remedial education before they start job-specific training, and this can be a cost burden for an SMM.

Vocational Training. In recent decades, as industrial employment shifted and demand for vocational education shrank in regions across the country, community colleges provided less training in factory skills such as machining and welding or did not upgrade their training to the more sophisticated technical skills now needed in manufacturing. At the same time, relatively few manufacturers engaged in substantial interaction with state or local workforce systems, which left providers in the dark about how manufacturing—and the skills required to work in it—was changing. Often not known by large and small manufacturers alike are the provisions of the Workforce Investment Act (WIA) of 1998. The WIA provides federal job training aid (grant monies) and requires state governors to appoint Workforce Investment Boards (WIBs). The majority of seats on these WIBs and their chairs are to come directly from the business community.

Thus, by participating, SMMs can get more directly involved with education and training activities in their local areas. And by working

with elementary and high schools, community colleges, public training programs and providing internships and externships for students and teachers, manufacturers can help define curricula, increase awareness of their job and career opportunities, and enhance the public perception and overall knowledge of manufacturing and manufacturing careers.

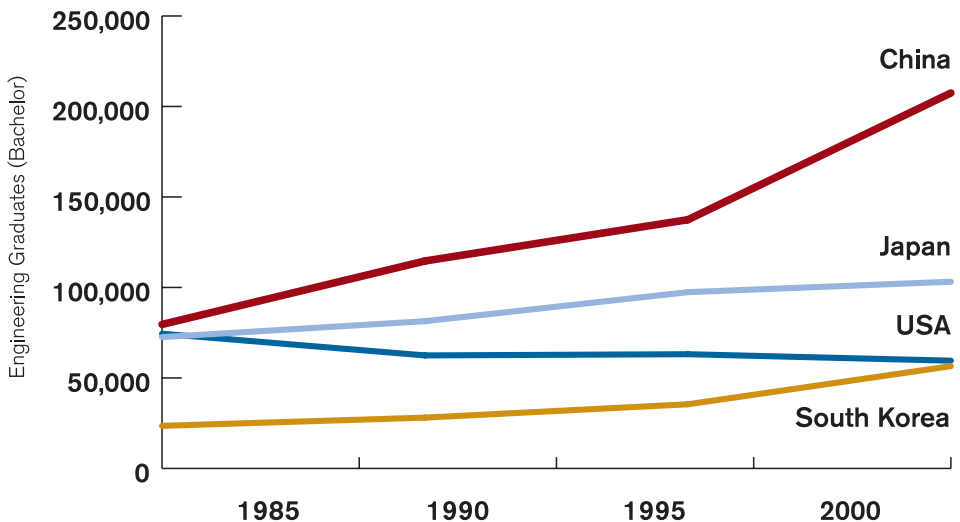
Math, Science and Engineering Education. Not enough Americans are pursuing physical science and engineering courses at the college and graduate school level—particularly when compared to trading partners and competitors like China, Japan and Korea. The problem starts with the quality of teaching at the secondary level. In a 1995 study, fourth graders in the United States ranked 12th against other nations in mathematics competency and eighth graders ranked 19th; in science, fourth graders ranked 6th and eighth graders 18th.⁸ Part of the problem stems from teacher qualifications. Another study found that 70 percent of

middle-school students are taught math by teachers with neither a major nor a certification in that subject.⁹

Inadequate and perhaps uninspiring secondary education is part of the reason young Americans' interest in science and technology has eroded over time. In 2001, only 8 percent of college degrees awarded in the United States were in engineering, mathematics or the physical sciences, representing a 50-percent decline since 1960. As chart 10 shows, between 1985 and 2000, the number of engineering graduates per year declined 20 percent to 59,500 in the United States while that number increased by 160 percent to 207,500 in China. Japan graduates more engineers than the United States does and soon Korea will as well.¹⁰

While fewer American undergraduates are studying math, science and engineering, graduate programs in those fields are enrolling an increasing proportion of foreign students—46 percent in 2001 compared to 28 percent two decades earlier.¹¹ Those stu-

Chart 10. United States Falling Behind in Engineering



Source: National Science Foundation

dents have benefited the U.S. economy, as historically about half have stayed to work here at least for a few years. Recently, however, other countries have begun to create employment and research opportunities for science and engineering degree holders, allowing them to pursue their careers outside the United States. Furthermore, tighter security requirements since 9/11 have led to fewer visa applications and a decline in the number of student and high-skilled foreign nationals entering the country. As a result of these trends and a doubling of the global workforce, the United States will have a shrinking foreign talent pool to fill its growing math, science and engineering shortages.

Manufacturing Career Image. Manufacturing as a career has had cultural and perception problems in recent years, holding back many younger workers from entertaining the sector as a likely employment choice. Negative images remain, and some people still consider manufacturing jobs to be low-paying and dirty. Public perception is still catching up with the way manufacturing has been revolutionized by a combination of technology and enlightened management philosophies, including flatter organizational structures, more delegation and empowerment, and the blurring of lines between blue collar and white collar jobs. The challenge before manufacturers is how to broadly communicate information about modern manufacturing and the satisfying careers it has to offer. The Manufacturing Institute's Dream It. Do It. Manufacturing Careers Campaign is a step forward in helping improve the public perception of manufacturing.

Corporate Culture and Leadership. To attract and retain qualified employees at all levels and to establish a high-performance workplace, the management of an SMM has to evolve with the times, continually developing new leadership skills and striving to develop a corporate culture that nurtures

the aspirations of today's workers. The best-qualified employees are looking for much more than a paycheck. They are looking for autonomy, involvement in decision-making, and transferable skills and experiences that will make them valuable to the market at large as well as to their current employers. They are more loyal to their careers than to their employers.

These problems will continue to challenge SMMs. The baby boom generation, born right after World War II, is beginning to retire. The NAM estimates that baby boomer retirements will peak in 2012 and there will be 10 million unfilled positions by 2020.

Employee turnover is close to zero at **The Bilco Company** in Connecticut, a leading manufacturer of roof access scuttles, steel

Finding qualified workers has become steadily more difficult in the 26 years Roger Joyce has worked with The Bilco Company.

basement, sidewalk, and access doors. Most employees who leave do so at the company's request, according to Roger Joyce, the vice president of engineering. Bilco pays better than most manufacturers, offers very good benefits and, as a family-owned company, treats everyone like family.

Finding qualified workers has become steadily more difficult in the 26 years Joyce has worked with Bilco. There was more manufacturing in the central Connecticut region a generation ago. Now there is less emphasis on skills such as welding and tool and die manufacturing and those subjects are covered less in high school and community college curricula. So decades ago, Bilco recognized that it would not be able to find qualified welders on the street and embarked on its own internal training programs. Now the company trains welders for many months

at its own cost because it has no other choice. In screening new recruits, Bilco looks for people who are trainable. “If you want to learn and work hard, there is opportunity for advancement,” said Joyce. The basic educational qualifications of today’s high school graduates are not what Joyce would expect. He noted that 53 percent of high school graduates in Connecticut who go on to community colleges need remediation to teach them what they should have learned in high school.

Bank Credit Policies and Interest Rates

Willingness of commercial banks to lend to SMMs tends to be somewhat cyclical depending on economic conditions and the banks’ own balance sheets. Interest rates are cyclical as well, depending on Federal Reserve monetary policies.

Some companies noticed a contraction in bank lending during the 2001-2003 recession. Credit conditions for SMMs have been relatively good in the past several years because of low interest rates, a healthy economy and competition among banks to put loans on the books. Community banks have become more aggressive in lending to small manufacturing and service companies.

Often they pay more attention to SMMs than the largest banks do.

Diamond Metal Casting finances its growth with a combination of internally generated funds and bank borrowing. Jerry Letendre, the company’s president, said economic cycles affect credit availability and banks have much tighter credit standards than they used to have. During the 2001-2003 recession, the company went into a survival mode. It limited capital investment to an amount well within cash flow from operations and tried to reduce bank debt, which seemed onerous at the time. Today, when Diamond Metal Casting wants to borrow, it can take advantage of a 26-year relationship with its principal bank. “We have a good track record,” said Letendre. “The bank knows our staying power.”

Al-jon’s Kneen said, “More and more today, the world is composed of ‘box bankers’. Either your company fits into the box for the purpose of credit approval or it doesn’t. Large banks are sometimes unwilling to take the time to understand your business and to take the credit risk that could lead to a growing and profitable relationship.” Kneen now prefers to deal with community banks that have a business focus, many of them privately held.

Internal Management Challenges

SMMs, like most businesses, are under constant pressure to cut costs, improve quality, and go to the market with new, improved products to stay competitive in the global marketplace. At the same time, personnel and financial resources may be stretched thin and not every business priority can be addressed at the same time. The owner or CEO of a small manufacturing enterprise is nimble, able to make quick decisions and ready to accept the entrepreneurial challenge that comes with the territory.

“Managements of small companies are sometimes so busy with the nuts and bolts of day-to-day operations that they have little time to think about what is happening in the business world, in the economy at large, in Washington,” said Karla Aaron, CEO of 15-employee **Hialeah Metal Spinning** in Hialeah, Fla. “Everything ‘happens’ to them. They need to be more proactive and to feel they have a voice. Often a company must grow to 100 or more employees before it has a ‘staff’ — someone available to attend a meeting, to spend some time researching what is happening, or to write a letter to a congressman or trade association.”

Strategic Planning

Strategic planning is the process a company uses to evaluate market opportunities, determine its competitive position, select appropriate marketing channels, develop business product strategies, and prepare the business and tactical plans necessary to be successful in the marketplace. Good strategic planning and the effective implementation of plans facilitate growth and is often a key factor in the company’s success. For the SMM, it is the process of having a disciplined approach to thinking strategically about the organization and how to

differentiate the company and set it apart from competitors.

An effective strategic plan is the pathway to creating value. It focuses on the scope of the company, including its product, geographic and vertical boundaries, and emphasizes how the firm manages its activities. Whereas strategic planning is sometimes considered only necessary for large, diversified companies, it is important for organizations of all sizes, including SMMs, to gather and analyze information and to make decisions about the range of markets in which they will compete and how they will implement the marketing, production, financial and human resource strategies to reach their goals.

Hialeah Metal Spinning makes round and hollow metal parts. “The strategic planning process identified our niche,” explained Aaron. “We determined we were not producing a commodity but selling a process.” The company’s end products are designed by its customers and a customer typically uses two or three spinnings, *i.e.*, orders two or three metal parts. The company has a diversified customer base from the electronics, lighting, appliance, marine, cookware, medical and cryogenic industries. “I have not lost work to China or Mexico

“Managements of small companies are sometimes so busy with the nuts and bolts of day-to-day operations that they have little time to think about what is happening in the business world, in the economy at large, in Washington.”

Karla Aaron, CEO, Hialeah Metal Spinning

because our products are the ones the customer has to have, on time, and it's more hassle to retool and move production to another manufacturer than to pay our prices. There are high exit costs and that partly explains why our industry is not very price sensitive. When companies are trying to pare down their suppliers, we are generally spared. If you are spending just \$5,000, it doesn't make sense to go overseas," she said.

Technology

What most often differentiates an SMM in today's global economy is the use of technology and high-skilled workers to make a product that no other company can match. In particular, SMMs in the United States need to focus on higher-end, higher-margin products where proprietary technologies, responsive customer service, speed and convenience are more important than cheap mass production. Despite recent efforts by China and India to train scientists and managers and move up the value chain, the United States is still the world's leader in innovation and technology.

Over the years, **Technical Materials** has developed expertise in specialty metals that cannot be duplicated anywhere else in the world. Customer needs drive the product development process. While producing standard products, the company also participates in joint development efforts with customers that have special requirements, as it did recently with a company that needs very specific clad metal properties in the disk drive suspensions it manufactures. Most senior people at Technical Materials have an engineering background. The vice president of marketing has a graduate degree in metallurgy from MIT, and would have difficulty talking to the company's customers if he did not have that background.

Keeping abreast and investing in new technology can be a challenge for an SMM.

Most senior people at Technical Materials have an engineering background. The vice president of marketing has a graduate degree in metallurgy from MIT, and would have difficulty talking to the company's customers if he did not have that background.

Limited budgets, lack of in-house expertise, and lack of access to the newest technologies are but a few of the barriers faced by small manufacturers, according to the National Institute for Standards & Technology Manufacturing Extension Partnership (NIST-MEP), a partnership of the private sector and state and local governments that offers technical and business assistance to SMMs through 60 nationwide non-profit MEP centers and 2,000 manufacturing and business specialists.

Nonetheless, SMMs appear to have made significant progress over the past five years in their use of the Internet, as well as CAD/CAM, robotics and nanotechnology. Internet usage and broadband connections have become so widespread for SMMs that the MEP centers no longer consider a training program in this area to be necessary. Even the smallest manufacturers generally have Web sites and they can easily find the resources for developing and maintaining them. In many cases, their Web sites are used primarily for information and selling is still done primarily on a personal basis. The potential for online, business-to-business transactions was overestimated during the technology bubble of the late 1990s.

Another step forward over the past five years has been in software availability. Vendors are tailoring manufacturing, accounting, and enterprise resource planning (ERP)

software more and more to the needs of small manufacturers. Some SMMs are finding it advantageous to integrate their manufacturing software, including functions such as purchase order management, master scheduling, material requirement planning and shop floor control, with their software for other business functions such as accounting, maintenance management, shipping and report writing.

One of the MEP centers' training priorities for SMMs is in radio frequency identification (RFID), according to Rick Korchak, IT practice area manager at MEP headquarters in Gaithersburg, Md. RFID is like a more sophisticated form of bar coding. Information is put on an electronic tag—basically a little chip with an antenna—so that it can be read at a distance rather than having to be scanned by a bar code laser. Some manufacturers have begun to use RFID internally in their plants to locate items and improve inventory control. A number of the largest purchasers such as the Department of Defense, Wal-Mart and Target have begun to implement RFID throughout their supply chains.

Quality Management

Quality is widely considered to be essential to customer satisfaction and success. It is a rather broad term. For a manufacturer, it may mean technical skills, financial stability and administrative ability. It also may include customer satisfaction, customer focus, external interface management, teamwork, benchmarking, and employee relations—including employee involvement, training and empowerment.¹² During the 1980s, quality became a concern for American manufacturers as global competition cut into markets they previously had dominated. Americans began to take an interest in Japanese manufacturing practices, and a management discipline known as “total quality management” became popular.

Quality issues have become increasingly important for SMMs. In business-to-business relationships, buyers generally expect higher quality from their suppliers than they did in the past. A large buying organization such as an OEM or a retailer cannot afford the risk of entering into a relationship with a low-quality vendor. Firms that cannot document that they satisfy specific quality criteria have little chance of winning contracts from those large buyers.

Al Lubrano finds that the ISO certification process establishes disciplines where the company otherwise might have been lax.

A formal quality management program can provide substantial internal benefits in addition to helping an SMM's marketing efforts. Some manufacturers, however, consider formal quality programs too costly, time consuming, and documentation oriented, and prefer to use more informal quality assessment methods, for example inspection rather than statistical control methods. One way many companies today are instilling discipline in their quality programs, while also providing credible quality documentation to their customers, is through ISO 9000 certification.

ISO 9000 is widely embraced by SMMs because it has emerged as the *de facto* world-wide standard for quality certification. It is a family of generic management-system standards that provides companies with a model to follow as they establish and operate their quality systems. Its stated goal is to help companies to deliver products and services that meet the customer's quality requirements and applicable regulatory requirements while enhancing customer satisfaction and achieving continual improvement of its performance in pursuit of those objectives.¹³ The increasingly widespread adoption of

ISO 9000, combined with customer requirements for quality certification, has increased the pressure on SMMs to consider adoption of the standard.

Both Lubrano of **Technical Materials** and Kneen of **Al-jon** consider quality inherent in the way they do business. However, Lubrano finds that the ISO certification process establishes disciplines where the company otherwise might have been lax. “What you say you are doing must be documented,” he said. Kneen considers ISO 9000 to be more a consistency program than a quality program. A company could get an ISO certification for putting out a low-quality product as long as that level of quality was consistent. The way the program helps Al-jon is to assure customers who already use its products that the company will continue to supply the same kind of high-quality products that it already has. Nonetheless, the certification process provided Kneen and his staff the opportunity to take a fresh look at the company’s processes and think about ways those processes could be improved.

Cost Control

In today’s global manufacturing environment the control of costs is an absolute necessity. The smallest change in cost can have a significant impact on profitability for today’s SMM. Manufacturers no longer have the luxury of increasing prices to offset increases in cost. A standard rule of thumb says cost increases need to be held to less than one half of the inflation rate if a company is going to remain profitable. In today’s global economy the inflation rate is minimal. Price increases in the manufacturing sector are not acceptable to customers resulting in the need for costs to be reduced if a company is to remain profitable.

In the past, cost accounting was the tool used to calculate inventory values for the balance sheet and the cost of goods sold for

the income statement. Now cost accounting is an integral part of the business process used to provide management with the necessary information used in planning, controlling activities, allocating scarce resources, monitoring quality, improving efficiency and formulating policy.

Today’s SMMs not only need to utilize the best technologies in their manufacturing processes, but they also need to utilize the latest in cost accounting methodology. Activity based costing (ABC) is a method to accumulate product cost by determining all costs associated with activities required to produce it. This type of system uses multiple cost drivers to trace activity costs in a multiple-step process to goods produced or services performed. Some SMMs are being pushed by their major customers to price their products based on ABC methods. The change to an ABC system can have major implications on the complexity of the cost accounting system and the type and amount of detailed information that must be collected.

In addition to helping SMMs make better decisions based on more accurate and relevant information, ABC also helps by:

- illustrating cross-functional interactions;
- focusing on activities, whether mechanical or manual, as the ultimate consumers of resources;
- highlighting non-value-added activities;
- positively influencing behavior;
- promoting understanding of design for manufacturability;
- improving understanding of changing cost behavior patterns;
- developing a value-chain perspective;
- providing a benchmark for comparing various facilities.

Lean Manufacturing

Today, quality programs and cost control for SMMs are an integral part of a larger management concept known as lean manufacturing—

a systematic discipline of analyzing and changing production processes to eliminate steps that are not necessary to produce the product the customer wants. An example of the lean approach might be a manufacturer's decision to produce goods in relatively short runs in response to a customer's current demand rather than in longer runs to fill that customer's entire purchase order. Although shorter, more frequent production runs may seem counter-intuitive, they enable the company to reduce both lead times and inventory. The lean concept can be applied to other business disciplines such as finance and marketing as well, for example reducing the number of days required to close the books at the end of the month.

Lean methods are an overarching management philosophy at **Vermeer Manufacturing**, according to co-CEO Andringa. She said, "Lean is eliminating waste in every aspect of the business. That means cleaning up our product design, being able to be more flexible, being able to do more things with less people, having a better cross-trained group of people, being client driven, getting really close to the customer, getting on the customer's job site, understanding customers' needs, looking for unarticulated needs, and trying to work that into product packages Vermeer brings to its customers. She and her colleagues got the idea from one of the company's outside directors who was on the board of another company that was implementing lean manufacturing. "He said, 'you cannot just keep adding machinery and building more plants. You need to learn about kaizen,'" Andringa said. A kaizen event is a session of one or more days in which a multi-discipline team gets together and systematically analyzes a process with

"Lean is eliminating waste in every aspect of the business."

Mary Andringa, co-CEO
Vermeer Manufacturing Company

specifically defined objectives, for example, set-up time reduction, productivity improvement, and gross margin improvement. The process includes visual analysis, marking, measuring and listening to every team

member's recommendations. To make sure she is continually thinking in lean terms and to demonstrate management's commitment, Andringa

participates in selected internal kaizen events as well as kaizen events with customers.

Marketing

"No management discipline is more important for the small manufacturer than marketing," advises Albert A. Frink, assistant secretary of commerce for manufacturing and services. (*See the interview with Assistant Secretary Frink later in this report.*)

Marketing is composed of several inter-related elements including—

- product/market selection;
- pricing;
- distribution systems;
- market communications;
- product and technical service; and
- branding.

Marketing also requires constantly talking to customers and prospects about new ideas—how the company might develop new products and services, and how the company might reposition itself in response to changing customer demands and world economic forces. And yet the owner or CEO of an SMM is often focused primarily on running the existing business on a daily basis. As a result, marketing can fall too easily down on the list of priorities.

An SMM must determine how to allocate sales responsibilities among agents, distributors, and its own sales staff. For international sales, a smaller manufacturer needs

to determine if it can afford to hire its own sales people or utilize agents or distributors. The owner or CEO needs to be careful not to delegate too much of the marketing effort, and miss the opportunity to interact with customers and hear their ideas about what the company might do differently and how it might pursue new opportunities.

Vermeer Manufacturing sells agricultural, construction and environmental equipment through dealers and directly to customers. The crux of the company's marketing effort is keeping in close touch with customers and using their suggestions to guide product development efforts. The lean manufacturing concept extends from the factory floor to the customer's job site. "We talk to customers not only about product design but factors most crucial to them and how we can address them. For instance, equipment reliability is a huge concern, as is commonality of platform and parts. Given their difficulty in finding skilled workers, customers don't want to have to retrain people on different models of equipment. We have to make the equipment simple and reliable. This requires not just talking to customers but visiting job sites and talking to operators. We have done weeklong programs where we are watching and doing the same things we do on the factory floor in a kaizen event out on a construction site. We watch how they are using the equipment, how much time they are spending looking for things, whether they are having difficulty with a certain process in the construction, or a problem with the equipment itself. Then we question what we can do to take some waste points out of their process," Andringa said.

Exporting

When most manufacturing businesses start up, they concentrate their sales efforts in known markets based on known users of

their products and known distributors and sales territories. As they grow, they often overlook profitable sales opportunities outside the United States. As shown in Chart 11, exports account for more than 25 percent of sales for 8 percent of respondents to the 2005 *NAM Small and Medium Manufacturers Operating Survey*. Exports account for more than 10 percent of sales for 15 percent of those respondents.

Recent studies have shown that exporters, small and large, pay higher wages, enjoy higher productivity, and have stronger staying power than similar companies that do not export.¹⁴ A logical reason for the correlation between exporting and overall business success is that exporting provides a company additional sales growth opportunity, allows fixed costs to be spread over larger volume, exposes the company to the competitive pressure of world markets, and motivates it to produce products that can be used throughout the world.¹⁵

A great many SMMs, however, are not exploiting this opportunity. While 95 percent of all manufacturers that export are SMMs, according to the U.S. Census Bureau, they account for just 15 percent of the value of U.S. exports of manufactured goods. SMM's share rises to about 19 to 20 percent when indirect exports are counted—products such as parts and components sold by SMMs to large manufacturers, which in turn export them.

Often beginning to export seems like a formidable challenge to a small manufacturer. Establishing agent or distributor contacts is more difficult and time consuming overseas than in the United States. Export and international banking documentation sound complicated to the beginner. But small manufacturers can access a wide range of export assistance from the Department of Commerce and trade associations. A growing number of professional service providers

counseled Piazza. “You just have to bite the bullet one day and do it. What do you have to lose? Just a few bucks of investment dollars.”

Export Payment Methods. While finding overseas customers and arranging export documentation with a freight forwarder, the SMM has to negotiate the safest and most expedient payment method with the customer. To do so, it is essential to seek

the advice of and work with a commercial bank that has international capabilities. Often when the exporter is just getting to know the buyer and is not completely sure of its creditworthiness, it

requests that the buyer open a letter of credit with its own local bank. Then the local bank in the buyer’s country “advises” the letter of credit through the exporter’s bank in the United States. That allows the exporter to collect payment at his bank after shipping the goods and presenting exact documents that are required by the letter of credit—for example, a commercial invoice and a bill of lading. Once the exporter gets to know the buyer better, it might shift to documentary collections. In this case, the exporter sends the documents the importer needs to take delivery of the shipment to the importer’s bank, and then the importer receives those documents after paying the bank. Finally, the exporter might move to open accounts, simply by sending an invoice to the importer. Open accounts are used in most well-established trade relationships where the exporter is comfortable with the customer’s creditworthiness.

Piazza at **Price Pump** lets a new overseas customer know when its order is ready and requires a wire transfer of funds before shipping. Once the relationship is established, he is willing to bill on open account, but he particularly watches receivables that exceed

“Small manufacturers are held back from exporting by fear of the unknown. You just have to bite the bullet one day and do it.”

Bob Piazza, president, Price Pump Company

70 days, calling customers to find out the reason. International customers tend to pay more promptly than domestic customers, who sometimes take maximum advantage of available trade credit. While letters of credit provide credit protection for an exporter, Piazza finds they are prone to administrative problems. He cannot collect payment unless the documents he presents to the bank pre-

cisely meet the terms of the credit, and sometimes the credit expires before documentary discrepancies can be corrected. On the relatively few occasions he accepts payment in foreign currency, those payments must be made in advance.

Financial Risk Management

An SMM is often required to accept at least some of its payments for exports and to make at least some of its payments for imports in foreign currency. To the extent credit terms are offered, the SMM has currency exposure until the payment is made. The way most SMMs hedge that exposure is through foreign exchange forward transactions, although some go a step further and purchase currency options to provide protection if rates move unfavorably but still allow for gain if they move favorably.

Financial derivatives, including currency and interest rate options, futures and swaps, were first offered by the financial services industry in the late 1970s and early 1980s in response to unprecedented currency and interest rate volatility. Similar commodity derivatives already had a long history. In the early 1980s, extremely high interest rates were a potential problem for a small manufacturer, and banks for a fee arranged interest rate options and interest rate caps. Even though interest rates have been unusually

low in recent years, it is useful for an SMM to be aware of this issue, because conditions may change again some day.

Commodity price volatility, affecting both raw material and energy costs, is often an issue for an SMM.

“In times past, we knew better what our energy and raw material costs would be, but now they both fluctuate by the hour,” says Gerry Letendre of **Diamond Metal Casting**. The company tries whenever possible to negotiate clauses in its contracts with customers to provide for unexpected increases in energy and metal costs. Letendre considers that to be a more feasible approach than to try to hedge those commodity prices.

“We are a lean, Six Sigma company and we have been able to reduce a lot of our manufacturing costs, but it’s still difficult to keep up with energy prices.”

Al Lubrano, president, Technical Materials

For **Technical Materials**, the problem is a commodity price squeeze. The company’s energy and copper costs keep rising while the prices it can charge for its products to customers in technology-driven markets such as automotive electronics, computers and telecommunications keep dropping. “We are a lean, Six Sigma company and we have been able to reduce a lot of our manufacturing costs, but it’s still difficult to keep up with copper and energy prices,” company President Al Lubrano said. (Six Sigma is a quality measurement and improvement program that strives for no more than 3.4 defects per million items.)

Capital Investment and Financing

The “school” way to make capital investment or capital budgeting decisions is through a present-value analysis. Projected returns on

a project are discounted back to the present at a “hurdle rate,” usually at or close to the company’s weighted average cost of capital. If those returns exceed the present value of the required capital investment, the project will build shareholder value. In addition, companies often rank projects by internal rate of return, the rate at which the net present value of all investments made and returns realized on a project equals zero. But even the largest companies must weigh a great many qualitative factors as they prioritize among projects that clear their hurdle rates. SMMs’ capital investment decisions tend to be driven primarily by qualitative factors. Often a large capital investment is simply a matter of buying a new machine that the company needs to carry out its business plan and remain competitive.

“We don’t do an ROI calculation or expect a one-, two-, or three-year payback as you might do in a Fortune 500 company,” said Karla Aaron, CEO of **Hialeah Metal Spinning**. “We buy a new machine when we see a new process capability we need. We think if we buy the machine it will open the door to new possibilities, allow us to buy into a new market niche. So we will be able to offer more and further differentiate ourselves in the eyes of our customers. That is how we buy all of our equipment. Because we are a well-run company, our banker says fine. He understands our logic. If I had to justify it more analytically, I couldn’t. We have to be creative in our equipment purchases and find different ways to achieve the same thing. We just bought an inspection arm for \$15,000—a poor man’s version of a coordinate measuring machine (CMM), which normally goes for \$100,000. In the plant, we have to pick and choose the technologies we need. With regard to software for our computer-controlled machine tools and for receiving customer drawings and specifications electronically, there is virtu-

ally no decision involved. We simply have to remain current.”

SMMs finance their capital investments mainly through internally generated funds and bank borrowing. How much debt a company takes on is a function of the bank’s willingness to lend and the owner’s tolerance for risk. On one hand, a dedicated entrepreneur is willing to bet everything on the success of a company that is intertwined with his own identity, but on the other hand he doesn’t want to go bankrupt and lose his company during an economic downturn. Some turn to venture capital to enable them to grow faster; others prefer to maintain full ownership and control.

Except for some short-term, working-capital financing with bank lines of credit, **Vermeer Manufacturing Company** has financed all of its growth with internally generated capital. Throughout the company’s 57-year existence, founder Gary Vermeer’s policy has been to have no debt. He grew up in the depression and has experienced both business and agricultural cycles. Business downturns always create problems, but one problem Vermeer has avoided has been a banker knocking on the door and asking if the company will be able to service its debt. The second generation of family management, which runs the company now, completely agrees with the no-debt philosophy.

Collie Hutter, CEO of **Click Bond** and her co-owner husband Charles Hutter have preferred to maintain full ownership of their company rather than seek equity capital from the outside. “We have seen some fellow entrepreneur friends in the computer industry go the venture capital route and in some cases they have walked away with a lot of money, but I think they sacrificed some self-satisfaction. There are a lot of problems associated with having somebody else involved in the business. I don’t think venture capital would have worked for us,” Hutter said.

“We don’t do an ROI calculation or expect a one-, two-, or three-year payback as you might do in a Fortune 500 company. We buy a new machine when we see a new process capability we need.”

Karla Aaron, CEO of Hialeah Metal Spinning

Performance Measures

According to a well-known management adage, to manage something you must be able to measure it. And according to another, to figure out where you’re going you need to know where you are. Every SMM owner or manager needs to determine what to measure, and to select and review on a daily or weekly basis a few of the most important measures that indicate the health of the business, known as key performance indicators (KPIs). Robert S. Kaplan and David P. Norton, who developed the KPI concept, put KPIs in four categories: the financial perspective; the customer perspective; the innovation and learning perspective; and the internal business perspective.¹⁶ Experts warn against having too many; it’s more effective to focus on half a dozen KPIs that are really crucial and speak to the fundamental factors that drive the viability and success of the business. A set of sensibly diversified KPIs is often called a balanced scorecard. KPIs on a balanced scorecard are both financial and non-financial. For example, an SMM CEO’s KPIs might include sales growth, manufacturing costs, certain production process times, new product development times and results of customer surveys.

For **Al-jon** CEO Kneen, the most important indicator is found on a daily report received by every one of his managers that shows how many machines manufactured

by the company are down. If that number is zero, then Al-jon's machines are performing properly, warranty expense is minimal and customers are happy and likely to reorder.

For **Vermeer Manufacturing**, KPIs are an integral part of lean manufacturing and its emphasis on measurement. Vermeer's balanced scorecard includes:

- sales (orders from dealers);
- dealers' retail sales, inventories, capitalization rates, and absorption (percentage of operating income that can be covered by parts and service income—a measure of dealers' ability to withstand a sales downturn);
- sales volume per employee;
- level of inventory, accounts receivable, and fixed assets as a percent of revenues;
- percentage of sales volume related to products developed within the past four years;
- production time from raw material until shipment of finished product;
- cost of quality (warranties, scrap rate, rework, equipment loaners at the dealer level);
- customer satisfaction indexes in response to telephone questions such as whether the owner of a Vermeer product would buy the same product again, if so why, and if not why not; and
- employee satisfaction index in response to questions such as whether an employee would recommend Vermeer as a place to work.

CEO Ronald Moquist at Raven Industries describes Section 404 of Sarbanes-Oxley as a tremendous amount of work, but justified because it has provided a way to ensure that accounting processes are sound and well documented.

Corporate Governance

The owner and CEO of a small manufacturing company can benefit tremendously by assembling a board of directors or a board of advisors that includes outsiders with a diversity of business experience—people who can provide fresh points of view and are willing to challenge the CEO.

State law generally requires a corporation to have a board of directors, although in many states that board may consist of just one person. Potential directors have become more sensitive to their liabilities in recent years and in many cases are reluctant to serve on boards. As a result, some SMMs now rely more on advisory boards for guidance.

Hialeah Metal Spinning, an S-corporation, has a three-person board as required by its bylaws and Florida state law. Comprising CEO Karla Aaron, along with the company's lawyer and the former CEO, the board fulfills its legal responsibilities such as the adoption of bylaws, issuance of stock, election of principal officers, and the designation of banking institutions, but has little management oversight or involvement in the company's day-to-day operations. For advice on how to run her business, Aaron relies on a board of advisors that includes a marketing expert, a human resource specialist, an accountant, and two people from the metalworking industry. The advisers, who meet three or four times a year, have no legal responsibility to the company and no exposure, and Aaron is not obligated to take their advice. Many members of Aaron's CEO networking group have similar advisory boards. Other CEOs interviewed for this report cited the Young President's Organization, the Chief Executive Board and NAM board meetings as opportunities to network and discuss problems and issues with peer executives.

The Sarbanes-Oxley Act of 2002 imposed new governance requirements on public

companies. For example, a public company must now have a majority of outside directors on its board and its audit committee and nominating committee must be comprised entirely of outside directors. In addition, Section 404 of the law requires management to assess the company's internal controls over financial reporting and independent auditors to attest to the effectiveness of the controls. Although CEOs of privately held SMMs don't have to comply with Sarbanes-Oxley, many use the act as a guideline to evaluate their own governance practices. In addition, private companies that expect some day to go public, to seek venture capital, or even to borrow from a commercial bank must be ready to comply with Sarbanes-Oxley's requirements.

Raven Industries of Sioux Falls, S.D., a manufacturer of engineered films, electronic manufacturing systems and agricultural flow controls, is a relatively small publicly held company with \$168 million in sales and 850 employees. President and CEO Ronald M. Moquist describes Section 404 of Sarbanes-Oxley as a tremendous amount of work, but justified because it has provided a way to ensure that accounting processes are sound and well documented in the same way that other processes in the company have been documented in the ISO certification process. As in the ISO process, Raven cautions its staff against adopting a check-the-box mentality in the Section 404 compliance process. Moquist is the only insider on the company's seven-member board. He believes it is his responsibility to challenge the board and also to listen to challenges from the board members. Moquist describes the atmosphere of board meetings as calm and collegial because everyone is trying to help. Board discussions are more dynamic and productive with a smaller board, in his opinion.

Management Succession and Estate Planning

Management succession and estate planning is a serious issue for a privately held SMM. Family members may or may not be qualified for or interested in participating in the business. Proper advanced planning is required to minimize unfavorable tax consequences when a principal shareholder dies.

CEOs of several privately held manufacturers interviewed for this report recommend that owners look for methods under existing estate and tax laws to transfer stock to the next generation, start the process early and keep abreast of changes in the laws and regulations. One cites the example of heirs who had to pay millions of dollars of estate taxes because the principal owner simply refused to acknowledge and deal with the issue when he was alive and failed to start the gifting process in a timely manner. Another cites a family that had to sell its company before the principal owner died because the heirs recognized they would not be able to afford the estate taxes.

Two CEOs of family-owned companies also described their hiring practices. In one case, the only family members who work for the company are the CEO and the head of manufacturing even though more than 40 family members hold stock in the company. A family member is never chosen for a job over a better-qualified outside candidate, and that policy could even apply to the CEO some day. In another company, if the current CEO dies unexpectedly, there is a designated, qualified person within the company who will succeed him. Only the CEO, the board, and the designated successor know who that successor is. In that company, the policy on hiring family members is in writing for everyone to see. Before being considered for a position in the company, a family member must gain relevant business experience and succeed at a job elsewhere.

Policy Issues: Legislative, Regulatory and International

Although a central message of this report is that leading SMMs take responsibility for their success into their own hands and take the initiative to differentiate themselves to achieve competitive advantage, some of the challenges discussed above have solutions that can be achieved at least partly through enactment or reform of legislation and regulations and through negotiations with our international trade partners. A large part of the NAM's mission is to represent SMMs in trying to achieve those solutions. This section discusses current policy issues concerning regulatory improvement, energy legislation, international trade, taxes, health care reform, legal reform, educational reform and federal funding for research.

Regulatory Improvement

John Engler, president of the NAM, recently remarked that the vast majority of American manufacturers are good corporate citizens who comply with the regulatory requirements that apply to their companies. But in the rigorous competition of today's global marketplace, resources are precious, especially for SMMs. It is vital to them, he argued, that regulations achieve a viable purpose and be cost effective. SMMs also believe that the paperwork associated with regulations should be as simple as possible so their time can be spent on more productive activities. Also, as noted earlier under Regulatory Compliance Costs, SMMs bear a disproportionate share of business regulatory costs.

The NAM's agenda for regulatory improvement is based on the premise that regulation is a legitimate function of the federal government, but it should be based on sound economics, science and data. The true measure

of a regulation's effectiveness is whether the stated goal has been met, not the number of citations for violations. The NAM supports a strong Office of Information and Regulatory Affairs (OIRA) within the White House Office of Management and Budget to enforce quality standards for the promulgation of regulations, to review the cost effectiveness of existing and proposed regulations, and to suggest areas for improvement. The NAM opposes the use of lawsuits, whether initiated by an agency or a non-government entity, to accomplish regulatory goals without undergoing the proper regulatory process.

Energy Legislation

Largely because U.S. manufacturers are faced with some of the highest energy costs in the world, the NAM led a national grassroots effort that helped win passage of the Energy Policy Act of 2005, the most sweeping energy legislation in more than a decade.

The act addresses reliability standards and incentives for transmission grid improvements to improve the nation's electricity transmission capacity; provides incentives for continued research and use of clean and renewable fuels; encourages more nuclear power production and clean coal technology; extends Daylight Saving Time by four weeks to reduce energy consumption; and breaks the bureaucratic logjam that has prevented the approval of liquefied natural gas facilities.

Notably absent from the Energy Policy Act was any provision that would lift federal bans on deep-water exploration for natural gas on the Outer Continental Shelf (OCS) or oil development in the Arctic National Wildlife Refuge (ANWR). Those in favor of legislation to allow exploration on the OCS argue that current deep-water exploration

methods employ environmentally sound technologies.

The NAM believes that the energy bill was a good first step toward addressing this country's antiquated energy infrastructure and diversifying electricity production. But it doesn't go far enough. Additional actions the NAM recommends to build a more flexible, diverse and affordable energy supply include the following:

- provide access to the OCS for exploration and development of oil and natural gas resources;
- allow companies the ability to fuel switch during high energy seasons;
- allow exploration and development in the ANWR on Alaska's North Slope;
- expedite the permitting process for energy infrastructure such as power plants and LNG terminals;
- remove obstacles to building new oil refineries, including environmental restrictions contained in the Clean Air Act amendments of 1990;
- authorize the construction of enough new nuclear plants to generate 50,000 megawatts of nuclear energy by 2020; and
- ease restrictions and promote investment in clean coal production.

Trade Agenda

The NAM trade agenda is focused on leveling the international playing field for U.S. manufacturers and improving their competitiveness in the global market economy. The NAM's domestic priority on reducing the cost of manufacturing in the United States complements these international goals. Successful implementation of the trade agenda should help reduce the large U.S. trade deficit and strengthen the overall domestic economy. Among the NAM's key trade objectives are the following:

- achieve broad trade liberalization in the current WTO Doha negotiations, includ-

ing substantial reductions in industrial tariff and non-tariff barriers and reciprocal market access;

- negotiate and obtain congressional approval of additional free trade agreements (FTAs) similar to the Chile, Australia and Central American-Dominican Republic FTAs with other commercially meaningful countries and regions;
- get China and other trading partners to adopt flexible, market-determined exchange rates;
- obtain strengthened anti-counterfeiting and anti-piracy enforcement in China and other developing countries and encourage strong intellectual property protection more broadly;
- reduce the trade-distorting effects of differing standards, multiple testing regimes and other technical trade barriers—a particular burden on SMMs—and help SMMs participate more effectively in international standard-setting forums;
- press for harmonization of direct and indirect tax regimes, including the elimination of the preferred status of the value-added tax (VAT); and
- intensify efforts to increase U.S. exports to China by a large volume over the next three years.

Tax Policy

The NAM supports pro-growth tax relief to provide an insurance policy for continued and durable economic growth. Over the long term, the NAM supports the thoughtful consideration of measures to make the tax code fairer and simpler, and believes that policymakers should be guided by principles that will promote economic growth and job creation.

Among current tax issues relevant to SMMs are the following:

- *Permanent Tax Rate Cuts.* About 50 percent of the NAM's SMMs are organized

as “flow through” companies and pay taxes at the individual tax rates. To them, recent legislation that reduced the top individual tax rate from 35 percent to 32 percent has been extremely beneficial. Unfortunately, this change will end in 2011 unless Congress acts to make the tax rate cuts permanent.

- *Estate Tax Repeal.* Legislation enacted in 2001 gradually phases out the estate or “death” tax until 2010, when a “sunset” provision terminates such relief. The NAM strongly supports legislation that would eliminate the sunset and make death tax repeal permanent.
- *Capital Cost Recovery.* While supporting continued improvements in our capital cost recovery system, the NAM ultimately would like to see a system that allows all companies to expense capital equipment in the tax year it is purchased.
- *R&D Tax Credit.* The NAM supports legislation to strengthen the R&D tax credit and make it permanent. This is a critical element in supporting and continuing to build an innovation economy.

Health Care Reform

As discussed earlier in this report, the rising cost of health care is one of the biggest challenges manufacturers face today. The NAM believes that the answer to the rising cost of health coverage lies in an aggressive two-track strategy of reducing current health care costs while experimenting with changes or alternatives to the current health care system. Adopting health information technology is critical to the NAM’s health care strategy, much as information technology drove change in the manufacturing industry. The NAM believes the creation of a working electronic health record is critical to improving the cost and quality of health care. In addition, manufacturers are achieving major cost savings in disease

management programs. The NAM also advocates more aggressive steps towards disease prevention that can save workers and employers additional money and increase productivity.

NAM-supported reforms also include individual health insurance tax credits (useable in the workplace); improving and encouraging the use of Health Savings Accounts (HSAs), Health Reimbursement Arrangements (HRAs), and Flexible Spending Accounts (FSAs).

A **Health Savings Account** combines a tax-exempt account with a qualified high deductible health plan. Participants pay for current year out-of-pocket medical expenses below their health plan’s deductible from their HSA account and accumulate funds for future out-of-pocket expenditures.

A **Health Reimbursement Arrangement** is an employer-funded account that reimburses employees for a designated level of qualified medical expenses.

A **Flexible Spending Account** allows participants to pre-fund a designated amount of the current year’s out-of-pocket expenses on a tax-favored basis.

Legal Reform

Legislation to Discourage/Curtail

Frivolous Lawsuits. The NAM supported the Lawsuit Abuse Reduction Act of 2005, passed by the House of Representatives in October. Assuming eventual enactment after passage by the Senate, LARA will require sanctions for lawyers filing frivolous lawsuits, deter the filing of frivolous claims by placing the cost of defending such claims on the lawyers who bring them, and put an end to forum shopping by limiting the filing of personal injury claims to places where plaintiffs live or were hurt, or to the jurisdiction of the defendant’s principal place of business. The NAM will also be following the implementation of the Class Action

Fairness Act, signed into law in 2005, to ensure that judicial rulings do not undermine the law's usefulness.

Asbestos. There is broad and bipartisan agreement that asbestos litigation needs to be reined in. Congressional debate currently centers on a privately sourced trust fund. Non-bankrupt defendant company contributions would be determined first by historical asbestos litigation costs and then by revenue; companies meeting Small Business Act criteria would be exempt from contributing and bankrupt companies have a separate tier for contributing. The NAM testified before the Senate Judiciary Committee in favor of federal legislation to rein in asbestos litigation. Through its leadership of the Asbestos Alliance, the NAM will continue to be involved in discussions with Congress on a legislative solution to the asbestos problem.

Regulation and Taxation Through Litigation. The NAM supports initiatives to curb efforts by activist groups and governments at all levels from using lawsuits to get what they cannot otherwise achieve through the legislative or regulatory process. The NAM believes that the proper forum for dealing with fat content, gun control, and other issues involving public policy is the legislative or executive rulemaking agencies and not a courtroom, where public participation is limited.

Educational Reform

Manufacturers are facing skill shortages at all levels caused in large part by deficiencies throughout the educational system. As a result, many manufacturers are becoming more involved with local schools to try to have some influence over the education and training of future job candidates.

The NAM supports the following policy initiatives to help SMMs in their training effort:

- Vigorous implementation of the No Child Left Behind law and the emphasis it places

on rigorous standards and accountability. Manufacturers are particularly concerned about lagging graduation rates, as compared with our international counterparts in math, sciences and engineering—especially at the Master's and PhD levels. To compete in an increasingly technical global economy, a strong foundation in math and science is fundamental for all students, whether or not they pursue post-secondary education.

- The Department of Education and National Science Foundation Math and Science Partnerships are critical programs that improve math and science literacy as well as prepare students for advanced studies in critical disciplines.
- Business can and should do its part by working more closely with local schools, technical and community colleges and other post-secondary education providers to shape appropriate curriculum that prepares young people for the more technically advanced jobs of the 21st century.
- Public funding for workforce development in community colleges and technical schools, which are the training providers of choice for manufacturers. Over the past year, the Department of Labor has made numerous grants to community colleges to train workers for advanced manufacturing careers under President Bush's High Growth Training Initiative.

The Department of Labor is working to make the \$15 billion Workforce Investment System more demand driven, *i.e.*, more responsive to the needs of industry. At the same time, Workforce Investment Boards (WIBs) across the country need manufacturers in their memberships who can inform those boards of their workforce challenges.

Toni McCarty, executive director of the National Center for Integrated Systems Technology (NCIST) at Illinois State

University, said that partnerships among manufacturers, WIBs and community colleges to promote workforce development are win-win situations. The community colleges that listen and respond to identified needs of their local and regional employers become truly demand-driven and manufacturers become a primary driving force behind decisions related to education and training. With Department of Labor support, NCIST designs and implements advanced manufacturing training programs at numerous community colleges.

Federal Funding and Tax Credits For Research & Development

Lack of support for R&D threatens to undermine U.S. technology leadership. A permanent and strengthened R&D tax credit would encourage investment in R&D and thereby spur innovation and productivity.

The federal portion of R&D was .78 percent of GDP in 2003 compared to 1.92 percent in 1964.¹⁷ Private industry has taken on a greater burden and now accounts for two-thirds of the national investment in R&D. While increasing R&D dollars to the 1964 GDP space-race levels is unrealistic, maintaining a level of investment in R&D that keeps pace with GDP growth is critical for the United States in maintaining a competitive advantage.

Even though the U.S. government can claim the highest absolute level of R&D investment in the world, the priority of

expenditures in the United States has been devoted to national defense. Beyond defense development, the priority for federal R&D expenditures has been life sciences, which has received more funding in recent years than math, computers, physical sciences and engineering. Science and technology is the cornerstone of American productivity and therefore should receive additional R&D investment from the U.S. government.

Blasch Precision Ceramics, based in Albany, N.Y., engineers advanced industrial ceramics and refractory material products for the metallurgical, chemical, heat-treating, power generation, glass, petrochemical and other industries. The company has benefited from government cost-share grants in its continued R&D. It received a \$2.2 million Advanced Technology Program¹⁸ grant in 2001 from the U.S. National Institute of Science and Technology to develop an economical method of producing cathode power used in the production of solid oxide fuel cell (SOFC) power systems, followed by a 10-year, \$10 million cost-share grant from the Department of Energy (DOE) to assist in the further development of SOFC technology. Alongside the government grant, Blasch made a significant investment of its own funds in the project. Blasch has participated in teams with Siemens Power Corporation, Ford Motor Company, Lennox Industries, and several other companies as part of the DOE Solid State Energy Conversion Alliance to help commercialize SOFC power systems for residential, automotive and military applications.

Interview With the Assistant Secretary of Commerce For Manufacturing and Services

Report author Hal Davis interviewed Albert A. Frink, assistant secretary of commerce for manufacturing and services, in September 2005. He discussed how his Office of Manufacturing and Services, established in 2004, was progressing, and on the process of working with other federal and state departments and agencies to carry out the Manufacturing Initiative. Based on his own experience as a co-founder and co-owner of a small manufacturing company, he had no lack of ideas about what a small manufacturer needs to do to succeed in today's global economy.

You have been in your new capacity, acting as an advocate and coordinating all the federal government services for manufacturers, for about a year now. How is it going?

You will recall that the Department of Commerce hosted a series of roundtables with a whole variety of manufacturers in 2003 to hear their concerns. Recommendations from those roundtables were the foundation for the Department of Commerce's first ever *Manufacturing Report*, issued in early 2004, which set the tone for what our office is trying to do. The overall need is to lower the cost of doing business in the United States and thereby to increase the potential for competitiveness. The first step was to establish this Office of Manufacturing and Services, and preferably appoint someone from the manufacturing world to run it. Needless to say, after 30 years of my own manufacturing experience, I am finding this to be an interesting challenge. The second step was to implement the Manufacturing Council, which I call the "manufacturing senate," to give manufacturers a voice. And the third step was to establish the Interagency Working Group on Manufac-

turing, which now includes 17 government departments and agencies. These were all firsts, unlike anything that had been in place before.

We are finding the Interagency Working Group to be particularly beneficial. Through that group, we are able to discuss with all the different agencies how their regulations impact the manufacturing community. In some cases, they have developed a better understanding than they had about the burdens their policies create. For example, we have worked with the State Department on ways to make the visa application process less onerous for foreign buyers of U.S. goods and services who come to this country frequently. Now the State Department can see how their efforts might increase U.S. exports. Some day I would like to plan some trips to manufacturing facilities for this group to give them a more personal snapshot of the people who are trying to overcome a host of regulatory burdens.

This new Office of Manufacturing and Services gives the Commerce Department a domestic agenda for the first time, working with other government departments and agencies. Before, it was primarily a trade promotion facility. The new deputy assistant secretary for industry analysis and director for economic analysis are working closely on regulatory reform with the Office of Management and Budget. Together with OMB, they are evaluating 76 recommendations from the manufacturing community to simplify, eliminate or otherwise change various regulations.

We also plan to set up an intergovernmental working group, allowing us to get involved with state and community governments. One of my goals is to put a lead

manufacturing advocate, a position similar to mine, in every state along with a manufacturing council to create greater general awareness of the needs of the manufacturing community. If you ask any group of manufacturers what their concerns are, one of the things they will tell you is that most legislators and other government people do not understand the effect of current economic conditions on manufacturing. So they need a voice, and the intergovernmental process at the state level will help them.

With respect to China, our marching orders are to do everything possible to level the playing field and to hold people to the agreements they have signed. There are a huge number of trade laws in place, so we don't need new laws as much as we need to enforce the existing ones. We have sent an intellectual property rights attaché, Mark Cohen, to China, and he has already begun to make a difference. One of his biggest concerns is that many manufacturers have not taken the proper steps to protect themselves under existing laws of the United States and foreign countries. We are seeing numerous cases of American companies bringing their proprietary products to foreign partnerships, not protecting themselves adequately, and having to fight foreign partners who take those products away and produce them on their own. Chris Israel, who runs the STOP! Initiative, will work closely with Mark. So the federal government is really deploying resources to level the playing field. I don't know of any project that's a higher priority.

So what do you think small and medium manufacturers have to do to survive and prosper amid all the challenges of today's global economy?

It is difficult for an American company today to compete by just producing commodity products. There may be a few exceptions like Nucor in steel, but even that company has succeeded by pioneering an innovative

process. Companies that are successful today have defined how to differentiate themselves and figured out how to bring what is different to the market in a more efficient, cost-effective way.

Our role in government is to create conditions so entrepreneurs are empowered to do that. We are not meant to be a life support system. When my partners and I ran a manufacturer in California, the thought of calling in the government to help us solve our problems would never have occurred to

“One of my goals is to put a lead manufacturing advocate, a position similar to mine, in every state along with a manufacturing council to create greater general awareness of the needs of the manufacturing community.”

Albert A. Frink, assistant secretary of commerce for manufacturing and services

us. We always looked to ourselves to do what was necessary to survive in today's demanding, competitive economy. We knew what we had to do to add value. You can work yourself until you are blue in the face cutting costs and implementing lean manufacturing techniques—and indeed that's important. But ultimately you hit a wall. But when it comes to creating value, you are less likely to hit a ceiling. You can build a better product. You can bring your product to the market in a more appealing, user-friendly way with superior customer service.

It's easy for a small manufacturer to get caught up in day-to-day operations and not devote enough time and energy to marketing. Many small companies have too few customers, and the ones they do have are not very well diversified. For example, a tier-three supplier that sells 60 percent of its output

to one of the big auto companies is highly vulnerable. The auto company may start sourcing the part to China because the U.S. supplier could not supply it cost effectively. Someone should have seen that problem coming. Marketers will tell you that more than 25 percent of sales to one customer is dangerous. A company needs to market and brand itself. We urge the MEP centers to spend more time teaching small manufacturers how to market themselves.

Just about every small and medium-size manufacturer should be developing an export strategy—and here again, thinking about the company's strengths and what makes it different. It's even an opportunity to learn from the mistakes you made in the U.S. market. You can start with a clean slate in a new country.

You have to control your distribution and evaluate whether a prospective overseas partner will be effective in marketing your company and building your name. The partner has to understand that you are bringing something different to the table—that your company has not just a product, but a culture, an identity and a brand. As you go into a new country, you can't just think about doing some business. You have to

realize your first impression will be a lasting one and think about building a reputation over the long term.

And you need to build your brand. People worry about China, but the only brand they have is "Made in China." For example, Lenovo had the resources to buy and run IBM's Think Pad personal computer business, but it had to buy the brand.

If you have trepidations about starting to export, look to the numerous Department of Commerce programs that can help you start. Participate in a trade mission. Use the Gold Key program. Think about our forefathers who came to this country for new challenges and opportunities.

It all takes time. It took my partners and me 20 years to build up our overseas business. But if you stick to your guns as we did, you will find your exports to be among the most profitable sectors of your business.

I don't think it is in America's best interest to export commodity products. We are not a low-cost producer country, but we are the greatest innovators in the world. We should play to our strengths: innovation and differentiation.

Appendix

Government Resources for SMMs

While taking responsibility for competitive success into their own hands, leading SMMs keep abreast of the government programs currently available to help them. This section describes numerous Department of Commerce programs as well as Department of Labor, Small Business Administration, Office of Management Budget and other interagency programs.

Department of Commerce Programs

In 2003, then Secretary of Commerce Donald L. Evans announced the Manufacturing Initiative, a program designed to ensure that government policies foster a healthy and competitive manufacturing sector and spur economic growth. Subsequent roundtable discussions were held with small, medium-size, and large manufacturers from a range of industries. The recommendations stemming from these hearings were the foundation for the 2004 *Manufacturing Report* which laid out the manufacturing agenda the Department of Commerce is spearheading today in conjunction with numerous other government agencies.¹⁹

Organizational Changes. During 2004, following up on the program outlined in the *Manufacturing Report*, the Department of Commerce made six organizational enhancements:

- *Office of Manufacturing and Services*—a new group within the International Trade Administration headed by an assistant secretary of commerce to serve as advocate for the manufacturing community, coordinate existing government programs across agencies and carry out the recommendations in the *Manufacturing Report*. Telephone (202) 482-1461.
- *Office of Industry Analysis*—a new group headed by a deputy assistant secretary that is 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. Telephone (202) 482-1461.
- *Office of Competition and Economic Analysis*—headed by a new director and working closely with the deputy assistant secretary for industry analysis. Telephone (202) 482-1461.
- *Office of Trade Promotion*—a new group headed by an assistant secretary of commerce position to reorganize and strengthen the Department of Commerce’s export promotion functions. Telephone (1-800) USA-TRADE or www.export.gov.
- *Manufacturing Council*—a group of leading individuals from the manufacturing sector responsible for providing oversight on implementation of the Manufacturing Initiative.
- *Interagency Working Group on Manufacturing*—created to facilitate a coordinated federal approach to challenges facing the manufacturing sector both domestically and internationally. Participating agencies include Commerce, Agriculture, Defense, Education, Energy, Health and Human Services, Homeland Security, Labor, National Aeronautics and Space Administration, National Science Foundation, Office of Management and Budget, Office of Science and Technology Policy, Transportation and the Small Business Administration. The secretary of commerce asked fellow secretaries and agency heads to designate manufacturing liaisons to work with this group.

Other Recent Department of Commerce Initiatives

Investigations and Compliance Unit.

Recently established to take new and proactive measures to ensure that our trading partners honor their commitments, this office is staffed with experts in intellectual property rights, investigations, and intelligence. It works closely with United States Trade Representative (USTR) and the U.S. Patent and Trademark Office to investigate and resolve violations of trade agreements.

STOP! Initiative. The Department of Commerce is a key member of the STOP! (Strategy Targeting Organized Piracy) Initiative, announced in October 2004. It was created to coordinate government-wide activities to confront global piracy and counterfeiting. The program seeks to —

- secure and enforce intellectual property rights in international markets;
- stop fakes at U.S. borders;
- keep global supply chains free of infringing goods;
- dismantle criminal enterprises that steal America's intellectual property; and
- reach out to like-minded partners and build an international coalition to stop piracy and counterfeiting worldwide.

For manufacturers or other parties who have observed violations or who have other related concerns, there is a hotline, (1-866) 999-HALT, and a Web site, www.StopFakes.gov.

Coordinator for International Intellectual Property Enforcement. Works with agencies across the Administration to develop policies to address international intellectual property violations and enforce intellectual property laws overseas. This person heads the international work of the National Intellectual Property Law Enforcement Coordination Council (NIPLECC), coordinating and supervising international intellectual property protection plans among other agencies. The coordinator for IPR enforcement plays a

significant role in the implementation of the Administration's STOP Initiative.

Intellectual Property Rights Attaché in China. To deal specifically with intellectual property rights abuses in China, the Department of Commerce arranged for the assignment of Mark Cohen (cohenma@state.gov) through the U.S. Patent and Trademark Office. The two agencies have increased their intellectual property enforcement and compliance staff by 25 percent since 2001.

Unfair Trade Practices Task Force. Also stemming from the *Manufacturing Report*, the Department of Commerce in 2004 established the Unfair Trade Practices Task Force within its Import Administration to pursue the elimination of foreign unfair trade practices that adversely affect U.S. commercial interests. The task force is available to advise U.S. manufacturers of their full rights under U.S. trade law. Small companies may not have the resources to hire trade lawyers and the petition process may be difficult to understand. The task force can help in these situations. The mission of the Import Administration is to enforce laws and agreements to protect U.S. businesses from unfair competition within the United States resulting from unfair pricing by foreign companies and unfair subsidies to foreign companies by their governments,

Standards Initiative. In March 2003, the Department of Commerce launched the Standards Initiative, an eight-point plan that responds to industry concerns that divergent standards, redundant testing and compliance procedures, and regulatory red tape are becoming one of the greatest challenges to expanding exports. The report can be accessed through the Department of Commerce International Trade Administration Standards Home Page at www.ita.doc.gov/td/standards. Responsibility for the Standards Initiative has been assumed by the assistant secretary for manufacturing and services.

Manufacturing Extension Partnership (MEP) Program. As a federal-state-private partnership, the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP) program is a network of 59 centers and about 350 locations across the country and Puerto Rico providing technical assistance and business support services to SMMs that are unable to afford the consulting services utilized by larger manufacturers. Since it was established in 1988, the MEP program has assisted more than 184,000 firms. These not-for-profit centers employ roughly 1,000 professionals who work with manufacturers to help them adopt and use the latest and most efficient technologies, processes and business practices. While part of a national network, each center works directly with area manufacturers to provide expertise and services tailored to their most critical needs, such as risk assessment, process improvement, and worker training. The MEP also offers a technical-skills training program that can help a company transition to new businesses. Another area involves helping SMMs establish business relationships with the Department of Defense. Solutions are offered through a combination of direct assistance from center staff and partnerships with organizations such as state development agencies, colleges and universities, and private-sector consultants. To locate the nearest MEP program, visit www.mep.nist.gov.

Services for Exporters

U.S. Commercial Service. The U.S. Commercial Service has a network of export and industry specialists located in 108 U.S. offices and 150 international offices in 83 countries. The service helps an SMM to grow its international sales in four ways:

- market research;
- trade events that promote products or services to qualified buyers;

- introduction to qualified buyers and distributors; and
- counseling through every step of the export process.

For locations and information about U.S. Commercial Service offices and for other information, a manufacturer can call (1-800) USA-TRADE or visit www.export.gov. This Web site serves as the U.S. government's export portal for companies just beginning to export and those expanding their international sales. It provides online trade resources and access to one-on-one counseling.

International Partner Search. For an SMM that wants to find qualified international buyers, partners or agents without traveling overseas, U.S. Commercial Service specialists can deliver detailed company information on up to five prescreened international companies that have expressed an interest in the company's products and services. Telephone (1-800) USA-TRADE.

Customized Market Analysis (CMA). The CMA program is a custom-tailored research service that provides U.S. firms with specific information on marketing and foreign representation for individual products in particular markets. Interviews or surveys are conducted to determine the overall marketability of the product, key competitors, prices of comparable products, customary distribution and promotion practices, trade barriers, possible business partners and applicable trade events. Telephone (1-800) USA-TRADE or visit www.export.gov.

Gold Key Service. The Gold Key Service is a custom-tailored business matching service offered by the Commercial Service in key export markets around the world. It includes orientation briefings, market research, appointments with potential partners, interpreter services for meetings, and assistance for development of follow-up strategies. Telephone (1-800) USA-TRADE or visit www.export.gov.

International Company Profiles (ICPs).

ICPs are background reports on specific firms prepared by commercial officers overseas. Telephone (1-800) USA-TRADE or visit www.export.gov.

Trade Event Programs. The Commercial Service in overseas embassies and local Export Assistance Centers in the United States can help exporters identify trade shows that may be appropriate for their products and take the necessary steps to participate in them. Telephone (1-800) USA-TRADE.

Export Trading Company Affairs. The Export Trading Company Affairs function, part of the International Trade Administration, can advise an SMM on forming a legally protected export joint venture, understanding the antitrust implications of such a venture, finding export partners and trading partners, and finding an export trading company, export management company or export intermediary. Telephone (202) 482-5131.

Office of Small and Disadvantaged Business Utilization. The Department of Commerce, through its Prime Contractor Directory, can assist small businesses with their marketing efforts in obtaining suitable subcontracting opportunities and presenting their capabilities to prime contractors registered with the Department. Telephone (202) 482-1472.

Environmental Protection Agency Programs

Useful information resources for SMMs concerning environmental regulations include the following:

Small Business Ombudsman—provides an information clearinghouse and hotline to provide private citizens, small communities, small business enterprises and trade association information on environmental regulations. Telephone (1-800) 368-5888, www.epa.gov/sbo/.

Small Business Environmental Home Page—an EPA-sponsored Web site to help small businesses access environmental compliance and pollution prevention information. Visit www.smallbiz-enviroweb.org.

Suppliers Partnership for the Environment—a partnership of the EPA and NIST-MEP centers that makes available environmental management tools, best practices and lessons learned based on the experience of OEMs and Tier I suppliers in the automotive supply chain. Visit www.supplierspartnership.org.

Department of Energy Programs

Industrial Technologies Program—Works with U.S. industry to improve industrial energy efficiency and environmental performance and invests in high-risk, high-value R&D to reduce industrial energy use. Also provides information to manufacturers on energy efficiency and renewable energy best practices through EERE Information Center. (1-877) 337-3463 or www.eere.energy.gov/industry.

Department of Labor Programs

Workforce Investment Act. This legislation provides for the federal government to spend \$15 billion each year for employment and job training activities. In a February 2005 meeting with the Manufacturing Council Subcommittee on the U.S. Workforce, Assistant Secretary of Labor Emily DeRocco encouraged the subcommittee to develop a dialogue on how best to utilize those funds. Available training resources often go unused because state and local workforce agencies do not know how to make use of them. There is an opportunity for Workforce Investment Boards (WIBs) around the country to bring manufacturers into their membership and for manufacturers inform WIBs of their workforce challenges.

Workforce Investment Boards. The National Association of Workforce Investment Boards (NAWB) represents the interests of the nation's Workforce Investment Boards (WIBs). Across the country, more than 600 state and local WIBs are providing workforce development leadership in their communities. The business-led WIBs have the critical role of governance and oversight of the federal resources that support the operations of the national network of taxpayer-supported One-Stop Career Centers and federal training investments. Workforce Board membership consists of private-sector businesses and employer representatives, working in concert with public sector representatives to design effective workforce development services for job seekers and employers alike. NAWB can be reached at telephone (703) 778-7900, www.nawb.org.

High Growth Job Training Initiative. The purpose of this presidential initiative, implemented by the Department of Labor, is to grow industries with advanced manufacturing occupations. It is a strategic effort to prepare workers to take advantage of new and increasing job opportunities in the high-growth, high-demand and economically vital sectors and industries in the U.S. economy. The foundation of this initiative is partnerships that include the public workforce system, business and industry, education and training providers, and economic development authorities. Training programs are tailored to meet local workforce needs. Contact Department of Labor, Employment & Training Administration, Business Relations Group, (1-877) US-2JOBS, www.doleta.gov.

Community-Based Job Training Initiative. The purpose of this program is to improve the capabilities of the U.S. workforce through community-based job training grants, a new, employer-focused competitive grant program for training in community and technical colleges. Two rounds of

\$125 million grants were made available in 2005. Manufacturers can work regionally to define parameters for retraining that can be implemented by community colleges. Contact Department of Labor, Employment & Training Administration, Business Relations Group, (1-877) US-2JOBS, www.doleta.gov.

Advanced Manufacturing Initiative. In October 2004, Secretary of Labor Elaine Chao announced a series of investments of more than \$43 million to address the workforce needs of the advanced manufacturing industry. The Department of Labor has sought to understand and implement industry-identified strategies to confront critical workforce challenges based on input from employers, industry associations and other experts. The department's Employment and Training Administration is supporting comprehensive partnerships that include employers, the public workforce system, and other entities that have developed innovative approaches while also helping workers find good jobs with good wages and promising career pathways in the advanced manufacturing industry. This set of workforce solutions is based on defined manufacturing industry priorities such as training for innovation, pipeline development (too few young people consider the possibility of manufacturing careers), image (manufacturing confronts a negative public image characterized by such phrases as: moving offshore, declining, dirty, low pay, etc.), immigration, employability/soft skills, training program design, and matching training providers to business needs.

Bureau of Apprenticeship and Training. Assists private industry in developing and improving apprenticeship and other training programs designed to provide the skilled workers needed to compete in today's global economy. Contact Office of Apprenticeship Training, Employer and Labor Services,

Department of Labor, telephone (202) 693-3812, www.doleta.gov

Small Business Administration Programs

PRO-Net. The SBA's PRO-Net has recently been integrated with the Defense Department's Central Contractor Registration (CCR) database. This combined database serves as an electronic gateway of procurement information for and about small businesses that serves as a search engine for contracting officers, a marketing tool for small firms, and an Internet-based database of information on more than 180,000 small, disadvantaged, 8(a), and women-owned businesses.

Contact pronet@sba.gov or www.ccr.gov.

Office of Advocacy. Represents the views of small business before federal agencies and Congress, receives criticisms of federal policies that affect small businesses and makes proposals for minimizing the burden of regulations on small businesses. It monitors and reports to Congress on federal agencies' compliance with the Regulatory Flexibility Act (RFA), which requires a regulatory flexibility analysis of the impact of proposed rules on small entities. Contact www.sba.gov/advoc/ or telephone (202) 205-6533.

SBA Loan Programs. The SBA offers many loan programs to assist small businesses, primarily as a guarantor of loans made by private and other financial institutions.

- *Basic 7(a) Loan Guaranty.* This program serves as the SBA's primary business loan program to help qualified small businesses obtain financing when they might not be eligible for business loans through normal lending channels. The program is delivered through commercial banks. See www.sba.gov/financing.
- *504 Certified Development Company (CDC) Loan Program.* Provides long-term, fixed-rate financing for small businesses to acquire real estate or machinery or equip-

ment for expansion or modernization. Typically a 504 project includes a loan secured from a private-sector lender with a senior lien, a loan secured from a CDC (funded by a 100 percent SBA-guaranteed debenture) with a junior lien covering up to 40 percent of the total cost, with a contribution of at least 10 percent equity from the borrower. CDCs are private, nonprofit corporations set up to contribute to the economic development of their regions. See www.sba.gov/financing.

- *Export Express.* Combines the SBA's lending assistance with its technical assistance to help small businesses that have exporting potential but need funds to buy or produce goods or to provide services. See www.sba.gov/financing.
- *Export Working Capital Program.* Supports export financing for small businesses when that financing is not otherwise available on reasonable terms. The EWCP is a combined effort of the SBA and the Export-Import Bank of the United States. See www.sba.gov/financing/.

Government R&D Programs. President Bush signed an executive order in 2004 making manufacturing-related R&D a high priority for the more than \$2 billion distributed through the SBIR and STTR programs. See www.sba.gov/sbir/.

- *Small Business Innovation Research (SBIR).* Established under the Small Business Innovation Development Act of 1982 to provide funding to stimulate technological innovation in small businesses to meet federal agency research and development needs. Eleven federal agencies currently participate in the program.
- *Small Business Technology Transfer (STTR).* Established in the early 1990s, STTR projects must involve substantial (at least 30 percent) collaboration between a small business and a not-for-profit research institution.

Endnotes

- ¹ www.science.doe.gov/sbir/NEWWEB/Introduction.htm
- ² www.whitehouse.gov/infocus/smallbusiness/
- ³ www.nist.gov/public_affairs/guide/mep.htm
- ⁴ Engardio, Pete and Dexter Roberts, "The China Price," *Business Week*, December 6, 2004, p. 102
- ⁵ International Association of Bridge, Structural, Ornamental, and Reinforcing Iron Workers
- ⁶ Stiglitz, Joseph E., Jonathan M. Orszag, and Peter R. Orgzag, *The Impact of Asbestos Liabilities on Workers in Bankrupt Firms*, Sebago Associates, December 2002, p. 16. Commissioned by the American Insurance Association.
- ⁷ www.sba.gov/advo/research/rs264tot.pdf. Mr. Crain's Study was preceded by two other studies, *Profiles of Regulatory Costs: Report to the U.S. Small Business Administration*, by Thomas D. Hopkins, U.S. Department of Commerce, National Technical Information Service, 1995 (www.sba.gov/advo/); and *The Impact of Regulatory Costs on Small Firms*, by W. Mark Crain and Thomas D. Hopkins, Office of Advocacy, U.S. Small Business Administration, 2001 www.sba.gov/advo/research/rs207tot.pdf
- ⁸ International Association for the Evaluation of Educational Advancement
- ⁹ U.S. Department of Education, *Qualifications of the Public School Teacher Workforce: Prevalence of Out-of-Field Teaching 1987-88 to 1999-90*. Statistical Analysis Report, Table 1.
- ¹⁰ National Science Foundation, *Science and Engineering Indicators*, 2004. Appendix Table 2-34.
- ¹¹ *Ibid.* Appendix Table 2-12.
- ¹² Jones, Stephen C., Tami L. Knotts and Karen L. Brown, "Selected Quality Practices of Small Manufacturers," *The Quality Management Journal*, Milwaukee: 2005. Volume 12, Issue 1, p. 41.13
- ¹³ Briscoe, Jason A., Stanley F. Fawcett and Robert H. Todd, "The Implementation and Impact of ISO 9000 among Small Manufacturing Enterprises." *Journal of Small Business Management*. Milwaukee: July 2005. Vol 43, Issue 3, p. 309.
- ¹⁴ Szamoszegi, Andrew, *Exports by Small Businesses: Performance Issues and Policy Options*, Economic Strategy Institute, November 1999, p. iv
- ¹⁵ *Ibid.* p. 22
- ¹⁶ Kaplan, Robert S. and David P. Norton, "The Balanced Scorecard—Measures that Drive Performance." *Harvard Business Review*, January-February 1992, and "Using the Balanced Scorecard as a Strategic Management System, *Harvard Business Review*, January-February 1996.
- ¹⁷ The Manufacturing Council, Subcommittee on U.S. Competitiveness Subcommittee Report, *Focus: R&D—Innovation, Technology, Process, and Amount of Knowledge*.
- ¹⁸ Regrettably, the successful Advanced Technology Policy program is now being phased out. There are no funds for new projects, which is why the program is not listed in the Appendix of this report.
- ¹⁹ www.ita.doc.gov/media/Publications/pdf/manuam0104final.pdf



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