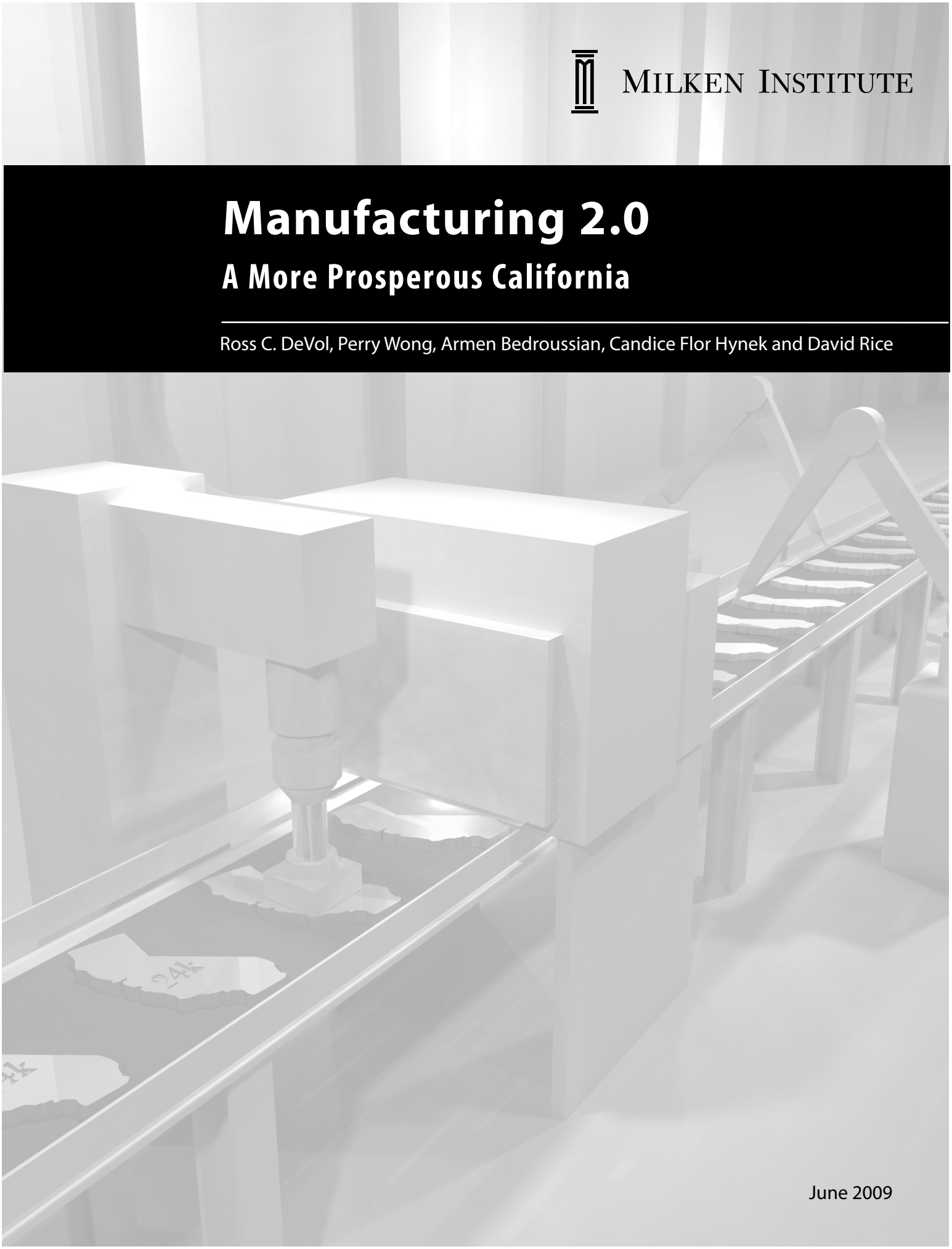
MILKEN INSTITUTE

Manufacturing 2.0

A More Prosperous California

June 2009

Ross C. DeVol, Perry Wong, Armen Bedroussian, Candice Flor Hynek and David Rice



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Online

For an interactive look at the statistics, visit **www.milkeninstitute.org/manufacturing**.

Acknowledgments

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About the Milken Institute

The Milken Institute is an independent economic think tank whose mission is to improve the lives and economic conditions of diverse populations in the United States and around the world by helping business and public policy leaders identify and implement innovative ideas for creating broad-based prosperity. We put research to work with the goal of revitalizing regions and finding new ways to generate capital for people with original ideas.

We focus on:

human capital: the talent, knowledge, and experience of people, and their value to organizations, economies, and society;

financial capital: innovations that allocate financial resources efficiently, especially to those who ordinarily would not have access to them, but who can best use them to build companies, create jobs, accelerate life-saving medical research, and solve long-standing social and economic problems; and

social capital: the bonds of society that underlie economic advancement, including schools, health care, cultural institutions, and government services.

By creating ways to spread the benefits of human, financial, and social capital to as many people as possible—by democratizing capital—we hope to contribute to prosperity and freedom in all corners of the globe.

We are nonprofit, nonpartisan, and publicly supported.

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Executive Summary

Introduction

A robust manufacturing industry is an indicator of a nation's ability to foster innovation and drive broad, sustained economic growth, and no state has been more important to U.S. manufacturing competitiveness than California. In 2002, the Milken Institute's report *Manufacturing Matters: California's Performance and Prospects* sounded the alarm bells on the decline of the state's manufacturing competitiveness and the impending economic implications. Seven years later, this report quantifies the damage resulting from a failure to address those concerns.

For the past hundred years, California's economy has been built on the success of the manufacturing industry. From the development of mechanized agronomy at the end of the 19th century, to the role of aerospace and the dominance of computers and software in the 20th, to the emergence of biotechnology at the beginning of the 21st, California's manufacturers have been pioneers in creating not only businesses and jobs but also whole new industries.

Our research shows that manufacturing—both traditional and high-tech—still drives California's economy in many ways, but the state is losing ground to other states and nations because of its regulatory climate, tax burden, and reputation as a difficult and costly place to do business.

The Need for Action

As a critical engine of economic growth and a catalyst for innovation, the manufacturing industry is a canary in the coal mine for the California economy. Some trials are due to global conditions beyond the state or even the country's control, but California can turn many of the challenges into opportunities, including creating a clean energy industry and next-generation production processes that establish industrywide standards for efficiency and sustainability.

Based on the flow of venture capital funding and amount of research and development spending, California has great capacity to innovate but isn't living up to its potential. One key to bridging this gap is a new partnership between manufacturers and the public sector. This cooperative undertaking should include the following initiatives:

- Streamlining the regulatory procedure for manufacturers, increasing transparency and accountability in the regulatory process, and encouraging long-term investment through new policy tools—all of which can be achieved without relaxing or changing a single regulatory standard.

- Enhancing public incentives for manufacturers through better planning, coordination across government agencies, and partnering with the private sector.

- Launching an industry-led campaign to encourage Californians to pursue careers in manufacturing, highlighting the attributes of modern manufacturing, its importance to the economy, its record of environmental stewardship, and its high wages.

- Creating a network of education, training, research, and business incubation centers around the state to develop a highly qualified manufacturing work force, to invent and commercialize advanced manufacturing techniques, and to assist start-up businesses.
- Creating a public-private initiative to conduct research, develop new technologies and processes, and commercialize more efficient and environmentally sustainable manufacturing practices with incentives to facilitate adoption of new standards.

Current State of Manufacturing

Our recommendations for incentives, training, and other ideas for making the state more attractive are rooted in research that shows how manufacturing's effects ripple silently through the economy. For every job created in manufacturing, 2.5 jobs are created in other sectors. At the upper bounds, electronic computer manufacturing has a multiplier effect of 16 jobs. Yes, 15 other jobs are dependent on one job created in that industry. The bottom line is this: Losing manufacturing jobs not only adversely affects the industry but also California's overall economic vitality.

Despite the great importance of manufacturing in the state, California faces two broad, yet distinct, competitive disadvantages: the state's regulatory climate and its tax burden. California consistently ranks among the most restrictive states in which to start a business, according to several research institutions' objective metrics as well as our own. As evidence, they cite the amount of time required and degree of difficulty in selecting a site, navigating regulations across jurisdictions, acquiring permits, conducting impact studies, identifying and preparing a work force, and making infrastructure improvements.

California has been progressively losing more of its manufacturing employment, particularly high-value-added manufacturing, to other states such as Oregon, Texas, Minnesota, and Washington. To analyze California's comparative manufacturing competitiveness, case studies using data from 2000 through 2007 were conducted on California and seven other "peer manufacturing" states. Together, these seven states were home to 2.7 million manufacturing jobs compared with California's 1.5 million manufacturing jobs in 2007. The peer states added more than 62,000 manufacturing jobs since 2003, while California lost 79,000 manufacturing jobs during the same period. In short, the case studies reveal that:

1. California is losing a larger share of manufacturing employment overall, in high-tech in particular, and at a faster rate compared to these other states;
2. California has a wide gap between its capacity for ingenuity and entrepreneurship and its ability to efficiently commercialize innovation in manufacturing;
3. This gap continues to widen in part due to the burden of an onerous regulatory climate and some of the highest taxes in the United States;
4. California has a reputation for being a state that is unfriendly to business, which harms its overall competitiveness; and
5. Peer states are using targeted incentives to keep and lure manufacturers away from California.

In comparing tax burdens, as of 2007, California's total taxes paid per capita were $4,993—the highest among the peer states (Arizona, Indiana, Kansas, Minnesota, Oregon, Texas, and Washington) with an average of $3,803 and much higher than the national average of $4,223. California also has the second-highest corporate income tax rate among the peer states and the twelfth highest in the nation. At $6,390 per capita, California spent more on government programs and services than any other peer state, and that amount increased nearly 50 percent from 2000 to 2007—a higher percentage increase than the other seven states. California, in addition to having the highest per capita rate in taxes paid, also has one of the highest growth rates in government borrowing.

Economic Impact of Decade-long Loss of Jobs

To illustrate the impact of lost manufacturing jobs, we conducted a simulation that assumed California manufacturers in 2007 still employed the same share of state workers as in 2000. The simulation found that if manufacturing had maintained its 12.8 percent share, 476,000 jobs would have been preserved—nearly 33 percent of the 2007 manufacturing base. If wages and output levels had been maintained, the industry would have preserved $27.3 billion in wages and $46.9 billion in output, or about 28 percent of 2007 totals. The ripple effect means the 476,000 jobs that would have been retained would have generated 1.17 million more jobs, for a total impact of 1.65 million positions. Similarly, the preserved wages and output would have generated $47.8 billion and $54.3 billon, respectively, after rippling through other sectors.

Manufacturing is an industry that creates wealth for its workers and drives broad upward social mobility. In 2007, the California manufacturing industry paid an average wage of $66,200, well above the national average and substantially more than health care and social assistance services—California's fastest-growing job sectors. Workers in California's five best-paying manufacturing industries—three of them in high-tech manufacturing—earned more than $100,000 annually on average.

The steady loss of total employment in U.S. manufacturing is not unexpected as the labor-intensive manufacturing processes flow to lower-cost emerging markets. But some of these nations are setting their sights on high-tech, high-value manufacturing that to date has remained in the United States because of its highly skilled work force. Industrial policy changes in developing nations and global economic forces will continue to transform the world's manufacturing landscape.

To remain competitive and expand into new markets, companies must develop increasingly sophisticated supply chains and production models with suppliers and partners overseas. And although the United States may disagree with the monetary policies of its trading partners, particularly with regard to exchange rates, efforts also should focus on solving challenges to manufacturing competitiveness that can be addressed locally. These include the regulatory environment, tax burden, and business climate, as well as inadequate investment in innovation, infrastructure, and human capital.

Note: The data used throughout our report is from the years 2000 through 2007.

A Path to Prosperity

Government's Critical Role

California is losing manufacturing jobs—in both traditional and high-tech industries—to other states and nations, and the key reasons are the state's regulatory climate, its tax burden, and its reputation as a difficult place to do business. Our analysis has proven that manufacturers face numerous obstacles, including competition from other states, the effects of globalization, a shortage of qualified workers, and comparatively high costs. It also has shown that other states, while facing many of the same issues, have managed to maintain and even expand manufacturing jobs through the use of incentives. (See Sections 2 through 5.)

Government plays an extremely important role in shaping the competitiveness of manufacturing, the overall business climate, and the robustness of the economy. Whether the goal is to retain companies and help them grow or to attract new ones, governments have numerous tools:

- Offsetting certain costs through tax credits;
- Improving infrastructure and the work force;
- Facilitating access to credit;
- Funding or encouraging basic research;
- Helping promote industries or products;
- Convening key stakeholders to increase cooperation and create economies of scale.

A number of scholars who have analyzed the cost-benefit of incentives assert that the net economic benefit to government and its citizens is uncertain. And policymakers across the political spectrum often are divided over whether providing incentives to the private sector is an appropriate role for government. Incentives are used by all governments—federal, state, and municipal—to attract private investment and employers and to fuel the economy, creating intense competition. As governments aggressively pursue businesses, the escalation can drive an incentives arms race of sorts.[1] Therefore, incentives are a competitive imperative for states to retain and attract manufacturers but are only one aspect of overall competitiveness.

Besides incentives, another important tool to attract development is removing inefficiencies due to excessive regulation, unnecessary bureaucratic complexity, the inconsistent application of rules, a constantly changing regulatory framework, the ineffective implementation of policies, a lack of resources for government agencies, excessive use of litigation to resolve regulatory disputes, and government workers who are poorly trained. Equally damaging is a government's reputation and attitude toward businesses and commercial development. For example, the time and effort required to obtain operating permits and licenses, the number and complexity of regulations, and the clarity and consistency with which rules are applied are areas where governments often strive to increase efficiency and enhance their area's reputation.

To retain and attract manufacturers, other states have created business-friendly policy frameworks, tax incentives, and other assistance programs. The most successful models include a complementary set of

1. Farrell, Chris, *The Economic War Among the States: An Overview*, The Federal Reserve Bank of Minnesota, June 1996.

incentives and initiatives that address the impediments to creating a more favorable climate for manufacturers. These frameworks have the following critical elements:

- Focus on key high-value industry clusters with potential for growth such as life sciences, high-technology, renewable energy, and aerospace;
- Access to a publicly supported pool of risk capital;
- Enhanced university-based R&D funded by the government;
- Public-private-university partnerships to facilitate commercialization of government-funded research;
- Centers of excellence to educate workers in the skills needed by key sectors;
- Support for entrepreneurs through business assistance programs and incubators offering low-cost commercial space and access to mentoring, financing, and peer networks.

Because all 50 states—and dozens of countries—offer incentives, manufacturers depend on them to maintain their competitiveness. However, these incentives should be redeployed to meet the challenges of a changing global market and the unique pressures on a sector that has undergone a dramatic transformation. To achieve this, the following proposals adhere to one overarching principle: work smarter, not just harder.

A Call to Action for California

The future of California manufacturing will be influenced by the method and extent to which the public and private sectors individually and cooperatively address the industry's challenges. This section includes big and small ideas to consider in the face of today's economic challenges.

These suggestions are guided by the following principles:

- Broad economic reforms are needed in addition to specific initiatives to improve the competitiveness of the state's manufacturing sector;
- Limited resources are better spent on improving existing government programs rather than creating new ones and on coordinating efforts across different jurisdictions in the state to avoid duplication and realize efficiencies;
- Government incentives should focus on the inputs critical to manufacturing rather than on specific firms;
- Public-private partnerships should be greatly enhanced to leverage collective resources and coordinate and improve efforts;
- Increasing the state's manufacturing base requires long-term planning rather than short-term, ad hoc policy initiatives;
- Investments should focus on increasing productivity by leveraging technology and innovation;
- Removing as many inefficiencies in the business-government relationship as possible is critical to enhancing competitiveness;
- Improving the transparency and accountability of government decision-making—including how incentives are used—will ensure effectiveness and equity;
- Encouraging environmentally sustainable manufacturing processes will make production more efficient while reducing the impact on the community.

Several of the following concepts are directed at improving the competitiveness of California's manufacturing industry, but they represent only a few of the crucial elements of the comprehensive, statewide economic strategy California needs. The state's current economic development policy is both rudderless and fragmented across multiple agencies and jurisdictions. A first step to addressing this issue is to establish clear leadership at the top of state government with the vision and authority to develop and implement a plan to guide California's long-term economic prosperity.

I. Smart Regulation—Efficient, Accountable, and Consistent

> *"Companies sometimes argue that, by mandating specific solutions, EPA regulations stifle innovation that could lead to better environmental results. By pursuing innovative approaches and insisting on strong accountability for results, we are finding ways to build more flexibility into regulations. EPA and some state environmental agencies have even begun to incorporate lean practices to help streamline administrative and regulatory processes."*
>
> *—U.S. Environmental Protection Agency*

Summary—We propose streamlining regulatory processes throughout California with the assistance of information technologies and targeted incentives that reward efficiency. More transparency and accountability should be built into the process by allowing citizens to evaluate their interactions with government agencies through Internet-based tools similar to sites like angieslist.com, which allows customers to evaluate private contractors and patients to evaluate their physicians. Also, contracts between regulatory authorities and businesses should be used to ensure that long-term investments will not be adversely affected by changes in short-term policy goals. The goal is to increase California's competitiveness by improving the regulatory process without relaxing or changing a single regulatory standard.

Background—California's regulatory environment consistently ranks as one of the most challenging and time-consuming by a variety of surveys and assessments. Critics say regulations are overly complex, ambiguous, and change frequently; are applied differently by each bureaucracy; and vary from one jurisdiction to the next.

Most businesses understand and even appreciate the goals of regulations to protect workers, consumers, the environment, and the community, of which the companies are also a part. However, even more challenging than a restrictive regulatory environment is one that is opaque, inconsistent, and constantly changing. Especially for capital-intensive businesses like manufacturing, the more unpredictable a regulatory environment is, the less likely it will be a competitive location. The nature of the political process is that every two to four years newly elected leaders have their own policy priorities, so regulations often change accordingly. This is difficult for businesses that make decisions to invest in the state under one administration's set of conditions and incentives only to have those conditions change after the next election—change that can affect profitability dramatically.

An additional regulatory-related challenge inherent in the public sector is that although elected leaders are directly accountable to the public through periodic elections, public employees who implement public policies are virtually unaccountable by comparison.

Opportunity—California can enhance its competitiveness without relaxing a single regulatory standard by making the process smarter, more open, and more efficient and by holding all government officials accountable for their decisions.

- **Efficient:** To ensure that companies' plans meet the regulations established, a long review of business plans and manufacturing processes is sometimes required. However, this process has become increasingly plodding and inefficient. This may be a result of limited government resources and inherent inefficiencies in the decision-making process. To shorten the regulatory review process, the following ideas should be considered:

    - **Fast-track fee**—For companies under strict time constraints and public agencies with few resources, applicants for permits and licenses should have the option of paying extra to have the process expedited and should be guaranteed a decision by a date certain. With additional fees, government officials can dedicate more resources to fast-tracked projects, conducting reviews with the same level of detail but in less time.

    - **Decision deadline**—There is little recourse for the applicant who needs a decision one way or another if the authorizing agency is unresponsive. A firm deadline for the review process should be established to ensure a decision or a timely request for additional information. For example, if a permit applicant has not received explicit approval, disapproval, or a request for additional information within 120 days of filing, the applicant is authorized to conduct operations as though approval had been granted.

    - **Efficiency incentive**—Fees are paid for the vast majority of permits, licenses, and similar approvals. To encourage efficiency in the review process, applicants should receive a rebate based on the time it takes officials to render a decision. For example, for every thirty days past the deadline for a decision, the applicant receives a 20 percent rebate.

- **Transparent and accountable:** Ensuring transparency and accountability for decisions is inherently difficult because of the variety of jurisdictions, multiple government agencies, complex regulations, and the great authority and decision-making discretion given to a relatively small number of government employees. The less transparent and accountable the process, the less competitive the business climate. To address both concerns, the following ideas should be considered:

    - **Regulation process tracking**—All applications for permits, licenses, and other regulations should be posted on a publicly accessible website with a brief description of the project. The regulatory authority(ies) with jurisdiction should be listed along with a deadline for a decision. Once a decision is made, it should be posted on the website with the reasoning behind it. This will make the process more open to the applicants and the public.

    - **Public official report card**—Using a publicly accessible online platform, citizens, businesses, and other interested parties should be able to rate their interaction with government officials, similar to such evaluation tools as ratemyprofessors.com and angieslist.com. This system will increase the accountability of government officials who are far removed from the direct accountability experienced by elected officials.

- **Consistent:** A common frustration among business leaders is that the regulatory environment is difficult to understand, navigate, and predict. Especially when making decisions about massive capital investments in physical assets that will be in place for possibly decades, firms need a clear understanding of what the

rules are, how they will be applied, and the best way to ensure compliance as well as some assurance that the rules will not change substantially after the investment is made. It is the uncertainty of how often and to what degree regulations will change that adversely affects a state's competitiveness, perhaps more so than the rigor of the regime itself.

- **Businesses need regulation—**Most businesses understand the need for regulations to protect the public good, and most leaders agree with them because they also share the responsibility for protecting the environment, ensuring worker safety, and contributing to the well-being of their communities. Most companies follow the rules, even if they do not always agree with them. There are direct consequences if they do not.

- **Changing priorities—**The periodic election of new public leaders coupled with the emergence of new policy issues result in constantly changing priorities. However, for capital-intensive commercial investments, an unexpected rule change can jeopardize the viability of that investment and create a climate seen as too unpredictable for long-term investment.

- **Binding contracts—**To ensure some consistency over time, California regulators and businesses should enter binding agreements. A contract between a business and a regulatory authority will reassure the business that the standards applied when they made an investment will remain in place even if the regulatory standard changes in the future.

- **Protecting the public interest—**Contracts between regulators and capital-intensive businesses considering moving to or expanding in California will protect the firm from future regulatory changes. To protect the public interest—for example, if a product or operation is later shown to be harmful—new standards would be applied when warranted. The burden would be on the jurisdictional authority to show why the new regulation should be applied to the business in question. If the authority's case is successful, implementing the new standard should occur over a reasonable period to mitigate the effects on the business. Otherwise, the contract between the firm and the jurisdiction insulates the company from shifting regulatory priorities of newly elected public officials, giving business leaders some assurance of predictability.

II. Enhanced Incentives—Strategic, Clear, and Coordinated

"To attract more jobs to Texas, lawmakers should extend the Texas Economic Development Act, also known as Chapter 313, which allows school districts to offer tax incentives to attract economic development projects. Chapter 313 abatements were part of the economic development packages that attracted the likes of Toyota in San Antonio and Caterpillar in Seguin. Renewing Chapter 313 keeps an important economic development tool in the Texas toolbox."

—Luke Bellsnyder, Executive Director, Texas Association of Manufacturers, May 11, 2009

Summary—Public incentives offered to the private sector to stimulate investment, job creation, and infrastructure development should be deployed strategically based on the cost-benefit ratio to society, the rest of the business community, and the state as a whole. To increase the effectiveness of incentives, a comprehensive review should be conducted to identify efficiencies, eliminate duplication, and simplify the process. Once completed, a common point of entry for businesses should be developed.

Background—In a globalized economy with a mobile work force and advancements in transportation and communications networks, competition for development, especially high-value manufacturing jobs, has become increasingly fierce. The federal government, every state government, and many metropolitan areas offer incentives to private companies to stimulate economic activity. States, and even cities in the same state, often go head to head, offering increasingly large incentives to attract a company to their location. The goal of these incentives is to increase the jurisdiction's tax base, provide employment for residents, and stimulate the economy.

California has myriad economic development incentives across different jurisdictions, although not as many as most of the peer states. One of the state's shortcomings is that its efforts often compete with one another or offer duplicative programs. And information about all the programs available from different agencies, including the federal government, is neither available in one place nor easily accessible. The lack of coordination, the fractured nature, and the conflicting priorities of government economic development efforts as well as the absence of clear leadership are symptomatic of the state's dire need for a comprehensive, long-term roadmap to ensure its prosperity.

Some research analyzing the cost of private-sector incentives and the cost to the authority granting them has questioned whether such incentives are in the best interest of government. Most studies have focused on the lost tax revenue and the number of jobs directly created by the recipient of the incentives. What is often not calculated is how the positions created provide a multiplier effect through business-to-business activity, more consumer spending in the area, other businesses that locate nearby, and spin-off businesses created.

Opportunity—In many respects, states have no choice but to provide incentives to the private sector; if they did not, they would be at an even greater disadvantage because forty-nine other states do offer them. The opportunity for California is not to offer more incentives but to make them more effective through strategic, coordinated, efficient deployment.

- **Strategic:** The type and extent of incentives should deliver a net benefit to the community where the company locates and to the state as a whole. A cost-benefit analysis should be conducted to determine whether the incentive is in the government's best interest. If the benefit is clear, it will help make the case for additional resources.
- **Coordinated:** With limited public resources, competing priorities, and an intensely competitive environment, the state that works smarter rather than harder wins. California's myriad public agencies, economic development efforts and incentives must be coordinated to be truly effective. A modest investment in reviewing all of these policies for duplications and gaps will increase the incentives' effectiveness.

- **Accessible:** The state needs a single point of entry for businesses seeking information about incentives, regardless of the target location. A clear, easily navigable website with all of the information needed will be a key promotional tool and much more useful to manufacturers and other businesses seeking information.

- **Accountable:** Among the criticisms of incentives are that they accrue to firms that eventually leave, import a great deal of labor, pay wages that are not high enough to warrant an incentive, or create some jobs in the state but outsource others abroad. The state should provide a publicly accessible website detailing who has received incentives, and it should implement "clawback" provisions that will recoup lost tax revenue if firms fail to create a certain number of jobs or leave the state within a certain period of time.

III. Modern Manufacturing—A Public Awareness Campaign

> *"An overwhelming 85 percent of kids say that they are not interested in a future engineering career for a variety of reasons, according to recent surveys of youth and adults conducted by Harris Interactive® on behalf of ASQ (American Society for Quality)."*
>
> *—January 22, 2009*

Summary—Conduct an industry-led statewide public awareness campaign to highlight the attributes of modern manufacturing, its important role in the economy, its record of environmental stewardship, and the high-wage employment opportunities it provides.

Background—Despite decades of environmental regulations, billions invested in increasing automation and productivity, use of the most advanced information technology systems, and dramatic innovations in production overall, the enduring icon of manufacturing is the smoke stack. This perception of manufacturing as a dirty, low-skill, low-paying career is not an accurate representation of modern manufacturing. This negative perception creates an unnecessarily onerous regulatory environment, causes instant concern at the community level, and reduces the appeal to young people making career choices.

The leftover imagery from the Industrial Revolution characterizing manufacturing jobs as "blue collar" is woefully out of date. Worker safety standards, environmental regulations, production automation, and deployment of some of the most complex machinery and processes in the world have forever changed the factory floor. However, the outdated perception persists to such a degree that manufacturers are at a distinct competitive disadvantage in site location, attracting talent, and obtaining community support. In the absence of images and stories to the contrary, misperceptions will continue.

Opportunity—Manufacturers have an opportunity to tell their own story and redefine the public's perception. Without a concerted industry-led effort to characterize today's manufacturing accurately, perceptions will be shaped by its detractors. A campaign to educate the public will increase the industry's competitiveness by demonstrating its tremendous economic value, commitment to worker safety, ongoing contribution to the community, dedication to environmental stewardship, and development of cutting-edge technologies.

- **Structure:** We propose an industrywide steering committee to develop a comprehensive campaign that tells the real story of modern-day manufacturing.

- **Public perception:** Support from the public is critical for manufacturing to remain competitive with other states and countries that are recruiting California companies. A statewide media campaign will educate Californians and help build that support.

- **Community support:** Manufacturers around the state should open their doors to their local media, community organizations, and other businesses so they can experience modern manufacturing first-hand.

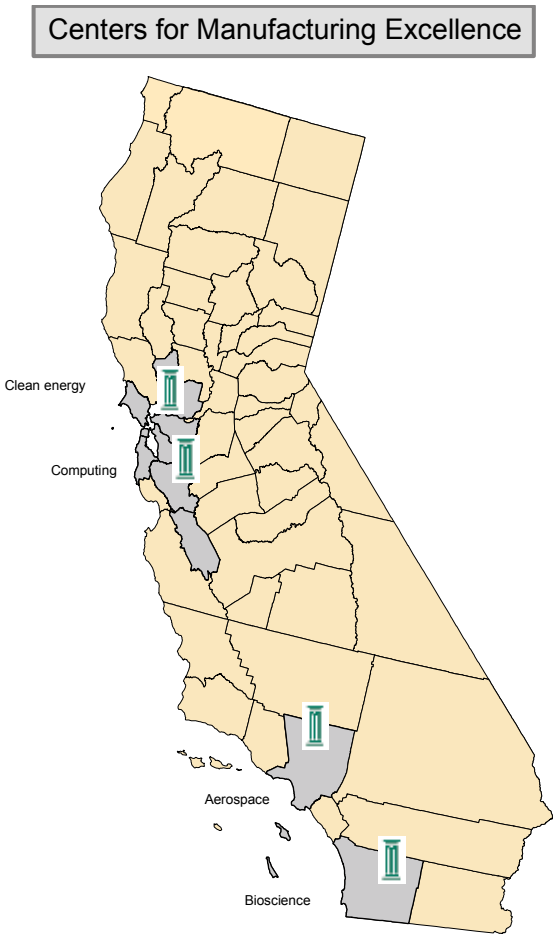
- **Job fairs:** Working with local high schools, community colleges, and other training agencies, manufacturers should provide periodic tours of their facilities to show potential workers what a manufacturing career entails.

IV. Centers for Excellence—Education, Innovation, and Entrepreneurship

"The nanotechnology boom is expected to become a $3 trillion industry capable of generating 20 million highly skilled jobs worldwide within the next fifteen years. Together, the state, the University of Oregon, and [the Oregon Nanoscience and Microtechnologies Institute] are not only creating the seeds for the economy of the future, but they are enhancing Oregon's economy today."

—Oregon Governor Ted Kulongoski, February 20, 2008.

Summary—We propose a network of education, training, research, and business incubation centers around the state to develop a qualified work force, to invent and commercialize advanced techniques, and to assist manufacturing start-up businesses.



Background—One of the critical challenges facing California manufacturers is access to workers with the skills and training to conduct complex technical work. U.S. manufacturers will need as many as 10 million new skilled workers by 2020,[2] which means California must invest now to prepare the future work force.

2. *Skills Gap*, 2005, National Association of Manufacturers.

Improving manufacturing techniques to dramatically increase productivity continues to drive industry growth. Whether it is a new factory design or developing technologies to retrofit and improve the performance of legacy plants, there are substantial opportunities for innovation. Developing new ways to use information technologies to automate ordering systems, process design, and conduct real-time monitoring will be key to remaining competitive.

Entrepreneurship and innovation are part of the California zeitgeist. Silicon Valley is a world leader in fostering advancements in software and other information technologies, fueled largely by the availability of risk capital in the region. However, the lesson of the tech bust in 2000 is that diversification within the entrepreneurial community is important to ensure long-term growth and insulate the state's economy from overdependence on one industry. It is a lesson Oregon has learned well; the state has created a multi-disciplinary, well-financed, organized effort to build its innovation capacity across many industry clusters.[3]

Opportunity—Developing a work force specifically for technical manufacturing will provide a long-term return on investment. To deploy training resources effectively, a series of Centers for Excellence for key industry clusters around the state will create the infrastructure to retrain transitioning workers and to prepare the next generation of manufacturing employees. At or near these education and training facilities should be laboratories to research advanced manufacturing techniques and foster emerging manufacturing businesses. Each center will be the regional hub for each industry cluster, charged with expanding the work force, conducting research, and fostering entrepreneurship.

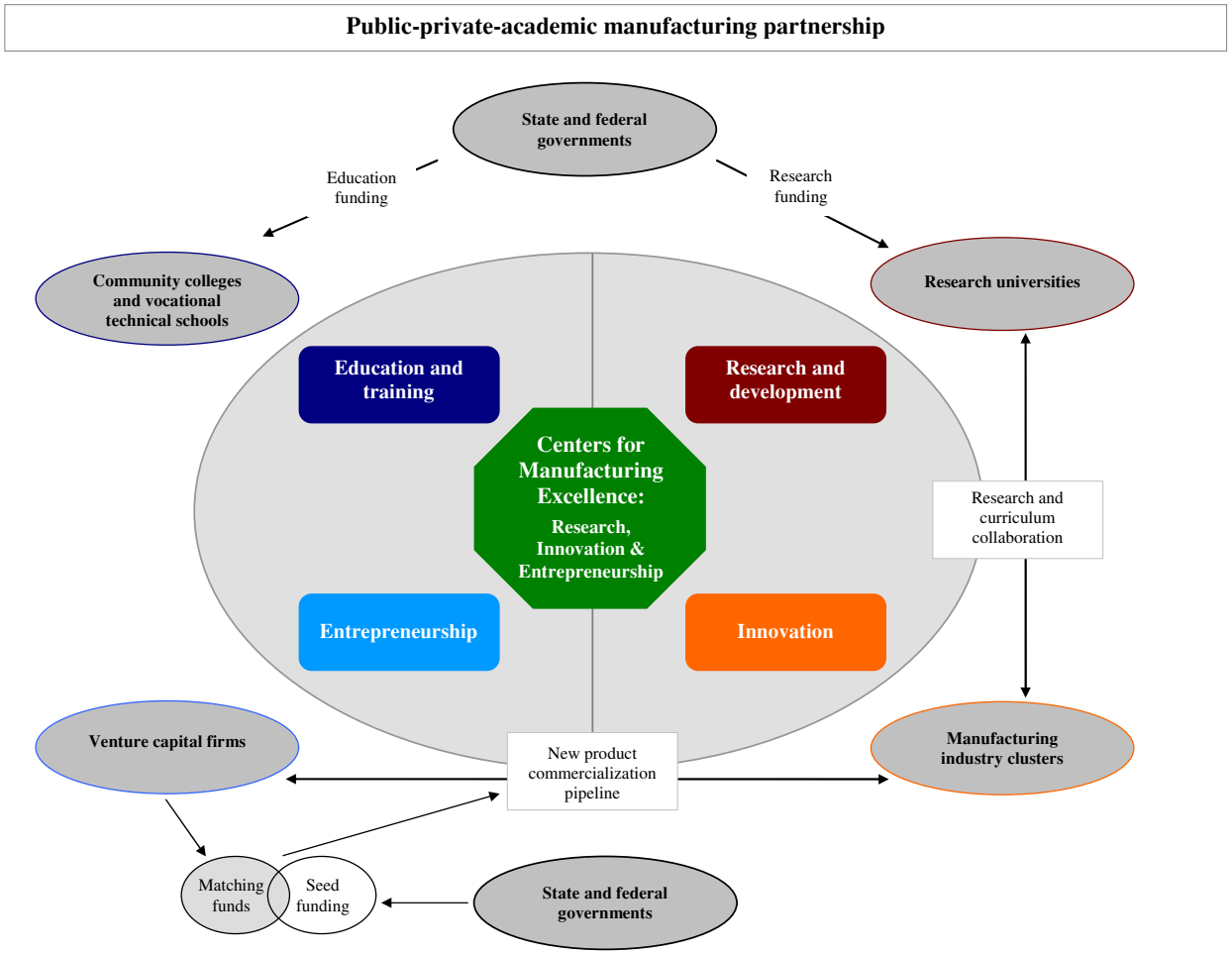
- **Human capital:** Of all the factors influencing a manufacturers' decision where to locate, none is more critical than the availability of a skilled work force. Investing in human capital is a longer-term investment, but one that is likely to pay high dividends over time. Building a skilled work force will create spillover effects and spawn spin-off businesses, leading to an industry cluster that gains capacity to innovate and a reputation that, in turn, attracts additional talent and related firms.
    - **Partnership—**Universities will serve as the anchor for each Center for Excellence. Partners will include area community colleges, vocational technical training centers, and firms from the target industry cluster.
    - **Education—**In partnership with industry, the centers will develop curricula that are broad enough to prepare students for careers in different but related fields while ensuring that the lessons are specific enough to the needs of industry. Specific emphasis will be given to ensuring high school technical vocational education programs are adequately supported.
    - **Training—**Community colleges, training facilities, and other providers should partner with industry to develop similar resources to train older workers transitioning from other careers, the underskilled, and young people who have chosen a technical career.
    - **Online tool—**A consortium of education providers and industry groups should create an online learning platform to provide ongoing training.

3. The Oregon Innovation Plan 2.0, January 2009.

- **Employee/employer incentives—**The state should subsidize the cost of training the underprivileged in low-employment regions. To encourage at-risk young people to work in manufacturing, they should receive a higher personal tax deduction for their first five years in manufacturing jobs. Manufacturers offering a hiring bonus to those who complete a training program should receive a tax credit equal to the bonus. Manufacturers should earn a tax credit for creating positions at or above the company's median wage. Manufacturers should also receive a tax credit equal to the amount they paid for an employee's education or training, and the amount should not be considered taxable income for the employee.

- **Innovation and entrepreneurship:** New technologies and processes are driving incredible productivity increases in manufacturing. Combined, the state's robust entrepreneurial culture and great capacity for science, engineering, and technological innovation could create a new generation of manufacturing techniques.

  - **Research—**Hub universities should receive additional state funding to conduct related research, create college and graduate-level curricula, and commercialize emerging concepts in collaboration with their industry partners.
  - **Technology transfer—**Working closely with manufacturers in the target industry clusters, researchers should facilitate testing and commercialization of new manufacturing techniques.
  - **Commercialization—**Partnering with leaders in the financial community, researchers and entrepreneurs will be able to turn their manufacturing concepts into business ventures.
  - **Capital—**The state should create an Advanced Manufacturing Fund to leverage matching private funds that can be invested in entrepreneurs based in the state.
  - **Networks—**Leading manufacturers should create an online portal where they can post job openings, find suppliers, buy and sell surplus inventory, develop partnerships, and share best practices.
  - **Incentives—**To attract private capital to fund the commercialization of new manufacturing businesses, investors should receive a tax credit on capital gains realized from their investments in California-based ventures. To encourage investment in existing manufacturing businesses with aging equipment, the state should allow an accelerated asset depreciation schedule, provide a low-interest loan guarantee to help finance upgrades to new technologies, and offer an additional tax credit if the new equipment will result in lower carbon output.



V. Making Green—California Sustainable Manufacturing Initiative

"By 2050 the overall added value of the low-carbon energy sector could be as high as $3 trillion per year worldwide, and it could employ more than 25 million people. So my goal is simple: I want Britain to achieve a disproportionately large share of these new global jobs."

—British Prime Minister Gordon Brown, UK Low Carbon Economy Summit, June 26, 2008

Summary—We propose a public-private initiative to conduct research, develop new technologies and processes, and commercialize more efficient and environmentally sustainable manufacturing practices with incentives to facilitate adoption of new standards.

Background—California has the distinction of being in the vanguard of two seemingly conflicting dynamics: a large manufacturing sector and a strong environmental movement. Historically, California has been one of the most critical engines of economic growth in the United States, in no small part because of its strength in manufacturing. The state also has been a global leader in setting rigorous environmental standards that have acted as a model for other governments. The intersection of the manufacturing sector and environmental

movement has often been adversarial and without recognition of their mutual dependency and common goals. This has resulted in a regulatory regime that uses limits on production and mitigation of environmental impacts in manufacturing processes rather than encouraging higher, smarter, more sustainable forms of production. In light of California's long-term economic challenges, manufacturing's critical role in future growth, and the need to address climate change, environmentalists and manufacturers must find a way to not only co-exist but also cooperate.

A burgeoning partnership between California environmentalists and businesses is already happening in the development of green products. California, drawing on its formidable capacity for technology-driven entrepreneurship, is poised to lead a new era of innovation in alternative energy and environmentally friendly products.[4] However, a criticism of the movement is that, while the products themselves may be green, the processes that made them are not. For example, using solar panels to reduce dependence on coal-fired electricity is often cited as a priority, but efforts to use less energy in their production have been inadequate.

California's manufacturers, working alongside environmental experts, can become global leaders in developing the next generation of green manufacturing processes, potentially creating a national standard and becoming a source of economic revitalization for the industry and the state. It is because of "California-only" regulations like Assembly Bill 32, which created a comprehensive program of regulatory and market mechanisms to reduce greenhouse gases, that manufacturers should be encouraged to grow. Nowhere else in the nation will manufacturing processes meet a higher standard for sustainability. However, swift action is crucial because Britain is already several steps ahead with its comprehensive Low Carbon Industrial Strategy.[5]

Opportunity—We propose the California Sustainable Manufacturing Initiative—"Making Green"—a public-private partnership to conduct research, fund development projects, and commercialize new technologies and processes that will result in more efficient and environmentally sustainable manufacturing.

- **Structure:** A broad group of stakeholders—environmentalists, manufacturers, venture capitalists, and academic experts—would oversee the proposed CSMI to develop truly innovative methods and processes.

- **R&D:** California universities should compete for research funds to develop sustainable manufacturing concepts in consultation with industry leaders. Research would focus on the efficient use of electricity and water, the reduction and management of waste, limits on carbon and particulate output, and other measures.

- **Funding:** A special fund with public and private commitments would finance joint research and development efforts at California universities, and their innovations would be tested by participating state manufacturers. Seeding the fund would be $100 million in federal stimulus money dedicated to green job creation. Additional private-sector funds will be required to replenish the account.

- **Commercialization:** The participation of the venture capital community would facilitate the commercialization of innovations, and special tax breaks on investments in new sustainability measures would encourage manufacturers to adopt them.

4. "Comparative Advantage and Green Business," Ernst & Young, June 2008.
5. UK Budget 2009, Chapter 7–Building a Low–Carbon Recovery, April 2009.

- **Standards:** Similar to the U.S. Green Building Council's LEED program (Leadership in Energy and Environmental Design), new efficiency design standards specifically for manufacturing could result from California's efforts. For instance, in 2006, General Motors built its Lansing Delta Township to meet gold LEED standards, but few manufacturers have followed suit because a standard more applicable to manufacturing needs to be developed.

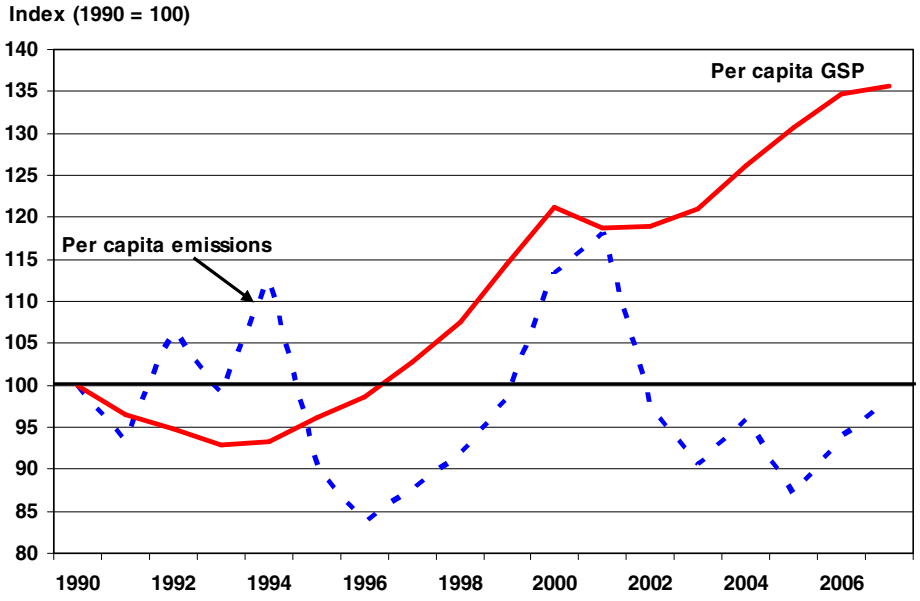
- **Promotion:** The "Made Green in California" brand should become synonymous with quality and sustainability. With state promotional assistance, California's manufacturers can cultivate a high-value brand that emphasizes a sustainable product made through a sustainable process.

- **Incentives:** To encourage the adoption of sustainable, efficient processes, a tax credit for new equipment should be provided to manufacturers that build new facilities or upgrade existing ones. An additional credit should be granted for investments that reduce a producer's carbon footprint, with the credit amount based on the level of carbon reduction.

- **Award:** An annual "Making Green" award should be given to companies that make substantial advancements.

These recommendations, based on the research detailed in the sections that follow, target the specific disadvantages that California's manufacturing sector is facing and customize methods that other regions and governments are using to promote manufacturing and expand their wealth. By solving some difficulties that plague the state's businesses and applying the nation's most successful economic development practices, we can reverse the deterioration of California's manufacturing base.

California's more energy-efficient economy
California carbon emissions and real gross state product



Sources: Energy Information Administration, U.S. Census Bureau, Bureau of Economic Analysis, Moody's Economy.com, Milken Institute.

The State of Manufacturing in California

Industrial Evolution

"A nation's standard of living in the long term depends on its ability to attain a high and rising level of productivity in the industries in which its firms compete,"[6] Harvard professor Michael Porter has said.

A robust manufacturing industry is an indicator of a nation's ability to foster innovation and drive broad, sustained economic growth. More so than any other industry, manufacturing has a multiplier effect, spawning job creation, investment, and ancillary business activity.

The manufacturing industry invests heavily in training, including for the academically disadvantaged and under-skilled. It generates employment across a wide spectrum of education and skill levels—from the highly educated knowledge workers to the highly skilled tradesmen—creating opportunities for social mobility and wealth creation because of the industry's relatively high pay and health and retirement benefits.

As the U.S. manufacturing industry has moved up the value chain—from the Industrial Revolution and the production of steel, heavy machinery, automobiles, and airplanes; to the digital revolution and the development of semiconductors, telecommunications equipment, and networking infrastructure; to the biotech revolution and the emergence of life sciences and nanotechnology—Americans have enjoyed unprecedented economic and social benefits.

California, too, has a rich history in manufacturing. A dominant agricultural power after the first steam-powered tractor was introduced at the end of the 19th century, it became a world leader in high-tech manufacturing at the dawn of the 21st. The state's current and future economic foundation is built on its capacity for making things.

After pioneering advancements in agriculture, the state became a leading manufacturer of durable goods. In 1916, the Loughead brothers established the Loughead Aircraft Manufacturing Company, later renamed Lockheed Aircraft Company. In 1921, Donald Douglas founded Douglas Aircraft, which saw two of its planes became the first to fly around the world in 1924.

In the 1920s, a massive oil deposit discovered in Long Beach was the largest known deposit in the world at the time, and petroleum refining quickly became the state's largest manufacturing industry. Soon the Los Angeles Harbor became the largest oil-exporting port in the world.

In the 1940s, the war effort spawned new manufacturing capacity. By 1945, California was making $8.5 billion a year from products for the War Department, and overall manufacturing output had more than tripled in just five years. Along with aircraft and ships, California companies produced the necessary electrical components, such as radios and sonar. Hewlett-Packard, for instance, produced signal generators and radar-jamming devices, which set the stage for the modern electronics industry.

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

In the 1950s, California aerospace manufacturing grew dramatically as the passenger airline industry was born. In the 1960s, the same firms built rocket boosters for space flights, landing gear for the moon flights, satellite control systems and camera controls for the Mars fly-by, and communications equipment for the first moon landing.

Silicon Valley was born in the 1970s, when companies such as Hewlett-Packard and Intel drove the technology industry. In 1971, Intel produced its first microprocessor and helped spawn the personal computer industry, which in turn influenced Microsoft and the software industry in the 1990s. And in the first decade of the 21st century, biotechnology is the dominant emerging manufacturing sector in California, home to global leaders like Amgen.

Manufacturing has been the engine of California's economic growth for more than 100 years. As manufacturing becomes increasingly competitive at home and abroad, the question is whether California manufacturing will thrive for the next 100 years.

A Thousand Cuts: Manufacturing's Gradual Decline

In 1946, one in three U.S. workers had jobs in manufacturing. Expanding global trade, global competition, the growing consumer class, increased productivity, elevated costs, and other factors have reduced the share of Americans working in manufacturing to one in ten today. However, manufacturing remains critical to the overall health of the U.S. economy and its share of gross national product.

The industry directly employs 13.9 million workers and 6 million more in related industries such as wholesaling and finance. In 2007, manufacturing products were valued at $1.6 trillion, or roughly 14 percent of real gross domestic product.[7] The manufacturing sector has been the leader in productivity gains among all sectors in the U.S. economy. From 1987 to 2005, manufacturing productivity climbed 94 percent, roughly two and a half times faster than the 38 percent average increase for all other sectors of the economy.[8] As a result, much of the industry has been in transition, shifting from lower-skilled, labor-intensive, less efficient and less productive processes to investing in innovation and high-value manufacturing.

Nationally, the capital poured into research and development to improve product design and efficiencies is staggering, but the number of manufacturing jobs has been deteriorating since the 1970s.

U.S. manufacturers spent $172 billion on R&D in 2006, mostly in the fields of computer and electronic products, chemicals, and pharmaceuticals and medicines.[9] Despite those investments, manufacturing has shed 3.7 million jobs in the past decade alone, leveling off at 14 million payroll jobs in 2007. The bulk of the losses occurred during the collapse of the tech bubble in 2000, but ongoing structural changes—including more outsourcing and higher productivity—have deepened the cuts.

California was home to almost 1.5 million manufacturing jobs in 2007, or 10.5 percent of the nation's total, according to the U.S. Bureau of Labor Statistics, the source used for the information in this section. But manufacturers in California eliminated 390,000 jobs from 2000 to 2007, with the most cuts in 2002 during the U.S. manufacturing recession and the least in 2006.

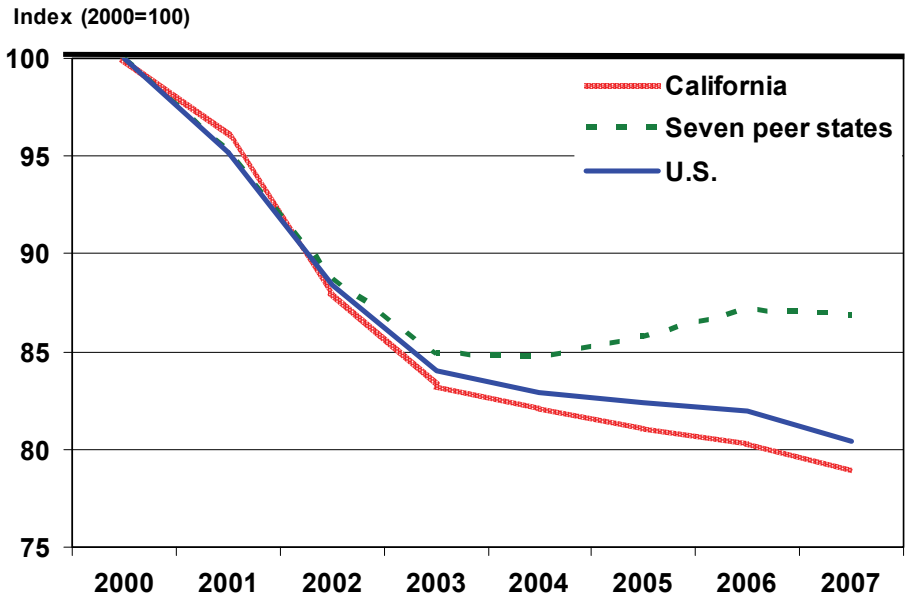
7. Bureau of Economic Analysis.
8. *The Facts About Modern Manufacturing*, 7th Edition, National Association of Manufacturers.
9. National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2006.

The world's eighth-largest economy, California is responsible for 13 percent of the United States' gross domestic product, making California's contribution roughly $1.5 trillion in 2007.[10] It is a fairly prosperous state with a per capita personal income of $41,805, ranking it eighth in the nation in 2007.[11] And as a large and diversified economy, it is heavily dependent on international trade, which accounted for one-quarter of the state's economy in 2007. California exported $134 billion worth of goods, with computers and electronic products accounting for 36 percent of the total.[12] California-based firms also captured more than 55 percent of overall national venture capital funding and 40 percent of the record $8.4 billion worldwide venture funding for clean technology projects.[13]

While the Golden State is still a huge economic power, it has lost manufacturing jobs at a faster pace than the nation as a whole. As a result, its relative advantage has eroded since 2000, especially against states such as Arizona, Nevada, Oregon, and Washington, where manufacturing employment began increasing again in 2003-04.

How California manufacturing stacks up

Manufacturing employment since 2000



Note: The peer states include Arizona, Indiana, Kansas, Minnesota, Oregon, Texas, and Washington. Full profiles of each state and the criterion used to select them are available in Appendix 1 of this report.

Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

California's jobs often go to states that have maintained a predictable and stable regulatory climate and competitive tax rates and costs. These states commonly lure manufacturers through financial assistance, tax breaks, infrastructure developments, and other incentives. These economic development strategies put California manufacturers at a disadvantage and erode the state's competitive position.

10. Bureau of Economic Analysis.
11. Bureau of Economic Analysis, California Department of Finance.
12. U.S. Department of Commerce.
13. *CleanTech 2009: The Emergence of a Low Carbon Economy, How California policy can accelerate economic growth and job generation through the cleantech sector*, May 2009.

Much of California's manufacturing sector is concentrated into a few large clusters that make high-tech products for global markets. The top ten manufacturing industries in terms of employment in California accounted for 44 percent of state manufacturing jobs in 2007. Six of the ten largest employers were in high-tech manufacturing. High-tech industries such as IT, aerospace, and biopharmaceuticals typically involve higher-paying occupations and value-added production and services. Additional economic activity generated from such industries is critical to understanding their role in promoting regional growth.

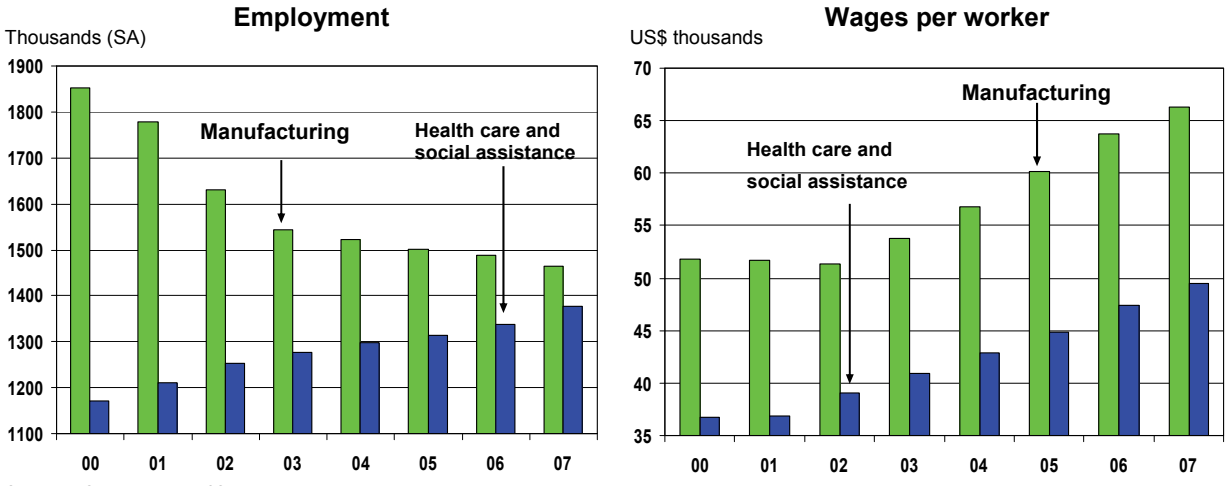
The state's largest manufacturing employer in 2007 was the semiconductor and electronic component industry, with more than 104,000 jobs. This high-tech industry lost more than 47,300 manufacturing jobs from the peak in 2000 to the bottom in 2004. A powerful information technology cluster tied to manufacturing and research institutions helped revive the industry, and it has added 7,500 manufacturing jobs since 2004.

A close second was search and navigation equipment manufacturing, with more than 103,800 jobs in 2007. This high-tech industry, which makes such products as radar equipment, aeronautical devices and flight recorders, has hemorrhaged almost 15,000 positions since 2000 and more than 67,000 since 1990. Meanwhile, Arizona, Oregon, and Washington have seen modest increases in this industry's employment.

Despite losing almost 142,000 manufacturing jobs since 1990, aerospace remains a significant presence in California. The third-largest manufacturing industry in the state, aerospace employed more than 72,200 workers in 2007. The rate of decline has slowed in recent years, with employment averaging about 73,000 since 2003. The Iraq war and increased demand for aircraft—in part from emerging markets—has helped stabilize the industry temporarily.

Manufacturing job losses are especially damaging to the state economy because they generally require higher skills and offer better pay. The average wage in California's manufacturing sector was $66,200 in 2007, compared with the national average of $53,800 for manufacturing. State manufacturing jobs also paid more than the $51,700 average in health care and social assistance services, California's fastest-growing job creators. However, for every one job created within the health services sector, roughly one additional job is produced, which is significantly less than manufacturing's average of 2.5 additional jobs.

California manufacturing versus health care and social assistance



Sources: U.S. Bureau Labor of Statistics, Moody's Economy.com.

Workers in the state's five best-paying manufacturing industries—three of them in high-tech—earned more than $100,000 annually on average. In 2007, the highest-paying manufacturing industry was computer and peripheral equipment at an average $157,000, while the lowest-paying was fiber, yarn, and thread mills manufacturing at $24,800.

Despite its lackluster employment picture, manufacturing is still a major contributor to economic growth. U.S. manufacturers contributed $1.6 trillion to the real gross domestic product in 2007, or 14 percent. California manufacturers contributed almost $200 billion, or 12.6 percent of the U.S. manufacturing real GDP. Texas was a distant second with a 9.1 percent share.

Manufacturing sustains the state economy as well, creating wealth and driving the state's economic expansion over the past 50 years. High-value, high-tech goods are the bulk of California's manufactured products. Los Angeles dominates aerospace; San Diego has a biotechnology bent; and the Bay Area has biotech and information technology clusters. In 2007, high-tech manufacturing's combined output totaled almost $114.8 billion, or 58 percent of manufacturing's total contribution to real gross state product, an increase of 28 percent since 2000.

California s high-tech manufacturing industries
Contribution to manufacturing real gross state product (US$ billions)

High-tech manufacturing industries	2000	2007	Percent change	Percent of manufacturing real GSP 2007
Navigational, measuring, electromedical, and control instruments	$15.9	$27.9	76.1	14.1
Semiconductor and other electronic component	$21.8	$27.3	25.4	13.8
Computer and peripheral equipment	$19.3	$22.5	16.6	11.3
Pharmaceutical and medicine	$7.6	$9.6	27.0	4.8
Aerospace product and parts	$5.6	$8.6	54.6	4.3
Medical equipment and supplies	$6.1	$7.0	15.3	3.5
Communications equipment	$6.6	$6.9	4.2	3.5
Manufacturing and reproducing magnetic and optical media	$2.1	$1.8	-14.2	0.9
Commercial and service industry machinery	$3.5	$1.5	-57.1	0.8
Audio and video equipment	$1.1	$1.5	33.4	0.8
Total	$89.6	$114.8	28.1	57.8

Note: Numbers may not add up due to rounding.
Sources: Bureau of Economic Analysis, Moody's Economy.com, Milken Institute.

The largest and fastest-growing manufacturing industry in terms of contribution to real GSP was the production of navigational, measuring, electromedical, and control instruments. That industry's share of real GSP has grown a staggering 76 percent since 2000 and 450 percent since 1990. The industry made those gains despite hemorrhaging 15,000 jobs from 2000 to 2007.

In fact, high productivity paired with deep job losses was common among the five high-tech manufacturing industries that contribute the most to real GSP, except for pharmaceutical and medical manufacturing, which expanded both employment and contribution to real GSP considerably. The sector has added more than 16,000 jobs since 2000 and more than 90,000 jobs since 1990. Its contribution to real GSP was $9.6 billion in 2007, an increase of 27 percent since 2000 and 319 percent since 1990.

Gaining Industries

California's manufacturing sector is constantly evolving. The composition of industries within the sector fluctuates as state, national, and global economies change. A recent trend has been an expansion of industries that serve the growing consumer markets.

One of those, the **beverage manufacturing** industry, was state manufacturing's biggest job creator, adding 9,900 jobs from 2000 to 2007, an increase of 30 percent, for 42,900 jobs. The average annual wage was $50,400, compared with the state and national manufacturing averages of $66,200 and $53,800, respectively. This was an increase of 11 percent since 2000.

Pharmaceutical and medicine manufacturing has grown considerably, providing more than 44,300 manufacturing jobs in 2007. This high-tech industry has added 6,400 jobs since 2000, an increase of 17 percent, and more than 21,100 jobs since 1990. The average wage was $102,200, a 44 percent increase since 2000.

Other food manufacturing, which includes coffee and tea, snacks, mixes, spices, condiments, prepared meals, and specialty ethnic foods, provided more than 22,100 manufacturing jobs in 2007. The industry has added more than 4,200 manufacturing jobs since 2000, a 24 percent increase, and more than 6,800 since 1990. The average annual wage was $49,200, an increase of 22 percent since 2000.

Declining Industries

On the other side of the spectrum is **cut and sew apparel manufacturing**. It was the fourth-largest manufacturing employer in California, with 66,900 jobs, or a commanding 41 percent of the nation's garment workers. However, it has experienced the most recent job losses, shedding more than 45,000 jobs since 2000 and more than 60,700 since 1996, the most recent peak. In 2007, the average wage was $31,800, a 54 percent increase since 2000.

At 306,400 jobs, the **computer and electrical product industry** had the biggest share—21 percent—of manufacturing workers in California. However, this industry suffered greatly from the tech bubble's collapse in 2000, when more than 115,000 jobs disappeared. Most of the jobs eliminated came from semiconductor and electronic component manufacturing and computer and peripheral equipment manufacturing, with combined losses of 70,200 jobs from 2000 to 2007. The average wages in the two industries were $102,000 and $157,000, respectively. Wages in both have increased considerably since 2000, by 19 percent and 24 percent, respectively.

The **printing industry** has been in a state of decline as the popularity of digital content has grown. It employed more than 58,300 workers in 2007, having shed 23,500 positions since 2000, a decrease of 29 percent. The average wage was $45,600 in 2007, a 16 percent increase since 2000.

Challenges to California Manufacturers

Competing States: A Contest for High-Tech Manufacturing

To see how California stacks up in manufacturing, we chose several peer states, determined by specific criteria, and did case studies of each one: Arizona, Indiana, Kansas, Minnesota, Oregon, and Washington. Though Texas didn't meet all the criteria, it was added to the list because of its large stake in U.S. manufacturing. Full profiles of each state and the criteria used to select them are available in Appendix 1 of this report. A key conclusion of those case studies is that California is losing high-tech manufacturing jobs to other states with less onerous regulatory climates, lower taxes, and a more business-friendly environment.

Peer states shares of U.S. high-tech manufacturing jobs

Peer states	2000	2007	Change (+/-)
California	20.5%	19.7%	-
Texas	7.8	7.5	-
Washington	4.1	4.5	+
Minnesota	2.9	3.1	+
Arizona	3.0	3.1	+
Indiana	2.3	2.8	+
Kansas	1.9	2.2	+
Oregon	1.8	2.0	+

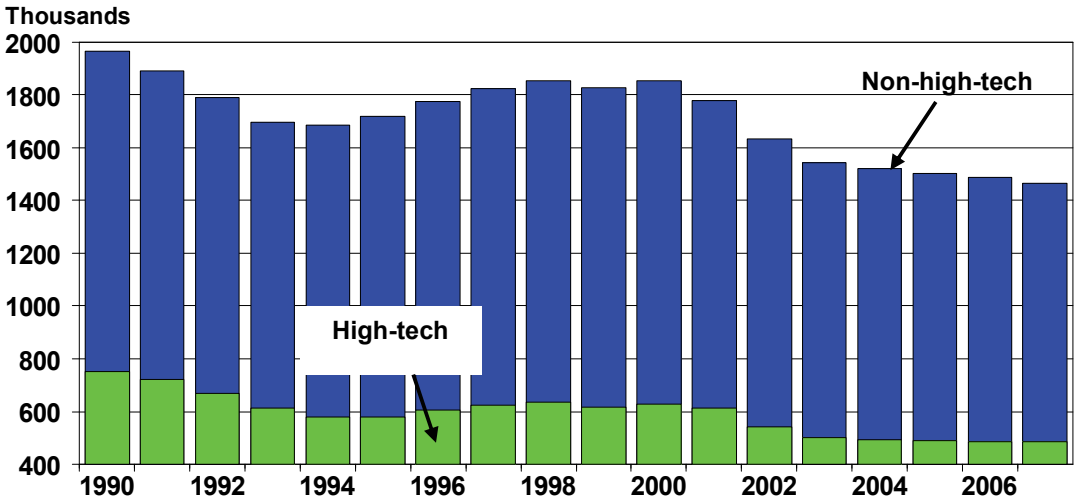
Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com

In 1990, California was a major source of high-tech manufacturing jobs in the United States, with more than 752,600 positions, or 22.3 percent of the nation's total. In 2000, its share of high-tech manufacturing employment had contracted to 20.5 percent after 123,200 jobs disappeared in a decade. Further cuts after 2000 eliminated more than 143,500 jobs. By 2007, high-tech manufacturing in the state had sunk to 485,900 jobs, or 19.7 percent of the nation's total.

In contrast, the peer states collectively had 707,600 high-tech manufacturing jobs in 1990, or 20.9 percent of the nation's total. In 2000, their combined high-tech manufacturing employment had actually increased, to 733,500, increasing their share of jobs to 23.9 percent of the nation's total. From 2000 to 2007, the peer states lost 115,000 high-tech manufacturing jobs. Even so, their share of the nation's high-tech manufacturing employment had grown to 25.1 percent in 2007.

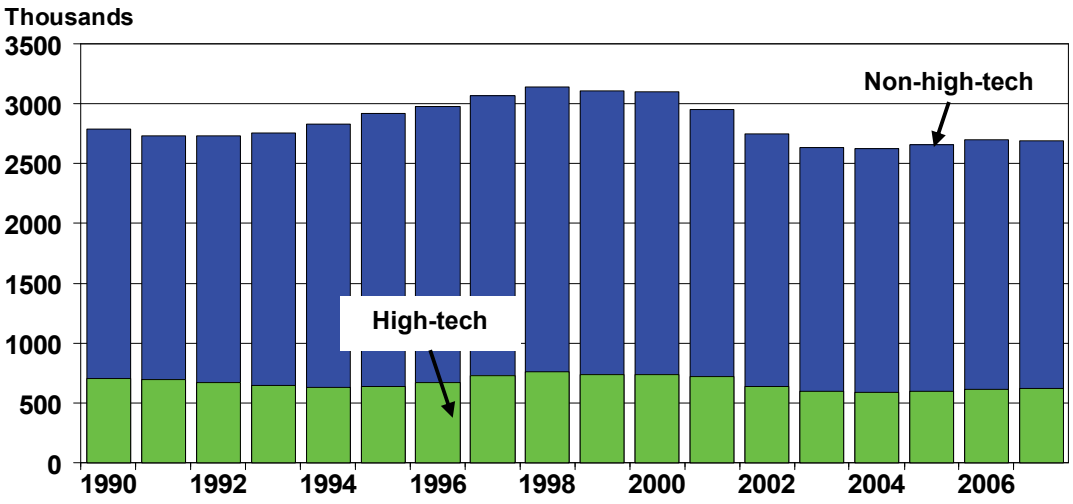
Not only are the peer states collectively gaining in high-tech manufacturing, but they are gaining in non-high-tech manufacturing as well. These states are building up manufacturing clusters to compete even more aggressively for manufacturing activities and the jobs they create. In 2007, employment in non-high-tech manufacturing had risen to 2002 levels at 2.1 million jobs, a net gain of 38,600 jobs since bottoming out in 2003. During the same period, California lost 63,600 jobs in non-high-tech manufacturing.

California's manufacturing employment
1990 – 2007



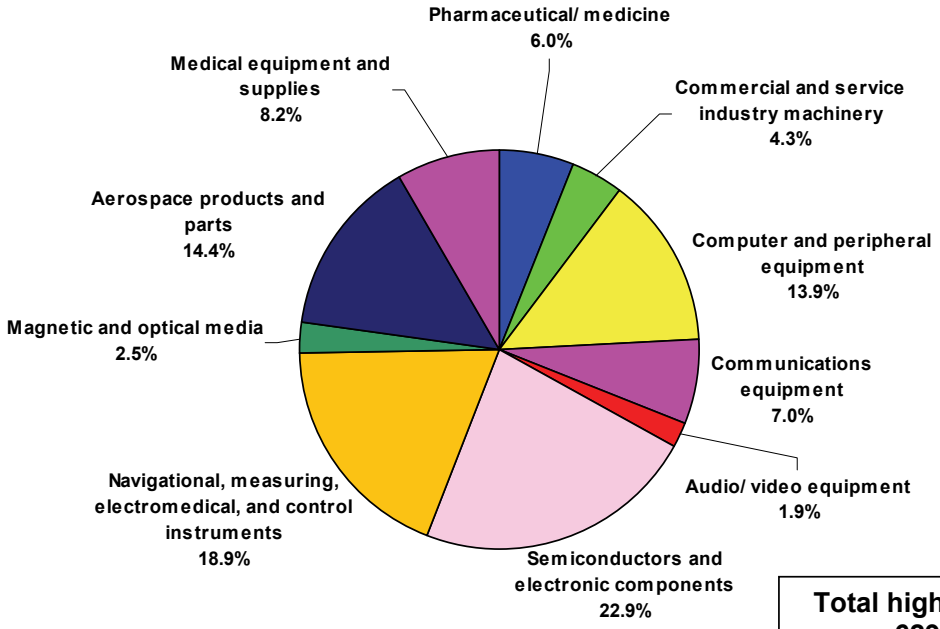
Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

Peer states manufacturing employment
1990 - 2007



***Sources*: U.S. Bureau of Labor Statistics, Moody s Economy.com, Milken Institute.**

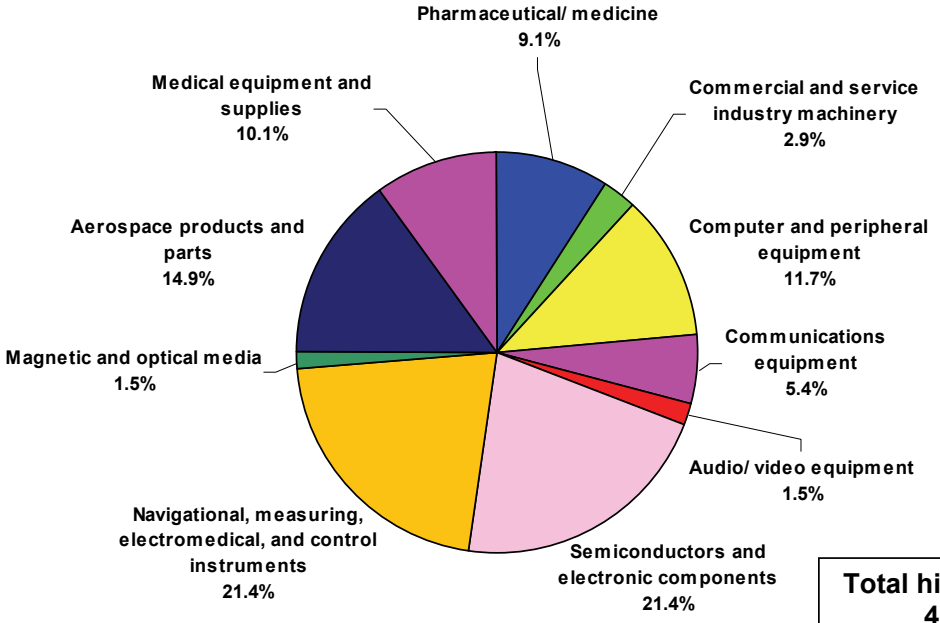
California's high-tech manufacturing industries
2000



Total high-tech jobs
629,400

Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

California's high-tech manufacturing industries
2007



Total high-tech jobs
485,900

Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

Looking at specific high-tech industries, California performed best in pharmaceutical and medicine manufacturing. That industry provided 44,300 jobs in 2007—almost twice its work force in 1990—or 14.9 percent of U.S. manufacturing jobs in that industry. The peer states also increased their collective work force in that industry to 38,400 jobs in 2007, or 12.9 percent of the U.S. total.

Industries where California lost the most share of high-tech manufacturing employment were aerospace products and parts; navigational, measuring, electromedical, and control instruments; and medical equipment and supplies manufacturing—industries where the peer states gained ground.

In 1990, both California and the collective peer states employed more than 200,000 in aerospace products and parts manufacturing. The aerospace industry has seen massive consolidations since then, with California suffering the most layoffs. Ten years later, California's aerospace employment was 90,700; by 2007, it had contracted to 72,300 jobs. The peer states also lost some aerospace jobs but still kept employment above the 200,000 mark. Since bottoming out in 2004, the peer states that gained the most aerospace jobs were Washington (18,600), Kansas (6,800), Texas (1,800), and Arizona (1,000).

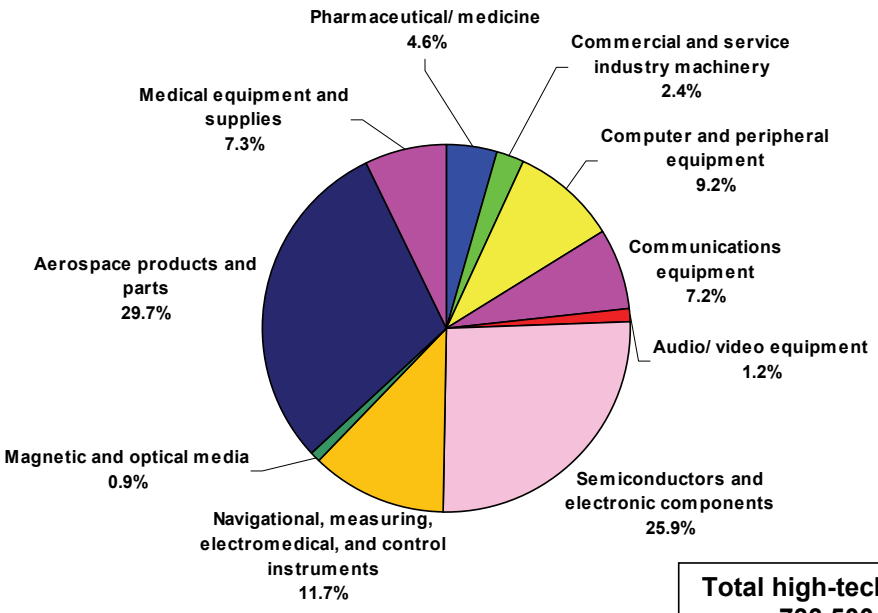
Navigational, measuring, electromedical, and control instruments manufacturing is tied closely to aerospace and defense industries. As a result, California has eliminated 2,700 jobs since the bottom in 2003. The collective peer states also experienced losses but rebounded, adding 6,900 jobs from 2003 to 2007. The peer states that gained the most jobs in that industry since 2003 were Texas (3,300) and Minnesota (1,900).

Another strength of the collective peer states was medical equipment and supplies manufacturing. In the peer states, that industry employed 60,400 in 2007, an increase of 6,900 jobs since 2000. In California, 3,000 of those jobs have vanished since 2000 for a total 48,800 positions in 2007. The peer states that gained the most in medical equipment manufacturing and supplies since 2000 were Indiana (4,800) and Minnesota (3,700).

Although California's share of high-tech, high-value jobs is still sizeable, it is declining at a worrisome rate. Many states—particularly the peer states—have recognized the importance of manufacturing to economic development and have invested in infrastructure; offered tax breaks and other incentives; and developed policies to convert, expand, or upgrade existing manufacturing sites.

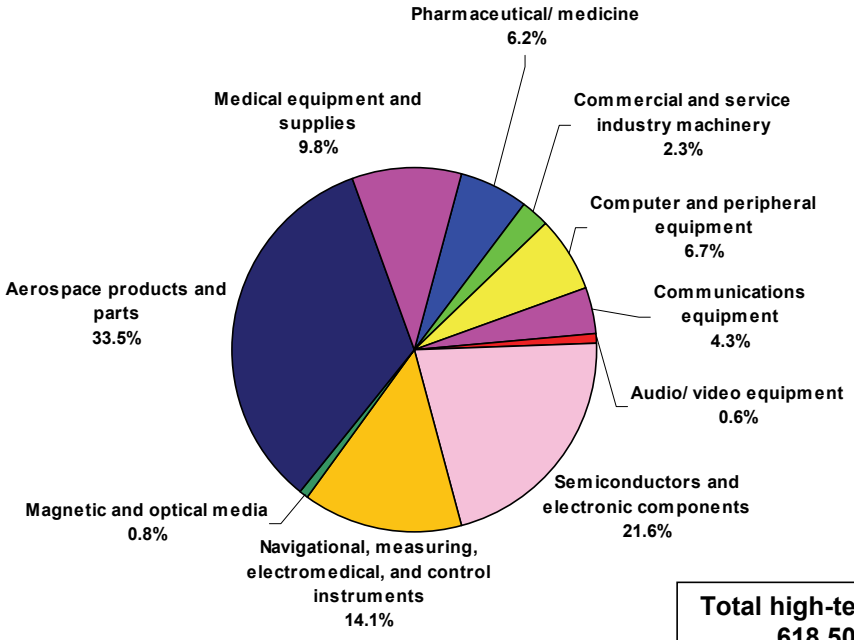
Many have retrained workers from traditional manufacturing to handle the complexities of technological advances. These states have gradually moved from traditional manufacturing to high-tech manufacturing and have attracted high-wage jobs for their residents. States with visionary and flexible outlooks will remain competitive and will prosper. California cannot afford to be complacent.

Peer states' high-tech manufacturing industries
2000



Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

Peer states' high-tech manufacturing industries
2007



Sources: U.S. Bureau of Labor Statistics, Moody's Economy.com, Milken Institute.

A Bad Reputation for Business

California is consistently ranked among the most challenging states in which to start a business, according to several research institutions. As evidence they cite the amount of time required and degree of difficulty in selecting a site; navigating regulations across jurisdictions; acquiring permits; conducting impact studies; identifying and preparing a work force; and making infrastructure improvements.

One of the more recent and comprehensive studies is by the California Foundation for Commerce and Education, which measured states' economic performance in two dimensions: first, economic output and quality of life, and second, how well states are positioned for the future.[14] According the foundation's research, California ranks thirty-eighth in economic performance, which is consistent with a number of similar studies.

One of the more regularly cited challenges to retaining and attracting businesses in California is the number and complexity of regulations. A survey of business executives found that California's regulatory environment is perceived as among the most "costly, complex, and uncertain" in the nation. In labor law, for example, California enacted an average 15 statutory changes per year from 1992 to 2002. The rate is four times the average for legislatures nationwide in that period and three times the average for New York.[15] California also is one of just fourteen states that require a separate state-level environmental impact report for certain projects, which typically doubles the approval time for projects to fifty-one weeks versus twenty-six weeks.

The difficulty facing California's manufacturers has been a long-debated and controversial issue. In 1998, a Government Accountability Office study found that "employers often face more comprehensive labor, tax, and environmental regulation by the state than by federal law." The GAO report provided an independent view of how onerous the California regulatory framework is compared to federal standards and those of other states. The government's analysis went on to say that "some areas of state regulation have no federal counterpart…[and]… the net effect of these combined federal and state labor law requirements is that California manufacturing firms must, in many cases, meet higher labor standards than those required by the federal government."[16]

Competing Nations: Seeking Skilled Labor, Lower Costs

Although the focus of this study is the performance of the California manufacturing industry compared to seven peer manufacturing states, manufacturers in California and throughout the United States are competing globally to attract qualified talent and keep operating costs low. A national survey in 2005 found that 80 percent of manufacturers saw an overall shortage of qualified, skilled production staff, engineers, and scientists. Eighty-three percent said the shortage of qualified workers was reducing their ability to meet customers' orders, and 50 percent indicated their existing employees had inadequate basic employability skills.[17]

Without qualified workers, U.S. manufacturers will have no choice but to seek alternative sources of labor through investing in automation, hiring skilled workers from abroad, or outsourcing to other locations. The most likely scenario is a combination of the three, which would mean further reductions in the U.S. manufacturing work force.

14. *California Economic Performance Scorecard*, California Foundation for Commerce and Education, June 5, 2008.
15. *California Competitiveness Project:* Conducted by Bain & Company for the California Business Roundtable, February 2004.
16. *Business Regulation: California Manufacturers Use Multiple Strategies to Comply With Laws*, U.S. Government Accountability Office, GAO/HEHS-98-208.
17. *Skills Gap*, 2005, National Association of Manufacturers.

In addition to the shortage of qualified workers, manufacturers face a disproportionate number of regulatory hurdles and related costs. According to a study by the federal government's Small Business Administration, it costs manufacturers an estimated $10,000 per employee—almost twice the average for all U.S. industries—to comply with federal regulations.[18] This estimate does not include state and local regulations, which can vary significantly from one place to the next.

Regulatory costs affect the manufacturing sector more than others, but the overall tax climate affects the competitiveness of firms across all industries. The United States is second only to Japan for the highest overall corporate income tax rate—39.3 percent for federal and sub-federal levies combined––among all countries in the Organisation for Economic Cooperation and Development (OECD). The OECD average in 2007 was 26.6 percent,[19] which means the U.S. rate is 50 percent higher than the OECD average. This disparity puts the United States as a whole at a competitive disadvantage with peer countries.

In addition to higher taxes, U.S. firms are shouldering a huge and growing financial burden from workers' health-care costs. In 2006, the United States spent $1,928 per capita on health care, compared with $1,100 in Britain, Canada, France, Germany, and Japan and $274 in Brazil, China, and India.[20] In comparison with the twenty-four nations in the Organisation for Economic Co-operation and Development, the amount spent in the United States is 44 percent more per capita than in Switzerland, the OECD country with the second-highest expenditures, and 134 percent more than the median for OECD nations.[21] Most of those costs in the United States involve employers covering all or a portion of employee premiums.[22] A common anecdote is General Motors' estimate that health-care costs add $1,500 to $2,000 to the sticker price of its vehicles. These costs are a serious concern and show no signs of leveling off.[23]

Globalization's Double-edged Sword

For decades, the United States and other leading economies have advocated a more liberal global economy, arguing that open markets and freer trade would create a rising tide that would raise all boats. Free trade, along with the emergence of democratic governance, has helped transform the post-cold war world into a freer, more stable, and more equitable one. But while globalization has unlocked new markets for U.S. products, it also has created intense competition from locales with lower costs and less regulation.

In 1990, for example, the value of trade was less than 40 percent of global gross domestic product, but by 2004 the overall world economy had grown 50 percent, and two-way trade had exceeded 55 percent of global GDP.[24] Foreign direct investment flows, or FDI, also increased dramatically to a record $1.8 trillion in 2007. During this period, the proportion of the developing world's population living in extreme poverty fell from 28 percent to 21 percent.[25]

18. *The Impact of Regulatory Costs on Small Firms*, W. Mark Crain, Small Business Administration Office of Advocacy, September 2005.
19. Scott A. Hodge, *U.S. Corporate Taxes Now 50 Percent Higher than OECD Average*, Fiscal Fact No. 136, The Tax Foundation, August 13, 2008
20. *Tracking the Contribution of U.S. Health Care to the Global Competitiveness of American Employers and Workers: 2009 Business Roundtable Health Care Value Comparability Study.*
21. *Healthcare Costs and U.S. Competitiveness*, Council on Foreign Relations, March 2009.
22. *High and Rising Health Care Costs: Demystifying U.S. Health Care Spending*, Robert Wood Johnson Foundation, October 2008.
23. In 2006, according to a survey by the Kaiser Family Foundation and the Health Research and Educational Trust, the average family premium rose 7.7 percent, while average wages rose 3.8 percent and inflation was around 3.5 percent.
24. The World Bank, 2006, http://devdata.worldbank.org/wdi2006/contents/Section6_1.htm (accessed May 14, 2009).
25. The World Bank, 2007, http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/0,,contentMDK:20153855~menuPK:373757~pagePK:148956~piPK:216618~theSitePK:336992,00.html (accessed May 14, 2009).

As the globe's manufacturing supply chains grow longer and wider, the system creates a large cohort of consumers and numerous suppliers for global goods. The United States is a primary beneficiary of globalization; its value of exports doubled from more than $500 billion in 1990 to more than $1 trillion in 2004. While the nation as a whole has benefited from globalization, the negative impact of increased international trade has burdened local regions and industries unevenly, especially in California. The employment base of some manufacturers in particular, such as textiles and apparel, has been severely affected.

The manufacturing landscape in the United States and all industrialized nations has been dramatically and irrevocably changed by globalization—a trend fueled by a combination of tectonic shifts in economic policy and transformative technological advancements.[26] Widespread economic liberalization in the form of free trade, open markets, and fewer restrictions on domestic and foreign capital, coupled with the spread of democracy, has moved dozens of nations from "developing country" status squarely into the "emerging market" column.[27] These newly emerging economies have become U.S. trading partners and its fiercest competitors.

Among these emerging industrial giants, China is easily the largest and the one drawing the most attention from U.S. manufacturing—and rightfully so. In 2002, the number of manufacturing workers in China was estimated to be 109 million, more than double the 53 million workers in all the G-7 countries combined.[28] This shift in manufacturing employment from developed to emerging economies has significantly affected most wealthy nations. From 1990 to 2003, the median decline in share of manufacturing employment in eighteen of the twenty-four Organisation for Economic Co-operation and Development countries was 10 percent, and that trend will only continue.

Multiple drivers are behind this shift in manufacturing employment, but two factors are of particular importance to the United States. The first is a dramatic increase in productivity. From 1998 to 2005, manufacturing output increased 10 percent while the number of jobs declined 19 percent.[29] In a comparison with fourteen other industrialized or newly industrialized countries, growth in U.S. manufacturing productivity was greater than that of all but two of those countries. The second factor is the exchange rate. Despite the ubiquity of free and open trade and more liberal economic policies around the world, China, as a key U.S. trading partner, has maintained a tight grip on certain factors that are leftover from the "command-and-control" policies of the past.

The leading concern is China's reluctance to allow its currency to float freely on the market instead of pegging it to the U.S. dollar, which has contributed to a chronic U.S. trade deficit of more than $5 billion a week.[30] Many experts think the "artificially" elevated dollar value and the subsequently cheaper overseas production costs paid by the United States' key trading partners have led to the erosion of U.S. manufacturing's employment base.

Generally, a weaker dollar enhances price competitiveness and helps sell more products. However, a weaker dollar also means that importing raw materials is more expensive. Manufacturers are among the nation's largest importers, and access to foreign-produced components, materials, and sources of energy are essential to

26. In 1998, of 145 regulatory changes made by 60 countries, 94 percent created more favorable conditions for FDI. *Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?*, Institute for the Study of Labor Discussion Paper No. 944, November 2003.
27. Pauline Grosjean and Claudia Senik, *Why Populist Democracy Promotes Market Liberalization*, Forschungsinstitut zur Zukunft der Arbeit/Institute for the Study of Labor, IZA DP No. 3527, June 2008.
28. *The Changing Nature of Manufacturing in OECD Countries*. STI Working Paper 2006/9. Organisation for Economic Co-operation and Development.
29. Susan Houseman, *Outsourcing, Offshoring, and Productivity Measurement in U.S. Manufacturing*; Upjohn Institute Staff Working Paper No. 06-130 (revised April 2007).
30. U.S. Census Bureau, 2008, www.census.gov/foreign-trade/balance/c5700.html#2008 (accessed May 14, 2009).

U.S. manufacturers' profitability.[31] In addition, a change in the value of the dollar will have different effects on different segments of the supply chain—a factor that policymakers need to take into account when they create foreign-exchange policy.

The level of political force that can be deployed and its potential effectiveness are still in question, especially with a key trading partner like China. The Chinese government likely will act in its own best interest, not the U.S. manufacturing sector's. In the end, political bargaining and policy negotiation can only go so far and may come too late to help manufacturing's long-term competitiveness.

The United States' turbulent trading relationship with Japan in the 1980s is an example of how exchange rate intervention can and cannot help the manufacturing sector's long-term competitiveness. Throughout the 1970s and especially in the 1980s, Japan had a record trade surplus with the United States. Consequently, after long, hard negotiations, France, West Germany, Japan, the United States, and the United Kingdom signed the Plaza Accord in 1985, intended in part to allow the depreciation of the U.S. dollar or appreciation of the yen. The yen did rise, but the U.S. trade deficit with Japan persisted for many years after the Plaza Accord, albeit at a lower level.

China is the largest competitor for U.S. manufacturers but certainly not the only one. A dozen newly industrialized nations have emerged that can offer competitive advantages. South Korea, Taiwan, Malaysia, the Philippines, Brazil, South Africa, and Thailand have adjusted their policies to aggressively pursue manufacturers in the developed world. They are persuading them to relocate by plying them with tax incentives and financial assistance and relaxing environmental standards and other regulations.[32]

Manufacturing activities that have remained in the United States tend to be the most advanced, typically requiring close coordination with engineering and design staff. More routine manufacturing, in which every efficiency must be pursued, ends up overseas because of the economic advantages.[33]

According to a recent report, high and medium technologies account for roughly 65 percent of manufacturing exports by OECD countries. The G-7 nations generally have seen steady and substantial growth in value-added production, especially from 1998 to 2002.[34] This evolution from labor-intensive to high-value-added manufacturing means the technology content of manufacturing is constantly changing. Nations like the United States, South Korea, and China are competing on similar paths in the global marketplace.

As noted previously, the United States is at a disadvantage in various cost measures, including labor, property development, and taxation. Our developing nation counterparts, however, have an absolute advantage over the developed world. For the United States to maintain high-technology and high-value-added production, it is critical for the states like California to recapitalize on their inherent strengths by investing in research and development and the creation of innovative manufacturing processes that maintain quality and increase efficiency.

31. Daniel Ikenson, "Thriving in a Global Economy the Truth About U.S. Manufacturing and Trade," (Cato Institute, 2007).
32. *Innovation in Emerging Markets: Strategies for Achieving Commercial Success*, Deloitte, 2006.
33. High-Technology Manufacturing and U.S. Competitiveness, Rand Corporation, March 2004.
34. *Staying Competitive in the Global Economy: Compendium of Studies on Global Value Chains*, 2008, Organisation for Economic Cooperation and Development.

Coexisting with California's reputation as a place with an unfriendly business climate is its enduring image of being on the leading edge of trends in business, society, and culture. California is still home to industry clusters, companies, and entrepreneurs that have the potential to spawn the next new invention that will profoundly impact their industry or even the world. The state's challenge is to ensure that those innovators remain in California and that the flow of talent, capital, and entrepreneurs increases to infuse new blood into the state's innovation pipeline. There is no time to lose as China and India have both declared innovation to be a strategic national priority. To this end, China has developed a 15-year plan for science and technology, and India is increasing research and development by an average of 40 percent a year. In short, globalization should be an opportunity for California rather than a threat.

Why Manufacturing Matters

Industry's Ripple Effects

With the services sector a growing contributor to the state's economic base, some job losses in manufacturing in the past few years have been offset by gains in service industries, namely professional, business, transportation and warehousing, and health care. With more production moving overseas, the focus of California manufacturing has been design and research and development.

Impeded by regulatory burdens and high labor and energy costs, companies are finding it more productive to build their prototype facilities in the state and send labor-intensive mass production offshore. While it may seem logical from a company's perspective, understanding the underlying consequences for the state's economy and long-term accumulation of wealth is critical to the discussion.

Meanwhile, other nations are expanding their R&D base in a bid to draw more than just production work. As other nations try to enhance their economies, manufacturing jobs continue to dissipate in the United States, particularly in California. It is imperative that California not only retain its value-added manufacturing base but also capitalize on multiple segments of the supply chain to remain competitive and ensure long-term prosperity.

Manufacturing jobs tend to create broader economic ripple effects. By the same token, losing manufacturing jobs has adverse effects on economic vitality, and the losses go deeper than employment, wages, and output. The presence of a single large firm requires the support of several smaller firms and contractors inside and outside the immediate sector. As a result, if a large firm leaves the state, the indirect impacts can be severe.

The extent of the damage typically is determined by analyzing the length and characteristics of the regional supply chain. Supply-chain activity generates income for the region's residents, who put it back into the economy. For example, in addition to consumer spending by engineers, machinists, and other production workers employed by a manufacturer, we should consider spending by business professionals, restaurant workers, retail clerks, real estate agents, and others. These consumption effects are called induced economic impacts.

In this section, we perform a historical alternative simulation that assumes California's manufacturing base in 2007 had maintained the share of state employment it had in 2000.[35] Using Bureau of Economic Analysis multipliers, we can determine the incremental jobs, earnings, and output that would have been created. We will take into account the indirect effects of service-sector suppliers and the induced economic impacts of manufacturing and non-manufacturing workers' spending.

Clearly, manufacturing's share of the state's nonfarm employment, wages, and output has declined since 2000 (see table next page). One argument for sending work offshore has been gains in productivity despite the job losses endured locally. While gains in productivity and profitability have certainly benefited individual companies, manufacturing's contribution to gross state output and wages has suffered.[36]

35. The peak of the last business cycle was March 2001, which is why the year 2000 was selected as the base year for comparison. www.nber.org/cycles/november2001.
36. State output or gross state product is defined as the market value of goods and services produced in the California. It is also equivalent to the sum of all wage and salary payments and profits accrued.

Manufacturing's share of California economy

	2000	2007
Employment	12.8%	9.7%
Earnings	15.0%	11.7%
Real output	14.2%	11.1%

Sources: BLS, BEA, Moody's Economy.com.

Retrospective Simulation

Failing to address the needs of manufacturers will continue to have dramatic effects on the state economy. Here we attempt to quantify the extent of the repercussions by conducting a retrospective simulation.

In 2000, manufacturing made up 12.8 percent of the state's employment base. By 2007, that share declined to 9.7 percent, amounting to 1.46 million manufacturing jobs in the state. If manufacturing had maintained its 12.8 percent share of state employment, 476,000 jobs would have been preserved—nearly 33 percent of the 2007 manufacturing base. If wages and output levels had been maintained, manufacturing would have preserved $27.3 billion in wages and $46.9 billion in output (see table below), or about 28 percent of the 2007 totals.

Estimated gains in state manufacturing

	Hypothetical 2007 (assuming 2000 share)	Actual 2007	Net gain
Employment (thousands)	1,939	1,463	476
Earnings (US$ billions)	$124.2	$96.9	$27.3
Real output (US$ billions)	$216.0	$169.1	$46.9

Sources: BLS, BEA, Moody's Economy.com, Milken Institute.

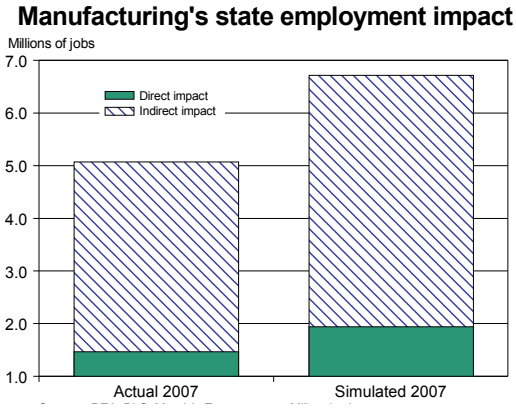
The 476,000 jobs that would have been retained, in turn, would have generated an additional 1.17 million jobs after rippling through other sectors, for a total impact of 1.65 million jobs (see table below). This suggests that California's manufacturing employment multiplier is nearly 3.5, meaning for every job created in California's manufacturing sector, 2.5 jobs are created in other sectors. Similarly, the preserved wages and output would have generated $47.8 billion and $54.3 billon, respectively, after rippling through other sectors.

Estimated gains in broader economy

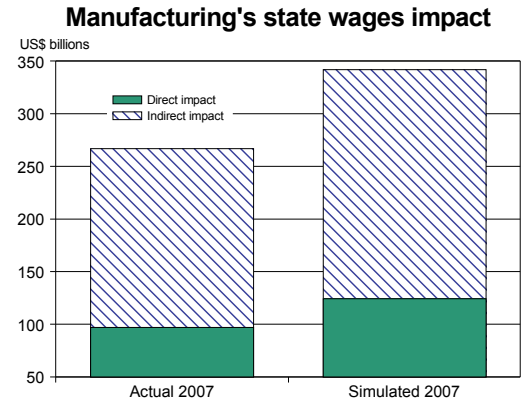
	Multiplier	Direct impact	Indirect impact	Total impact
Employment (thousands)	3.46	476	1,174	1,650
Earnings (US$ billions)	2.75	$27.3	$47.8	$75.1
Real output (US$ billions)	2.16	$46.9	$54.3	$101.2

Sources: BLS, BEA, Moody's Economy.com, Milken Institute.

The charts below compare the current and simulated impacts of manufacturing employment and wages had manufacturing's 2000 shares remained intact in 2007. The total impacts would have amounted to 6.7 million jobs and $342 billion in wages compared with 5.1 million jobs and $267 billion in wages in 2007.[37]



Sources: BEA, BLS, Milken Institute.



Sources: BEA, BLS, Milken Institute.

Another critical element is the quality of the jobs that would have been retained. Of the 476,000 jobs preserved, 36 percent, or roughly 173,000 jobs, would have stemmed from various high-tech industries, namely semiconductors; electronic components; computer equipment; aerospace; navigational, measuring, electromedical, and control instruments; and communication equipment.

Similarly, the simulated results show that if manufacturing wages and output had maintained their 2000 levels, high-tech manufacturing would have accounted for 56 percent and 44 percent of those net gains, respectively.

In addition, while one of every three jobs retained would have stemmed from a high-tech industry, more than half the wages retained would have originated from high-tech. This further illustrates the higher wages associated with such value-added industries.

Of note, the semiconductor and computer manufacturing industries would have retained 47,000 and 34,000 jobs, respectively, had their shares of total nonfarm employment remained at 2000 levels. The consequences of moving production overseas are most apparent in the production of apparel, where 50,000 jobs would have been retained.

While production activities stemming from such low-tech sectors do not typically provide the degree of economic stimulus that most value-added sectors do, they represent a significant component of the supply chain from which the state can benefit. Such jobs may be occupied by less-skilled workers, providing income to lower- and middle-income families.

37. Multiplier for manufacturing employment is 3.46. Because manufacturing employment in 2007 was 1.46 million, the sector is responsible for roughly 5.1 million jobs when accounting for the ripple effects.

Retrospective simulation by subsector

Ranked by greatest absolute employment gains, California

Rank	Manufacturing subsector	2000 share of nonfarm employment	2007 share of nonfarm employment	Thousands: Hypothetical 2007 emp (assuming 2000 share emp)	Thousands: Net gain
1	Cut and sew apparel manufacturing	0.77%	0.44%	117.2	50.3
2	Semiconductor and other electronic component manufacturing*	0.99%	0.69%	150.8	46.6
3	Computer and peripheral equipment manufacturing*	0.60%	0.38%	91.4	34.3
4	Printing and related support activities	0.56%	0.38%	85.7	27.3
5	Aerospace product and parts manufacturing*	0.63%	0.48%	95.0	22.7
6	Plastics product manufacturing	0.45%	0.31%	67.7	21.2
7	Navigational, measuring, electromedical, and control instruments manufacturing*	0.82%	0.68%	124.3	20.5
8	Communications equipment manufacturing*	0.30%	0.17%	45.9	19.5
9	Household and institutional furniture and kitchen cabinet manufacturing	0.34%	0.23%	52.2	17.9
10	Commercial and service industry machinery manufacturing*	0.19%	0.09%	28.3	14.3

Sources: BLS, Moody's Economy.com, Milken Institute.

**denotes high-tech industry*

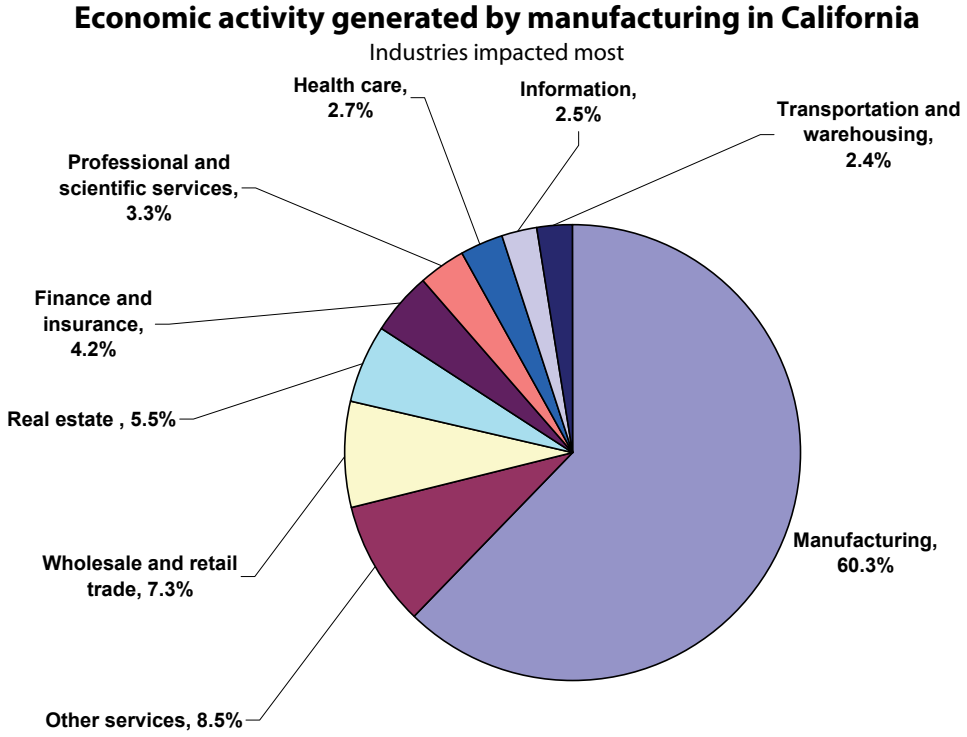
The nearly half-million jobs that would have been retained under our hypothetical scenario would have paid slightly more than $57,000 annually on average. Because the state's average manufacturing wage in 2007 was $66,200, this suggests most of the retained jobs would have been in lower-paying occupations within manufacturing. However, the state's average wage for all industries in 2007 was $54,400, so even these occupations with below-average pay would have significantly benefited the state's overall distribution of wealth. The output per employee associated with these jobs would have averaged $98,500—close to the state average of $100,000 across all sectors but less than the manufacturing average of $115,500 in 2007.

High-tech industries tend to attract high-skilled labor and typically yield higher forms of indirect impacts on the broader economy. For example, electronic computer manufacturing, a component of computer and peripheral manufacturing, boasts the highest employment multiplier of sixteen; every job created in this industry spawns fifteen jobs within the immediate sector and others in the state.

An individual with higher levels of education and skill, for example, is likely to have a support staff. The incomes of that person, their staff, and related service providers return to the economy through consumer purchases of goods and services. This accumulation and redistribution of wealth is essential to building regional prosperity in the long run.

The pie chart below illustrates the broader effects of manufacturing on other sectors. On average, 60 percent of the impact is spread through related subsectors within manufacturing, and the remaining 40 percent is captured outside the sector in trade and service-related industries.[38] Wholesale and retail trade account for 7.3 percent of manufacturing's ripple effects. Real estate and financial activity combined comprise 10 percent. The broader effects extend to various services such as information technology support, management, education, and health care.

38. The distribution of economic activity is based on the concept of final-demand output multipliers provided by the BEA's RIMS multipliers.



Sources: U.S. Bureau of Labor Statistics, Moody's economy.com, Milken Institute.

The incremental gains go beyond jobs, wages, and output. The wealth created through direct wages and induced purchases of goods and services helps provide a steady flow of tax revenue to state and local governments. Therefore, retaining manufacturing jobs is critical not only to the economy overall but also to state and local governments' ability to maintain a balanced budget. A similar argument can be made with respect to pensions. A retired manufacturing employee in California will continue to contribute to the state economy through spending and taxes.

Cost-benefit analysis can help clarify the costs of retaining jobs versus losing them. Take, for example, a manufacturing company with 1,000 employees and average annual wages of $66,000 that decides to expand outside California because of the unfavorable business climate. This move would lead to an immediate reduction in the state's corporate and personal state tax revenue and an increase in unemployment payments to displaced workers. Alternatively, suppose the state had prevented the company's relocation by loosening regulations or providing tax credits or sales tax exemptions. State officials must weigh the incremental costs and benefits of tax incentives against the tax losses and increases in unemployment benefits resulting from the company's relocation. If lost taxes and higher jobless benefits exceed the cost of incentives, then incentives would be in the state's best interest.

On a larger scale, assuming that manufacturers continue to reduce their California work force and expand in other locations, the state will need to spend more to retrain displaced employees to work in unfamiliar, non-manufacturing fields. In this transitional phase, the state would have to spend additional funds to assist the displaced workers. Given that the government's recruiting of new companies is usually time-consuming and complex, recruitment costs can exceed those of investing in retaining existing employers.

In the case of "green jobs," the external benefits, particularly with respect to the environment, are sometimes overlooked. The long-term advantages of manufacturing alternative energy sources can go well beyond the industry's immediate economic implications in terms of jobs, earnings, and output. By enhancing the production of green technologies in the state, California has the potential to fully leverage its R&D assets and sustain its lead in energy innovation. Thus, capitalizing on the full extent of the green technology supply chain can translate into broader economic stimulus for the state.

Turning the Tide: Investing in Manufacturing

What Other States Are Doing

The U.S. manufacturing industry is a critical engine of economic growth, but changing global economic forces and technological advancements have made emerging markets more competitive, allowing them to steadily gain larger shares of manufacturing employment from the United States and other developed economies. The steady loss of jobs is not unexpected as labor-intensive, lower-skilled manufacturing processes flow to cheaper emerging markets. The critical question is why California has been losing manufacturing employment—particularly high-value-added manufacturing—to other states. It is vital to determine why the state's manufacturing competitiveness is in decline and to chart a course to reverse this trend.

To analyze California manufacturing's competitiveness, case studies were completed for California and seven peer manufacturing states (see Appendix 1). The case studies reveal that 1) California is losing a larger share of manufacturing employment and at a faster rate than the other states; 2) A wide gap exists between California's capacity for ingenuity and entrepreneurship and its ability to efficiently commercialize innovation in manufacturing; 3) This gap is widening in part because of the high cost of doing business due to an onerous regulatory climate and some of the highest taxes in the nation; and 4) California is known as a place that is unfriendly to business.

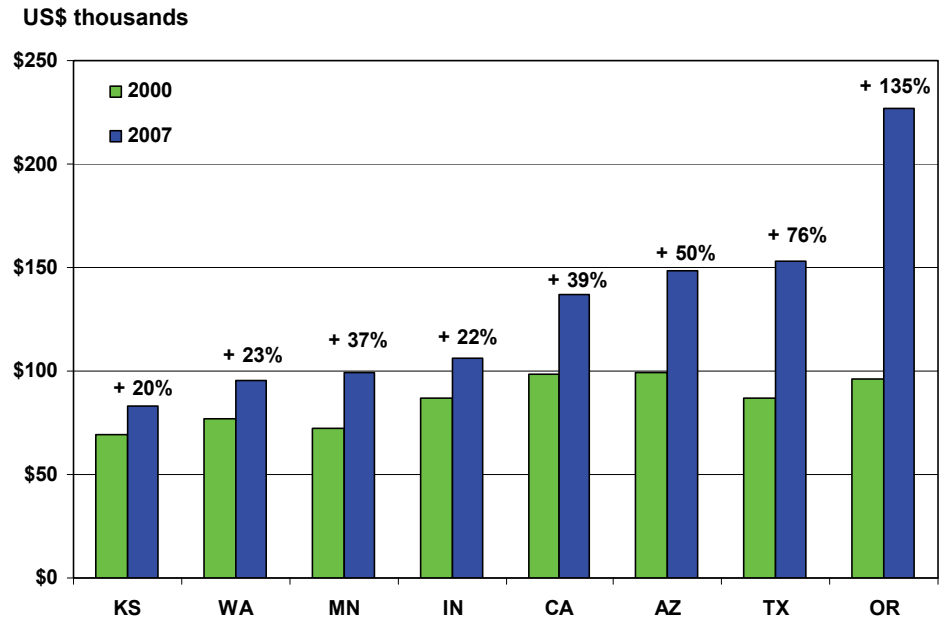
To illustrate the erosion of California's manufacturing competitiveness, key trends identified in the case studies are summarized below. They are divided by condition—the comparative state of California's manufacturing industry; cause—the drivers behind California's decline; and interventions—the most noteworthy efforts of peer states to make their manufacturing industries more competitive.

I. Condition: California's Performance Versus Other States

Declining manufacturing employment—California has seen its share of U.S. high-tech manufacturing and non-high-tech manufacturing jobs shrink, coming in last in job creation among the peer states. Particularly disturbing is California's lost share of high-tech manufacturing employment—an area where it is perceived as a global leader. Indiana had the most growth—22 percent—in its share of U.S. high-tech manufacturing employment even though its economy only grew by 7 percent from 2000 to 2007. By comparison, California's share of high-tech manufacturing jobs declined by 4 percent, and its economy grew 20 percent. This raises questions as to why California's economy grew yet high-tech manufacturing employment declined.

Declining manufacturing output—California increased its overall gross state product by more than 20 percent, or fourth among the peer states. However, manufacturing's share of real GSP declined by nearly 10 percent during this same period—the greatest percentage point decline among the states analyzed. Conversely, Texas' domestic product grew by 24 percent, and its manufacturing share of real GSP increased by 24 percent. In short, California manufacturing's share of GSP decreased while Texas's share grew, yet California and Texas saw GSP expand by roughly the same amount. If California's decline in output cannot be attributed to a lack of overall economic growth, then specific conditions must be to blame.

Peer states' real manufacturing output per worker
2000 versus 2007



Sources: Bureau of Economic Analysis, Federal Reserve Bank of San Francisco, Milken Institute.

Declining production value—California has the highest average wage per manufacturing employee at $66,241—besting the national average by more than $10,000. However, California ranked in the middle among peer states for increasing real manufacturing output per worker. Oregon, on the other hand, ranked seventh in wage per employee and first in real manufacturing output per worker. This disparity means that direct manufacturing costs and structural economic costs in California are higher than in Oregon. A reasonable assumption: Oregon can produce more per employee for less money.

Globally competitive—California's economy is the eighth largest in the world and global in scope, yet it had the smallest percentage point increase in exported goods (12 percent) among the peer states from 2000 to 2007. While U.S. exports of manufactured goods increased 44 percent, California's manufacturing exports increased 6.6 percent—the smallest percentage point increase of the states studied. In comparison, Washington's exports of manufactured goods climbed more than 100 percent and its total exports 106 percent.

This contrast illustrates two key points: The export of manufactured goods is a likely driver behind overall export performance, and California manufacturing does not appear to be as globally competitive as its peer state competitors.

II. Cause: Drivers Behind California's Decline

Business climate—Although reputation is difficult to measure, being perceived as business-friendly is important when companies are considering where to locate. Several studies give low scores to California's business climate, based on the amount of time required and degree of difficulty in selecting an industrial location; navigating regulations across jurisdictions; acquiring permits; conducting impact studies; identifying and preparing a work force; and making infrastructure improvements. To draw a comparison, Arizona scored well among the peer states and nationally on indices related to the business climate, and the state saw its nonfarm establishments increase by 20 percent over seven years––double the rate in California.

Tax policy—California has the highest corporate and individual income tax rates among the peer states. The State Business Tax Climate Index—the leading national assessment of tax policy, published annually by the Tax Foundation—ranked California as having the fourth-highest taxes in the country. In 2007, California's total taxes paid per capita were $4,993—the most among the peer states and much higher than the national average of $4,223. Arizona ranked in the middle among peer states in corporate and individual income tax rates, and total taxes paid per capita was just $3,302. Arizona had the highest percentage increases in gross state product, total nonfarm employment, and median household income.

Regulatory climate—According to the Beacon Hill Institute's Competitiveness Index, California ranks 22nd nationally in strictness of environmental regulations. Among the peer states, California has the second-most-restrictive environmental laws; only New York is more restrictive. The broader Economic Freedom Index, which benchmarks states across a range of regulations, licensing, and permitting requirements, ranked California as the sixth-strictest state in 1999 and third strictest in 2008. The peer state at the other end of the spectrum was Washington, at second least restrictive on both indices. Among the states studied, Washington was also the top gainer in exports of manufactured goods.

Government spending—At $6,390 per capita, California spent more on government programs and services than any other peer state, and that amount increased nearly 50 percent from 2000 to 2007—a higher percentage increase than in the other seven states. In addition, California has one of the highest rates of growth in government borrowing. Arizona, on the other hand, has the lowest per capita taxes paid, the second-lowest rate of per capita government spending, and the greatest gain in new business establishments among the peer states. Its GSP increased by the biggest percentage, and median household income grew 23 percent, the second-biggest percentage increase.

III. Interventions: What Peer States Are Doing to Enhance Competitiveness

Work force development—Kansas led an innovative collaboration among its universities, community colleges, and technical schools to help meet businesses' work force demands, including the development of training programs and the screening and evaluation of potential employees. The state also provides tax credits to companies for a range of employee training and recruitment expenses, including textbooks and training manuals, the use of temporary training facilities, and curriculum planning. From 2000 to 2007, Kansas lost the smallest percentage of manufacturing jobs (7.5 percent) among the peer states and far less than the U.S. overall (20 percent).

Business climate—The Texas Manufacturing Assistance Center was developed specifically to help identify problems in manufacturing processes, recommend solutions, and help execute projects to increase productivity. In 2003, Washington State created the Office of Regulatory Assistance to coordinate multi-agency review and response for large projects, giving applicants a single point of contact. This improved the timeliness of projects being approved and reduced costs by minimizing the number of required reports and responses to agencies. The state also created an online permit assistance system to show applicants what information is needed for agencies to make permit decisions.

Access to capital—Recognizing the most vulnerable stage of business development—having enough capital to scale a viable business to profitability—several peer states established funds to help firms bridge this gap. Texas had five major funds dedicated to specialized capital needs, including an emerging technology fund, subsidized loans for large-scale manufacturing, a "deal-closing" fund dedicated to start-ups on the verge of viability, and an infrastructure fund to help rural communities with upgrades to transportation networks and other public projects. Meanwhile, Arizona created a unique angel investors tax credit to spur private financing for high-tech start-ups. The state had a 20 percent net increase in new businesses—twice as much as any other peer state—and saw overall employment increase more than any of the seven states.

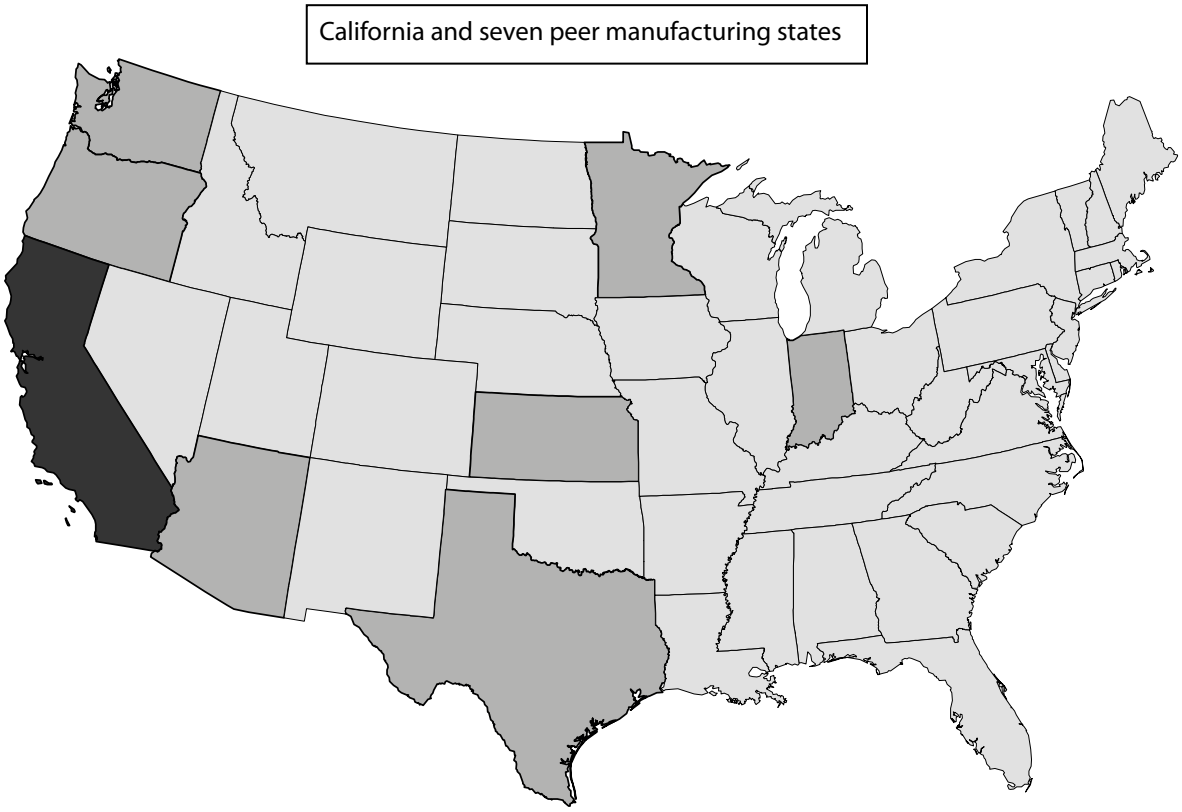
Investing in innovation—California ranks high nationally in its efforts to incentivize research and development. Although recently changed, at the time, the state's 15 percent R&D tax credit for in-house research was one of the highest in the nation, and its 24 percent credit for contract research was the highest. However, some peer states have taken an active role in leveraging public and private resources to increase their innovation infrastructure. For example, Oregon publishes an annual Innovation Index to measure efforts by the government, private sector, and universities to build the state's capacity for innovation in several sectors. This led to the creation of the Oregon Nanoscience and Microtechnologies Institute, a seamless collaboration among three Oregon universities to develop and commercialize products. The institute is financed by both government and the private sector.

Conclusion—California's manufacturing industry, although in decline, holds the key to the state's economic growth. The state's global reputation as the cradle of American ingenuity begins with California's manufacturers and depends on their capacity to compete. Manufacturing increases overall economic growth, pays higher wages, and drives overall exports. Therefore, as a critical engine of economic growth and a frequent catalyst for innovation, the decline of the state's manufacturing industry is the canary in the coal mine for the California economy as a whole.

Appendix 1

Case Studies and Methodology

In previous sections, we document the state of manufacturing in California and the drivers behind its overall decline from 2000 to 2007. Although global economic forces largely beyond the control of policymakers continue to create formidable challenges to manufacturers' competitiveness in the United States and other developed economies, the primary focus of this report is the extent to which California's manufacturing industry is less competitive compared with other states. We have created case studies for each of the seven peer states and California to identify and analyze why California's manufacturing industry is declining more rapidly.



Selection of peer states: To analyze the drivers behind the decline of California's manufacturing industry effectively, we compared it to the national average and to seven other states that met specific criteria. These states were chosen because 1) the state's share of U.S. manufacturing employment increased from 2000 to 2007, 2) the state's share of U.S. high-tech manufacturing employment also increased during the same time period, and 3) The state's share of U.S. high-tech manufacturing employment in 2007 either matched or exceeded the national average of 2 percent. Although Texas did not meet all three criteria, it was included in the analysis because of its large share of U.S. manufacturing and its similarity and proximity to California.

High-tech manufacturing is an important criterion in determining a region's future prosperity and sustainable growth because its creation of high-skilled, well-paying jobs improves the standard of living.

Leading indicators: In addition to analyzing the manufacturing industries in the eight states, we examined different indicators for each state's overall economy and business climate during the same period. We overlaid this data with the states' rankings in several leading business and economic indices and reviewed key economic development policy incentives. At the beginning of each state's case study, the top five indicators highlighting the state's manufacturing competitiveness are provided, followed by more detailed analysis.

Economic climate: To place a state's manufacturing industry in the proper context, we analyzed a set of broad economic indicators to determine the overall state of the economy and what implications it may have had on manufacturing. For example, was the state's economy growing or contracting? How linked is overall economic activity in the state to manufacturing output? Are the state's economy and manufacturing industry dependent on exports and more susceptible to global trends? These are all indirect factors that influence manufacturing's competitiveness.

Business climate: The climate for business activity and the efficient conduct of commerce varies from one state to the next for a number of reasons, including the state's tax policies, regulatory regime, and level of government spending. These factors can significantly influence the overall competitiveness of the state's economy and the businesses operating within it. They also come into play when businesses are determining where to locate. Such costs are an important consideration because businesses in high-tax, high-regulation states will be at a comparative disadvantage.

Leading business and economic indices: A number of organizations periodically produce well-regarded studies that quantify business and economic conditions and then rank states according to performance. The indices referenced in the case studies are completed using different methods, but much of the data used is the same. This means a state may rank higher in one index and lower in another. Nevertheless, these indices are useful for setting benchmarks and comparing the conditions between states. A brief description of each index's methodology is included in the appendix.

Manufacturing indicators: Many of the key indicators used to identify the peer states are used again to analyze their manufacturing industries in more depth and in relation to the other peer states. In addition to looking at manufacturing overall, the case studies also examine high-tech manufacturing in particular because of its importance as a driver of broader economic growth.

Public incentives: The final section of the case studies provides examples of the more effective publicly sponsored incentives employed in each state. Incentives are explicit efforts made by state governments to retain and attract manufacturers. The incentives can be in the form of tax credits for specific business-related expenses such as purchasing equipment, training employees, or buying land. They can also include access to low-cost capital or grants to retrofit aging facilities or targeted public infrastructure improvements.

Comparisons: To illustrate how California's manufacturing competitiveness declined compared to the seven peer states from 2000 to 2007, sections of the case studies rank states based on how much they changed. For example, state A may have a lower average wage per manufacturing employee, but it ranks higher than state B because the percent change from 2000 to 2007 is higher for state A than state B.

CALIFORNIA

Top five indicators, 2007

Real gross state product	$1,549 billion
Per capita personal income	$41,805
Total exports of good	$134.3 billion
Manufacturing's share of real GSP	12.8%
Real manufacturing output per worker	$136,761

I. Economic climate indicators for U.S. and California in 2007 and California's ranking among the peer states

Economic climate indicator	US	CA	% Change 2000 to 2007 US	% Change 2000 to 2007 CA	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$1,549.0	17.4%	20.3%	4
Total nonfarm employment (thousands, SA)	137,604.3	15,173.4	4.4%	4.7%	5
Total exports of goods (US$ billions)	$1,162.5	$134.3	48.7%	12.3%	8
Per capita personal income (US$)	$38,615	$41,805	29.4%	28.8%	3
Median household income (US$)	$50,740	$59,928	20.8%	26.2%	1

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

As the largest economy in the United States, California contributed 13.4 percent to the U.S. real GDP in 2007. Its annual economic growth rate averaged 3.3 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent. California has a large labor force with total nonfarm employment at 15.2 million in 2007. Per capita personal income in the Golden State rose to $41,800—a 28.8 percent increase over seven years —which was almost $3,200 more than the U.S. average. California's median household income was higher than any of its peer states at almost $60,000 in 2007.

California was the second-largest state in terms of value of exports. The total value of exported goods (based on the Origin of Movement series) was $134.3 billion in 2007. The state's top three commodities in 2007 were airplane or helicopter parts, computer parts and accessories, and electronic integrated circuits. The top three destinations for California goods were Mexico, Canada, and Japan.

II. Business climate indicators for U.S. and California in 2007 and California's ranking among the peer states

Business climate indicator	US	CA	% Change 2000 to 2007 US	% Change 2000 to 2007 CA	Rank (1-8)
Corporate income tax rate	15.0% -35.0%	8.84%	0.0%	0.0%	7[40]
Individual income tax rate	10.0% -35.0%	1.0% -10.3%	-33.3% - -11.6%	0.0% - 10.8%	8[41]
Property tax rate	1.38%	.68%	--	--	1
Sales tax rate	none	6.25%	--	4.2%	3[42]
Employer unemployment insurance tax rate	0.66%	0.73%	24.5%	37.7%	3
Total state-local tax burden rate	9.90%	10.80%	4.2%	2.9%	8
Per capita total state-local taxes paid (US$)	$4,223	$4,993	35.8%	32.4%	8
Government debt as % of GDP/GSP	65.5%	6.3%	12.9%	43.2%	5
Per capita government spending (US$)	$14,327	$6,390	42.3%	44.5%	8
Nonfarm establishments (latest 2006)	7,601,160	878,128	7.5%	9.8%	4

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

California ranked either seventh or eighth worst in 50 percent of the business climate indicators, the highest percentage of any of the peer states. California's poor performance in this category is largely due to increases in taxes (corporate, individual, unemployment) during the study period. And in the majority of areas where California ranked poorly, the conditions are worsening rather than improving. For example, during the period of analysis, California increased its individual tax rate by 11 percent, while the federal tax rate decreased by 12 percent to 33 percent. California was also the only one of the peer states to increase its rate during this period.

However, a more telling figure is that the $4,993 that Californians pay in taxes per capita is the highest among the peer states and $700 more than the national rate of $4,223. Given the relative tax burden, it is no surprise that per capita spending by California state and local governments is also the highest among the peer states, but that rate also saw the biggest increase—45 percent—from 2000 to 2007. California also has one of the highest percentages of government debt to GSP, so despite collecting more in taxes, California's public sector is relying increasingly on debt for funding, a factor that rose 43 percent compared with the U.S. increase of 13 percent.

40. California is the only peer state to have a different corporate tax rate for "financial institutions," which is 10.84 percent.
41. The high-end tax rate of 10.3 percent is the highest among peer states. The low-end rate of 1 percent is the fifth highest.
42. Tied with Texas. California's rate went up from 6.00 percent in 2000 to 6.25 percent by 2007.

III. Leading business and economic indices: California's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank[43]
State Business Tax Climate Index (Tax Foundation)	8	47
Best & Worst States [to do business] Survey (Chief Executive Magazine)	8	51[44]
Competitiveness Index (Beacon Hill Institute)	7	24
Economic Competitiveness Index (American Legislative Exchange Council)	4	27
2007 State and Local Tax Burden (Public Policy Institute of New York)	8	41
Economic Freedom Index (Pacific Research Institute)	8	49
Small Business Survival Index (Small Business & Entrepreneurship Council)	8	49
2007 Cost-of-Doing-Business Index (Milken Institute)	8	44
State New Economy Index (Kauffman Foundation)	2	8
State Technology & Science Index (Milken Institute)	4	4

Note: Indices cited were published in 2008, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.

Based on ten leading indices benchmarking states' business and economic climates in relation to the peer states, California is ranked poorly by seven studies, average by one, and competitive by two. It ranks equally poorly on a national basis. The two indices in which California performed well—Kauffman's New Economy Index and the Milken Institute's Technology and Science Index—are based in large part on a state's capacity for science and technological innovation. Overall scores are also heavily influenced by a state's share of venture capital funding, a category in which California typically does well, in part because of the number of VC firms in the state. Both of these indices also focus more on the condition of a state's knowledge infrastructure and its capacity to generate economic activity than on measuring actual performance like the other eight indices. This means that despite the strength of California's knowledge infrastructure and potential for robust and sustained economic growth, as documented by the Kauffman Foundation and Milken Institute, the eight other business and economic indices show that California is underperforming.

Combining the results from the business climate indicator section and California's performance on these indices, an important question comes to light: If California has one of the best knowledge infrastructures in the United States and the world, why does the state consistently underperform? Using the eight performance indices, it is clear that California's overall tax burden and the onerous regulatory environment are preventing the state from reaching its economic potential.

43. Some index rankings were reversed to make them consistent across the different indices.
44. Index includes the District of Columbia.

IV. Manufacturing indicators for U.S. and California in 2007 and California's ranking among the peer states

Manufacturing indicators	US	CA	% Change 2000 to 2007 US	% Change 2000 to 2007 CA	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	12.8%	-6.1%	-9.8%	8
High-tech manufacturing share of real GDP/GSP	4.8%	7.4%	39.3%	6.5%	5
Manufacturing employment (thousands)	13,882.6	1,463.3	-19.6%	-21.0%	8
High-tech manufacturing employment (thousands)	2,468.7	485.9	-19.4%	-22.8%	7
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	19.68%	2.0%	-4.2%	7
Manufacturing wage per employee (US$)	$53,804	$66,241	25.3%	28.0%	2
Manufacturers' capital expenditures (US$ billions)	$135.8	$14.1	-12.3%	-16.8%	6
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$50.7	13.3%	10.7%	7
Real manufacturing output (US$ billions)	$1,571.7	$198.6	10.2%	8.5%	6
Real manufacturing output per worker (US$ thousands)	$113.6	$136.8	37.9%	39.1%	4
Value added per production worker (US$)	$249,139	$268,768	48.8%	34.2%	7
Exports of manufactured goods (US$ billions)	$1,022.1	$118.9	44.4%	6.6%	8

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate between 2000 and 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in the growth of the California economy. It contributed 12.8 percent to the state's GSP in 2007, most of it from high-tech manufacturing industries. California has the largest share of manufacturing employment in the nation with almost 1.5 million jobs. The state is a leader in high-tech manufacturing and innovation. It attracts millions of dollars in venture capital investments and has the largest share of industrial research and development expenditures.

Despite its superiority, California's share of manufacturing employment, especially in high-tech manufacturing, is slipping. Manufacturers' capital expenditures declined more than the U.S. average. This shows that California manufacturers have reduced their investments in the expansion and upgrades of their production plants and equipment.

High-tech manufacturing requires a high-skilled work force. The industry pays well. Because of the high number of workers in high-tech manufacturing in California, the average wage of manufacturing employees in the state was more than in most states. Technological advances coupled with a high-skilled work force make California one of the top states in productivity. The value added per production worker in the state was more than $268,000 in 2007, more than the U.S. average.

V. California's public economic development incentives

Public economic development incentives	Program
Corporate income tax exemption	No
Tax exemption on manufacturing machinery equipment	Yes[45]
State loans for equipment and machinery	Yes
Excise tax exemption	Yes
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	Yes[46]
Job creation tax credit	Yes
Research and development tax exemption	Yes
State loan guarantees	Yes
Long-term state economic plan	No

Source: Site Selection Magazine, November 2008.

California has a number of resources to retain and attract businesses as well as incentives specific to manufacturing. For example, in designated areas, manufacturers can receive tax credits for the purchase of machinery and equipment and certain expenditures on research and development. Until recently, California provided one of the highest R&D tax credits for in-house and contract research. And the Stem Cell Research Initiative, funded by $3 billion in obligation bonds through Proposition 71 in 2004, is able to finance up to $350 million a year for stem-cell research and development.

To help businesses navigate the regulatory process, a number of counties have established Business Environmental Resource Centers that act as one-stop, nonregulatory offices set up to help businesses understand and comply with air quality, hazardous materials/waste, solid waste, and water quality regulations. However, these centers are only in certain parts of the state, have been under-resourced, and are not very effective.

Overall, California's incentives, particularly in regard to manufacturing, are lacking in four fundamental ways: 1.) The incentives and the agencies administering them at the federal, state, and local levels are not coordinated, which means more administrative overhead and less strategic focus. 2.) What the state is offering, with the exception of the two incentives mentioned above, are standard, garden-variety incentives on par with most other states. 3.) The incentives provided are not robust enough to effectively counter the overall tax burden, onerous regulatory climate, and other structural challenges. 4.) California is the only one among its peers to lack a comprehensive, long-term economic strategy.

45. Limited to designated areas.
46. Some "high-tech" manufacturers that meet a particular set of criteria can apply for a reduced property tax rate.

ARIZONA

Top five indicators, 2007

Real gross state product	$213.3 billion
Per capita personal income	$32,833
Total exports of goods	$19.2 billion
Manufacturing's share of real GSP	12.6%
Real manufacturing output per worker	$148,509

I. Economic climate indicators for U.S. and Arizona in 2007 and Arizona's ranking among the peer states

Economic climate indicator	US	AZ	% Change 2000 to 2007 US	% Change 2000 to 2007 AZ	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$213.3	17.4%	34.6%	1
Total nonfarm employment (thousands, SA)	137,604.3	2,673.8	4.4%	19.2%	1
Total exports of goods (US$ billions)	$1,162.5	$19.2	48.7%	34.1%	7
Per capita personal income (US$)	$38,615	$32,833	29.4%	28.0%	5
Median household income (US$)	$50,740	$49,923	20.8%	23.1%	2

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate between 2000 and 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Arizona's economy grew by 35 percent in seven years, contributing 2 percent to the nation's real GDP in 2007. Its annual growth averaged 4.6 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent. Arizona's work force has grown considerably, with total nonfarm employment at more than 2.6 million in 2007. Though per capita personal income rose to $32,833—a 28 percent increase over seven years—it was almost $5,800 less than the U.S. average. At $49,923 in 2007, median household income also lagged the national average.

Arizona exports increased in the past seven years, with the total value of exports (based on the Origin of Movement series) at $19.2 billion in 2007. Arizona's top three commodities were processors and controllers, electronic integrated circuits, and airplane or helicopter parts. The top three destinations were Mexico, Canada, and China.

II. Business climate indicators for U.S. and Arizona in 2007 and Arizona's ranking among the peer states

Business climate indicator	US	AZ	% Change 2000 to 2007 US	% Change 2000 to 2007 AZ	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	6.97%	0.0%	-12.9%	4
Individual income tax rate	10.0%-35.0%	2.73% -4.79%	-33.3% -11.6%	-4.9% -5.0%	4
Property tax rate	1.38%	1.21%	--	--	5
Sales tax rate	none	5.60%	--	12.0%	3
Employer unemployment insurance tax rate	0.66%	0.34%	24.5%	17.2%	1
Total state-local tax burden rate	9.90%	8.70%	4.2%	0.0%	2
Per capita total state-local taxes paid (US$)	$4,223	$3,302	35.8%	33.6%	1
Government debt as % of GDP/GSP	65.5%	3.9%	12.9%	95.0%	3
Per capita government spending (US$)	$14,327	$4,470	42.3%	40.6%	2
Nonfarm establishments (latest 2006)	7,601,160	137,845	7.5%	20.1%	1

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Arizona has the best overall score of the peer states in various business indicators. Although the state ranks in the middle on corporate and personal income tax rates, both rates were reduced significantly during the study period; the corporate rate was cut by 13 percent and the individual rate by 5 percent. Arizona also has the lowest unemployment insurance tax rate. The state does have a relatively high 2.95 percent business property tax on factories not in an enterprise zone. Despite being in the middle range on corporate and individual tax rates, Arizona residents pay the least per capita in state and local taxes of any peer state at $3,302—more than 20 percent less than the U.S. average. Arizona's strongest indicator was a 20 percent increase in nonfarm establishments from 2000 to 2007—double the growth rate for California and the nation.

III. Leading business and economic indices: Arizona's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	5	25
Best & Worst States [to do business] Survey (Chief Executive Magazine)	2	8
Competitiveness Index (Beacon Hill Institute)	5	19
Economic Competitiveness Index (American Legislative Exchange Council)	3	8
2007 State and Local Tax Burden (Public Policy Institute of New York)	2	12
Economic Freedom Index (Pacific Research Institute)	2	11
Small Business Survival Index (Small Business & Entrepreneurship Council)	3	13
2007 Cost-of-Doing-Business Index (Milken Institute)	4	22
State New Economy Index (Kauffman Foundation)	6	20
State Technology & Science Index (Milken Institute)	4	17

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

Indices that focused more on tax rates ranked Arizona in the middle to high range among the peer states, although Arizona ranks better than that in overall competitiveness because of its comparatively low per capita tax burden. The state's more favorable regulatory environment and lower barriers to entrepreneurship and business creation are reflected in strong rankings for "economic freedom" and for small businesses, in particular. These rankings also reflect the large number of firms created during the study period. However, Arizona is only in the middle to low-mid range among peer states in its capacity for science and technology. This is most likely a reflection of the state's relatively recent emergence as a location for high-tech sectors.

IV. Manufacturing indicators for U.S. and Arizona in 2007 and Arizona's ranking among the peer states

Manufacturing indicators	US	AZ	% Change 2000 to 2007 US	% Change 2000 to 2007 AZ	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	12.6%	-6.1%	-3.1%	4
High-tech manufacturing share of real GDP/GSP	4.8%	8.8%	39.3%	5.4%	6
Manufacturing employment (thousands)	13,882.6	181.7	-19.6%	-13.5%	5
High-tech manufacturing employment (thousands)	2,468.7	76.5	-19.4%	-17.8%	6
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	3.10%	2.0%	2.0%	6
Manufacturing wage per employee (US$)	$53,804	$58,904	25.3%	18.6%	8
Manufacturers' capital expenditures (US$ billions)	$135.8	$1.9	-12.3%	-24.6%	7
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$3.0	13.3%	21.9%	6
Real manufacturing output (US$ billions)	$1,571.7	$27.1	10.2%	30.5%	3
Real manufacturing output per worker (US$ thousands)	$113.6	$148.5	37.9%	50.1%	3
Value added per production worker (US$)	$249,139	$270,500	48.8%	14.5%	8
Exports of manufactured goods (US$ billions)	$1,022.1	$17.1	44.4%	26.6%	7

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate between 2000 and 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in the growth of Arizona's economy. Its manufacturing real GSP totaled $27.1 billion, or 12.6 percent of the state's real GSP in 2007. Arizona's manufacturing real GSP climbed 31 percent from 2000 to 2007, mostly from high-tech manufacturing industries.

Manufacturing employment in Arizona totaled 181,700 jobs, or 1.3 percent of the nation's total in 2007, with 42 percent of it in high-tech manufacturing. The state has a growing technology cluster, the Tempe technology corridor near Phoenix, which attracts millions in venture capital. Industrial research and development spending in the state grew 22 percent from 2000 to 2007. However, the manufacturers' capital expenditures in the state declined by more than the U.S. average, showing that Arizona manufacturers overall have reduced investments in the expansion and upgrades of their plants and equipment.

While California has lost a tremendous number of aerospace and defense-related manufacturing jobs since 1990, Arizona has experienced modest gains. Arizona's share of U.S. high-tech manufacturing employment was 3.1 percent in 2007, compared with the national average of 2.0 percent. It is home to other high-tech manufacturing industries as well, such as semiconductor and navigational, measuring, electromedical, and control instruments manufacturing. It was not immune to the 2000 tech crash, losing more than 34,000 manufacturing jobs from 2000 to 2003. But while most states continued to bleed manufacturing jobs after that economic recovery, Arizona bucked the trend and created more than 6,000 manufacturing jobs from 2003 to 2007.

Though high-tech industries still make up the lion's share of Arizona manufacturing, the state's recent job gains were from fabricated metal products manufacturing (architectural and structural metal products manufacturing), nonmetallic mineral product manufacturing (construction-related), and food manufacturing.

High-tech manufacturing requires a high-skilled work force. Because of the large number of workers in high-tech manufacturing, the average wage of manufacturing employees in the state was higher than in most states. The average wage for Arizona's entire manufacturing sector was $58,900 in 2007, a 19 percent increase from 2000. Technological advances coupled with a high-skilled work force made Arizona one of the top states in productivity. The value added per production worker in the state was $270,500 in 2007, besting the U.S. and California averages.

V. Arizona's public economic development incentives

Public economic development incentives	Program
Corporate income tax exemption	Yes
Tax exemption on manufacturing machinery equipment	Yes
State loans for equipment and machinery	Yes
Excise tax exemption	No
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	Yes[47]
Job creation tax credit	Yes
Research and development tax exemption	Yes
State loan guarantees	Yes[48]
Long-term state economic plan	No

Source: Site Selection Magazine, November 2008.

Arizona has one of the more diverse, creative sets of economic development incentives among the peer states. With targeted programs for entrepreneurs, low-cost financing for larger industrial projects, and specific tax credits for "pollution control" equipment, Arizona's incentives are aggressive and strategic. For example, the state has a variety of resources to assist entrepreneurs, including free business consulting services and a unique angel investors tax credit, to spur private financing for high-tech start-ups. To encourage research and development, Arizona advises entrepreneurs on accessing Small Business Innovation Research and Small Business Technology Transfer grants from the federal government. The state also offers grants for road construction projects in proximity to businesses willing to locate in more rural areas where public infrastructure is not as developed.

47. Recent policy changes have created foreign trade zones that allow any business operating in one of the six zones in Arizona to be eligible for property tax reductions of up to 80 percent.
48. Publicly sponsored loan guarantees are limited; there is no mechanism to leverage public bond funding for private development, and Arizona is the only peer state without a specific industrial development authority.

In spite of Arizona's myriad creative programs, the resources available to fund them are relatively thin. For example, the state offers a job creation tax credit, but at $3,000 it is a fraction of what other peer states provide. Also, because of a constitutional restriction, Arizona state and local governments are prohibited from offering subsidies to private-sector industries. State economic development officials cite the lack of such targeted inducements as a reason the state has not attracted more than a few solar power companies despite its climate.

INDIANA

Top five indicators, 2007

Real gross state product	$207.6 billion
Per capita personal income	$33,215
Total exports of goods	$26.0 billion
Manufacturing's share of real GSP	28.2%
Real manufacturing output per worker	$106,501

I. Economic climate indicators for U.S. and Indiana in 2007 and Indiana's ranking among the peer states

Economic climate indicator	US	IN	% Change 2000 to 2007 US	% Change 2000 to 2007 IN	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$207.6	17.4%	6.8%	8
Total nonfarm employment (thousands, SA)	137,604.3	2,985.9	4.4%	-0.47%	8
Total exports of goods (US$ billions)	$1,162.5	$25.9	48.7%	68.7%	4
Per capita personal income (US$)	$38,615	$33,215	29.4%	22.4%	8
Median household income (US$)	$50,740	$47,422	20.8%	14.1%	8

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Indiana's economy grew a modest 6.8 percent over seven years. The state contributed 1.8 percent to the U.S. real GDP in 2007. Its annual economic growth averaged 1.2 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent. Although Indiana's total nonfarm employment reflected net negative growth in that period, the state has added 94,000 jobs since employment bottomed out in 2003. Though per capita personal income and median household income rose over the seven-year period, both indicators lagged the national average.

Indiana's exports increased in the past seven years. The total value of exports of goods (based on the Origin of Movement series) was $25.9 billion in 2007. Its top three commodities were gearboxes for motor vehicles, compression-ignition internal combustion piston engines, and trailers for housing or camping. The top three destinations for its exports were Canada, Mexico, and the United Kingdom.

II. Business climate indicators for U.S. and Indiana in 2007 and Indiana's ranking among the peer states

Business climate indicator	US	IN	% Change 2000 to 2007 US	% Change 2000 to 2007 IN	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	8.50%	0.0%	150.0%	7
Individual income tax rate	10.0%-35.0%	3.40%	-33.3% - -11.6%	0.0%	2
Property tax rate	1.38%	2.12%	--	--	7
Sales tax rate	none	6.00%	--	20.0%	4
Employer unemployment insurance tax rate	0.66%	0.61%	24.5%	64.9%	5
Total state-local tax burden rate	9.90%	9.50%	4.2%	6.7%	4
Per capita total state-local taxes paid (US$)	$4,223	$3,459	35.8%	35.4%	3
Government debt as % of GDP/GSP	65.5%	7.8%	12.9%	90.2%	8
Per capita government spending (US$)	$14,327	$4,540	42.3%	36.1%	2
Nonfarm establishments (latest 2006)	7,601,160	151,283	7.5%	3.4%	7

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Indiana's rankings on business climate indicators range from good to average to poor. For example, from 2000 to 2007, Indiana's corporate tax rate increased 150 percent, from one of the lowest rates among the peer states to one of the highest. Indiana also has one of the highest property tax rates among the eight states analyzed—a rate that is nearly 50 percent more than the national average. More importantly, Indiana's dependence on public debt increased 90 percent during the study period, making it the worst among its peer in terms of debt to GSP. Conversely, Indiana has high rankings for per capita tax burden, government spending, and individual tax rate and an average ranking for unemployment and sales taxes.

III. Leading business and economic indices: Indiana's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	4	12
Best & Worst States [to do business] Survey (Chief Executive Magazine)	3	11
Competitiveness Index (Beacon Hill Institute)	8	44
Economic Competitiveness Index (American Legislative Exchange Council)	8	47
2007 State and Local Tax Burden (Public Policy Institute of New York)	4	23
Economic Freedom Index (Pacific Research Institute)	3	14
Small Business Survival Index (Small Business & Entrepreneurship Council)	4	20
2007 Cost-of-Doing-Business Index (Milken Institute)	2	14
State New Economy Index (Kauffman Foundation)	8	36
State Technology & Science Index (Milken Institute)	8	33

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix

Indiana ranked last among the peer states in four of ten leading indices cited, although it also ranked in the top tier in three of them. The two indices benchmarking overall competitiveness ranked Indiana 44th and 47th nationally, due in large part to both poor performance and inadequate infrastructure to support the knowledge economy, which includes financial, legal, design, and research workers. The dearth of available venture capital, the low number of patents generated, and the relatively small share of high-tech firms are reflected in the Kauffman and Milken Institute indices. However, the cost of doing business in Indiana is low as is the friendliness of its regulatory environment. Indiana also scores well in terms of its relatively low tax burden.

IV. Manufacturing indicators for U.S. and Indiana in 2007 and Indiana's ranking among the peer states

Manufacturing indicators	US	IN	% Change 2000 to 2007 US	% Change 2000 to 2007 IN	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	28.2%	-6.1%	-5.4%	6
High-tech manufacturing share of real GDP/GSP	4.8%	7.3%	39.3%	29.7%	4
Manufacturing employment (thousands)	13,882.6	549.97	-19.6%	-17.2%	7
High-tech manufacturing employment (thousands)	2,468.7	68.1	-19.4%	-5.4%	1
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	2.76%	2.0%	17.4%	1
Manufacturing wage per employee (US$)	$53,804	$51,340	25.3%	25.2%	5
Manufacturers' capital expenditures (US$ billions)	$135.8	$5.3	-12.3%	-13.3%	4
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$4.6	13.3%	72.8%	3
Real manufacturing output (US$ billions)	$1,571.7	$58.5	10.2%	1.1%	8
Real manufacturing output per worker (US$ thousands)	$113.6	$106.5	37.9%	22.0%	7
Value added per production worker (US$)	$249,139	$224,781	48.8%	39.8%	5
Exports of manufactured goods (US$ billions)	$1,022.1	$25.3	44.4%	68.6%	4

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a significant role in the growth of Indiana's economy. Its manufacturing real GSP totaled $58.5 billion, or 28.2 percent of the state's real GSP in 2007. Indiana's manufacturing GSP rose 1.1 percent from 2000 to 2007, most of it from non-high-tech manufacturing industries. Manufacturers' capital expenditures declined more than the U.S. average. This shows that Indiana manufacturers have reduced their investments in the expansion and upgrades of their plants and equipment.

Indiana was the nation's eighth-largest manufacturing state, with 550,000 manufacturing jobs, or 4 percent of the nation's total in 2007. Its manufacturing sector shed 114,500 jobs since 2000. Most of the job losses were in the transportation equipment and primary metal manufacturing industries. Though employment declined, the rates of decline in both high-tech and non-high-tech manufacturing were not as severe as the national average during the seven-year period. In fact, only high-tech manufacturing jobs rebounded after employment in the state's entire manufacturing sector bottomed out in 2003.

The state saw considerable gains in such industries as pharmaceutical and medicine manufacturing, adding 2,900 jobs since 2000 and more than 3,000 jobs since 1990. Another growth industry was medical equipment and supplies manufacturing, which added 4,800 jobs since 2000 and 5,500 jobs since 1990. The growth of these industries increased Indiana's share of the nation's high-tech manufacturing to 2.76 percent in 2007 compared with the U.S. average of 2 percent.

The average wage in Indiana's manufacturing sector was $51,300, less than in some of the peer states and the U.S. average but still a 25 percent increase since 2000. The value added per production worker in the state was $224,781 in 2007, also less than the U.S. average.

V. Indiana's public economic development initiatives

Public economic development incentives	Program
Corporate income tax exemption	Yes
Tax exemption on manufacturing machinery & equipment	Yes
State loans for machinery & equipment	Yes
Excise tax exemption	No
Tax exemption on manufacturers' inventories	Yes[49]
Property tax exemption	Yes[50]
Job creation tax credit	Yes[51]
Research and development tax exemption	Yes
State loan guarantees	Yes
Long-term state economic plan	No

Source: Site Selection Magazine, November 2008.

The clarity, comprehensiveness, and coordination of Indiana's efforts show its seriousness and vigor in building the economy. The state has a diverse yet strategic set of incentives designed to address the primary competitiveness challenges faced by manufacturers and business. In the design and deployment of programs, the state is relatively unrestricted in its use of direct grants, loans, tax credits, work force training incentives, and general business counsel and assistance. For example, from 2005 to 2007, Indiana's 21 Fund, which provides direct grants to high-tech start-up companies, gave 38 awards totaling nearly $43 million. Ninety percent of the funds were awarded to small companies. The state also provides tax credits for companies across all industries that are training employees to use the latest communication technologies to enhance productivity. And, subjectively speaking, Indiana has the best economic development website among the peer states.

49. Out-of-state shipments only.
50. No statewide exemptions although municipalities are authorized to provide exemptions.
51. Applies only to enterprise zones or other designated areas.

KANSAS

Top five indicators, 2007

Real gross state product	$96.5 billion
Per capita personal income	$25,197
Total exports of goods	$10.3 billion
Manufacturing's share of real GSP	15.9%
Real manufacturing output per worker	$82,835

I. Economic climate indicators for U.S. and Kansas in 2007 and Kansas's ranking among the peer states

Economic climate indicator	US	KS	% Change 2000 to 2007 US	% Change 2000 to 2007 KS	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$96.5	17.4%	16.6%	6
Total nonfarm employment (thousands, SA)	137,604.3	1,380.0	4.4%	2.5%	7
Total exports of goods (US$ billions)	$1,162.5	$10.3	48.7%	99.7%	2
Per capita personal income (US$)	$38,615	$25,197	29.4%	22.9%	7
Median household income (US$)	$50,740	$47,341	20.8%	16.5%	7

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Kansas's economy grew a modest 16.6 percent over seven years. The state contributed 0.8 percent to the U.S. real GDP in 2007. Its annual economic growth rate averaged 2.3 percent from 2000 to 2007, the same as the U.S. average. Total nonfarm employment expanded 2.5 percent in that period. The state rebounded fairly well from the last recession, adding 66,000 jobs since employment bottomed out in 2003. Though both per capita personal income and median household income rose over the seven-year period, both indicators lagged the peer states and national average.

Kansas's export activity doubled over the seven-year period. The total value of exports (based on the Origin of Movement series) was $10.3 billion in 2007. The state's top three export commodities were airplanes and aircraft, wheat, and whole hides and skins. The top three destinations for its exports were Canada, Mexico, and Japan.

II. Business climate indicators for U.S. and Kansas in 2007 and Kansas's ranking among the peer states

Business climate indicator	US	KS	% Change 2000 to 2007 US	% Change 2000 to 2007 KS	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	4.00% - 7.35%	0.0%	0.0% -83.8%	5
Individual income tax rate	10.0%-35.0%	3.5%-6.45%	-33.3% - -11.6%	0.0%	4
Property tax rate	1.38%	2.09%	--	--	5
Sales tax rate	none	5.30%	--	8.2%	2
Employer unemployment insurance tax rate	0.66%	0.48%	24.5%	11.6%	3
Total state-local tax burden rate	9.90%	9.90%	4.2%	6.5%	5
Per capita total state-local taxes paid (US$)	$4,223	$3,886	35.8%	41.9%	5
Government debt as % of GDP/GSP	65.5%	4.8%	12.9%	108.7%	4
Per capita government spending (US$)	$14,327	$4,749	42.3%	39.9%	5
Nonfarm establishments (latest 2006)	7,601,160	76,446	7.5%	2.0%	8

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Kansas ranks in the low to middle range for most indicators, making the comparative business climate no better or worse than the other peer states on average. Two indicators are of particular concern, however. The first is the percentage of government debt relative to GSP. Although on a percentage basis Kansas ranks in the middle, its level of debt to GSP increased by more than 108 percent during the study period—the greatest increase among the peer states. The second is the low number of new nonfarm establishments; Kansas ranked last among the peer states. From a tax perspective, Kansas increased corporate taxes by 83 percent, sales taxes by 8 percent, and unemployment taxes by 12 percent in the study period. In all three cases, Kansas's increases were a fair amount more than the national average. The increase in per capita tax burden was the highest among the peer states.

III. Leading business and economic indices: Kansas's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	6	33
Best & Worst States [to do business] Survey (Chief Executive Magazine)	4	21
Competitiveness Index (Beacon Hill Institute)	4	17
Economic Competitiveness Index (American Legislative Exchange Council)	6	42
2007 State and Local Tax Burden (Public Policy Institute of New York)	4	22
Economic Freedom Index (Pacific Research Institute)	1	1
Small Business Survival Index (Small Business & Entrepreneurship Council)	5	31
2007 Cost-of-Doing-Business Index (Milken Institute)	8	38
State New Economy Index (Kauffman Foundation)	7	31
State Technology & Science Index (Milken Institute)	7	24

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

The leading tax-related indices give Kansas relatively average marks, reflecting the fact that, although the state's per capita tax burden has increased substantially during the study period, taxes before 2000 were far lower than the national average. The difference between Kansas's rankings in the Beacon Hill and American Legislative Exchange Council competitiveness studies is because of ALEC's emphasis on the state's increasing tax level overall and Beacon Hill's emphasis on lower regulatory burdens. This relaxed regulation is also reflected in the Economic Freedom Index, in which Kansas was deemed to have the least onerous regulations in the nation. However, Kansas ranks near the bottom among peer states in terms of resources to leverage the knowledge economy, which includes financial, legal, design, and research workers.

IV. Manufacturing indicators for U.S. and Kansas in 2007 and Kansas's ranking among the peer states

Manufacturing indicators	US	KS	% Change 2000 to 2007 US	% Change 2000 to 2007 KS	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	15.9%	-6.1%	-4.4%	5
High-tech manufacturing share of real GDP/GSP	4.8%	6.5%	39.3%	1.9%	7
Manufacturing employment (thousands)	13,882.6	185.5	-19.6%	-7.5%	1
High-tech manufacturing employment (thousands)	2,468.7	53.1	-19.4%	-9.2%	2
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	2.15%	2.0%	12.6%	2
Manufacturing wage per employee (US$)	$53,804	$48,558	25.3%	25.3%	4
Manufacturers' capital expenditures (US$ billions)	$135.8	$1.9	-12.3%	51.8%	1
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$2.0	13.3%	74.8%	2
Real manufacturing output (US$ billions)	$1,571.7	$15.4	10.2%	11.4%	5
Real manufacturing output per worker (US$ thousands)	$113.6	$82.8	37.9%	20.2%	8
Value added per production worker (US$)	$249,139	$207,944	48.8%	43.4%	4
Exports of manufactured goods (US$ billions)	$1,022.1	$9.0	44.4%	92.4%	2

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in Kansas's economic growth. Its manufacturing real GSP totaled $15.4 billion, or 15.9 percent of real GSP in 2007. Manufacturing real GSP rose 11.4 percent from 2000 to 2007, most of it from non-high-tech manufacturing industries. Kansas's manufacturers' capital spending grew, one of just two peer states where that area increased. This shows that Kansas manufacturers increased their investments in the expansion and upgrades of their plants and equipment.

Manufacturing employment in Kansas totaled 185,500 jobs in 2007. Though employment declined, the rates of decline in both high-tech and non-high-tech manufacturing were not as severe as the national average during the seven-year study period. In fact, employment in both high-tech and non-high-tech manufacturing rebounded after the state's entire manufacturing sector bottomed out in 2003, though high-tech employment is growing faster.

The leading manufacturing industries in Kansas were transportation equipment and food. Manufacturing employment totaled 185,500 jobs, or 1.3 percent of the U.S. total, in 2007. Makers of transportation equipment, mostly aerospace-related, employed 27.5 percent of the manufacturing work force, while food manufacturers employed 17.2 percent. The aerospace industry and navigational, measuring, electromedical, and control instruments industry together have added nearly 7,000 manufacturing jobs since 2003, a period of increased demand for aircraft. The growth of these industries, in addition to semiconductors and communications equipment, increased Kansas's share of high-tech manufacturing employment to 2.15 percent in 2007 versus the U.S. average of 2.0 percent.

The average manufacturing wage in Kansas was $48,600, an increase of 25.3 percent since 2000. Although the average wage for manufacturing employees in the state was lower than in some of the peer states and the U.S. average, the growth rate was in line with the national average of 25.3 percent for the seven-year period. The value added per production worker in the state was $207,944 in 2007, less than the U.S. average.

V. Kansas's public economic development incentives

Public incentives	Rank
Corporate income tax exemption	Yes[52]
Tax exemption on manufacturing machinery equipment	Yes[53]
State loans for equipment and machinery	No
Excise tax exemption	No
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	Yes
Job creation tax credit	Yes
Research and development tax exemption	Yes
State loan guarantees	No
Long-term state economic plan	Yes

Source: Site Selection Magazine, November 2008.

Kansas's incentives have focused primarily on work force development. For example, the state has led an innovative collaboration between its universities and community and technical colleges to help meet businesses' work force demands, including the development of training programs and the screening and evaluation of potential employees. The state also provides tax credits to companies for a range of employee training and recruitment expenses, including textbooks and training manuals, the use of temporary training facilities, and curriculum planning. Most of the state's economic development funding focuses on financial assistance to cities and counties, such as low-interest loans for infrastructure improvements or community development block grants. However, these and a number of other programs come with many restrictions and reporting requirements, and most of the tax credits are capped at relatively small amounts. For example, the state allows for a job creation tax credit, but it is just $2,500 per new job, and its investment tax credit is only 1 percent of qualified investment.

52. Amount varies depending on metro versus rural areas.
53. Cities and counties can include buildings, land, and other tangible property.

MINNESOTA

Top five indicators, 2007

Real gross state product	$214.9 billion
Per capita personal income	$41,105
Total exports of goods	$18.1 billion
Manufacturing's share of real GSP	15.8%
Real manufacturing output per worker	$99,196

I. Economic climate indicators for U.S. and Minnesota in 2007 and Minnesota's ranking among the peer states

Economic climate indicator	US	MN	% Change 2000 to 2007 US	% Change 2000 to 2007 MN	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$214.9	17.4%	16.1%	7
Total nonfarm employment (thousands, SA)	137,604.3	2,771.4	4.4%	3.2%	6
Total exports of goods (US$ billions)	$1,162.5	$18.1	48.7%	75.3%	3
Per capita personal income (US$)	$38,615	$41,105	29.4%	28.4%	4
Median household income (US$)	$50,740	$55,664	20.8%	18.2%	6

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Minnesota's economy grew by a decent 16.1 percent from 2000 to 2007 and contributed 1.9 percent to the U.S. real GDP in 2007. Its annual growth rate averaged 2.5 percent, slightly more than the U.S. average of 2.3 percent over the same period. Minnesota's total nonfarm employment, which grew by 3.2 percent, rebounded fairly well from the last recession, adding more than 111,500 jobs since employment bottomed out in 2003. Per capita personal income and median household income rose over the seven-year period, and both were more than the national average.

Minnesota's exports grew significantly in the seven-year period. The total value of exports (based on the Origin of Movement series) was $18.1 billion in 2007. The top three exported commodities were artificial body parts and accessories, motor vehicle parts and accessories, and parts for automatic data processing machines. The top three destinations for Minnesota exports in 2007 were Canada, China, and Japan.

II. Business climate indicators for U.S. and Minnesota in 2007 and Minnesota's ranking among the peer states

Business climate indicator	US	MN	% Change 2000 to 2007 US	% Change 2000 to 2007 MN	Rank
Corporate income tax rate	15.0%-35.0%	9.80%	0.0%	0.0%	8
Individual income tax rate	10.0%-35.0%	5.35%-7.85%	-33.3% - -11.6%	-2.7% - -1.9%	6
Property tax rate	1.38%	1.27%	--	--	6
Sales tax rate	none	6.50%	--	0.0%	7
Employer unemployment insurance tax rate	0.66%	0.77%	24.5%	67.4%	2
Total state-local tax burden rate	9.90%	10.40%	4.2%	2.0%	5
Per capita total state-local taxes paid (US$)	$4,223	$4,599	35.8%	29.1%	2
Government debt as % of GDP/GSP	65.5%	3.5%	12.9%	16.7%	2
Per capita government spending (US$)	$14,327	$6,134	42.3%	29.3%	7
Nonfarm establishments (latest 2006)	7,601,160	151,150	7.5%	8.7%	5

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Minnesota's tax rates are some of the highest among the peer states. Across the broad-based taxes—corporate, individual, property, and sales—the state has either the highest or nearly the highest rates. The state also has one of the highest government spending per capita rates; higher tax rates are needed to fund the increasing size of government. Two categories in which the state ranks well are per capita GSP government debt and per capita tax burden. However, from an economic development perspective, high tax rates, even though the per capita tax burden is low, is a widely accepted indication of a higher-cost state for business, especially when the rates are going up to support bigger government. Another poor showing is Minnesota's fifth-place ranking in the growth of nonfarm business establishments during the study period.

III. Leading business and economic indices: Minnesota's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	7	42
Best & Worst States [to do business] Survey (Chief Executive Magazine)	6	32
Competitiveness Index (Beacon Hill Institute)	1	6
Economic Competitiveness Index (American Legislative Exchange Council)	6	34
2007 State and Local Tax Burden (Public Policy Institute of New York)	2	13
Economic Freedom Index (Pacific Research Institute)	7	44
Small Business Survival Index (Small Business & Entrepreneurship Council)	7	46
2007 Cost-of-Doing-Business Index (Milken Institute)	2	13
State New Economy Index (Kauffman Foundation)	3	14
State Technology & Science Index (Milken Institute)	3	11

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

According to the tax-related indices, Minnesota has some of the highest rates not just among peer states but in the nation as a whole. The state's performance on competitiveness varies based on the methodology used, a reflection of how the two studies weight states' regulatory environments. The Small Business Survival and Economic Freedom indices focus intensely on regulatory climate, and both indices rank Minnesota's regulations among the most onerous in the country. However, the state's strength in infrastructure to support the knowledge economy—fields such as financial, legal, design, and research—is reflected in positive rankings by the Kauffman Foundation and Milken Institute studies.

IV. Manufacturing indicators for U.S. and Minnesota in 2007 and Minnesota's ranking among the peer states

Manufacturing indicators	US	MN	% Change 2000 to 2007 US	% Change 2000 to 2007 MN	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	15.8%	-6.1%	1.7%	3
High-tech manufacturing share of real GDP/GSP	4.8%	5.6%	39.3%	87.3%	2
Manufacturing employment (thousands)	13,882.6	341.2	-19.6%	-14.0%	6
High-tech manufacturing employment (thousands)	2,468.7	77.1	-19.4%	-12.6%	4
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	3.12%	2.0%	8.3%	4
Manufacturing wage per employee (US$)	$53,804	$52,765	25.3%	25.8%	3
Manufacturers' capital expenditures (US$ billions)	$135.8	$2.8	-12.3%	-4.3%	3
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$6.3	13.3%	70.3%	4
Real manufacturing output (US$ billions)	$1,571.7	$33.9	10.2%	18.1%	4
Real manufacturing output per worker (US$ thousands)	$113.6	$99.2	37.9%	37.1%	5
Value added per production worker (US$)	$249,139	$222,051	48.8%	35.5%	6
Exports of manufactured goods (US$ billions)	$1,022.1	$16.3	44.4%	71.5%	3

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in the growth of Minnesota's economy. Its manufacturing real GSP totaled $33.9 billion, or 15.8 percent of the state's real GSP in 2007. The state's manufacturing real GSP rose 18.1 percent from 2000 to 2007, most of it from non-high-tech manufacturing industries. Manufacturers' capital expenditures contracted less than the national average, showing that Minnesota manufacturers decreased their investments in the expansion and upgrades of plants and equipment.

Manufacturing employment in Minnesota totaled 341,200 jobs, or 2.5 percent of the nation's total in 2007, about the same as in 1990. Although the level of employment was the same in both years, Minnesota had a bigger share of U.S. manufacturing jobs in 2007: 2.5 percent compared with 1.9 percent in 1990. Though employment declined, the rates of decline in both high-tech and non-high-tech manufacturing were not as severe as the national average during the seven-year period. In fact, employment in high-tech manufacturing rebounded modestly after manufacturing employment bottomed out in 2003.

Most job losses from 2000 to 2007 were in the computer and electrical product and fabricated metal product industries. However, the state made considerable gains in other high-tech manufacturing industries such as navigational, measuring, electromedical, and control instruments manufacturing, which has added 1,400 jobs since 2000 and 5,400 jobs since 1990. Medical equipment and supplies manufacturing has added 3,700 jobs

since 2000 and 6,500 jobs since 1990. The growth has increased Minnesota's share of the nation's high-tech manufacturing from 2.9 percent in 2000 to 3.1 percent in 2007.

The average manufacturing wage in Minnesota was $52,800, slightly less than the U.S. average, but still a 25.8 percent increase since 2000. The value added per production worker was $222,051 in 2007, less than the U.S. average.

V. Minnesota's public economic development incentives

Public incentives	Rank
Corporate income tax exemption	Yes[54]
Tax exemption on manufacturing machinery equipment	Yes
State loans for equipment and machinery	Yes
Excise tax exemption	Yes
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	Yes
Job creation tax credit	Yes
Research and development tax exemption	Yes
State loan guarantees	Yes
Long-term state economic plan	No

Source: Site Selection Magazine, November 2008.

Minnesota has emphasized "robust" public-private collaborations among economic developers, utilities, private firms, and the Minnesota Department of Employment and Economic Development to help businesses grow. A key focus for one such partnership is to promote Minnesota and its business economy at the local, regional, and national levels. The state provides financial assistance to businesses through an innovative program that awards competitive grants to local governments that leverage the funds to offer low-interest loans to companies expanding or locating in the area. Loans up to $5 million may be made to any one business as long as 20 percent of the project costs are privately financed through equity or other sources. Tax incentives focus primarily on encouraging investment in innovative businesses in Minnesota border cities to combat the loss of businesses to neighboring states. A novel service provided by the state is E-Verify, an Internet-based system that helps employers electronically verify the employment eligibility of prospective employees.

54. Income, sales, property taxes, and investment earnings are exempt for firms in selected zones and certain biotechnology companies.

OREGON

Top five indicators, 2007

Real gross state product	$143.7 billion
Per capita personal income	$35,143
Total exports of goods	$16.5 billion
Manufacturing's share of real GSP	32.1%
Real manufacturing output per worker	$226,709

I. Economic climate indicators for U.S. and Oregon in 2007 and Oregon's ranking among the peer states

	US	OR	% Change 2000 to 2007 US	% Change 2000 to 2007 OR	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$143.7	17.4%	27.8%	2
Total nonfarm employment (thousands, SA)	137,604.3	1,731.4	4.4%	7.0%	4
Total exports of goods (US$ billions)	$1,162.5	$16.5	48.7%	44.5%	6
Per capita personal income (US$)	$38,615	$35,143	29.4%	25.1%	6
Median household income (US$)	$50,740	$48,735	20.8%	19.1%	4

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Oregon's economy grew an impressive 27.8 percent over seven years. The state contributed 1.2 percent to the U.S. real GDP in 2007. Its annual economic growth averaged 4.1 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent. Oregon's work force has grown modestly, with total nonfarm employment at more than 1.7 million in 2007. Though per capita personal income in the state rose to $35,143—a 25.1 percent increase over seven years—it was less than the U.S. average. At $48,735 in 2007, median household income also lagged the national average.

Oregon's exports increased in the past seven years. The total value of exports (based on the Origin of Movement series) was $16.5 billion in 2007. The top three commodities exported were processors and controllers, wheat, and electronic integrated circuits. The top three destinations for its exports in 2007 were Canada, Japan, and China.

II. Business climate indicators for U.S. and Oregon in 2007 and Oregon's ranking among the peer states

Business climate indicator	US	OR	% Change 2000 to 2007 US	% Change 2000 to 2007 OR	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	6.60%	0.0%	0.0%	2
Individual income tax rate	10.0%-35.0%	5.0% -9.0%	-33.3% - -11.6%	0.0%	7
Property tax rate	1.38%	1.22%	--	--	3
Sales tax rate	none	none	--	--	1
Employer unemployment insurance tax rate	0.66%	1.16%	24.5%	-4.1%	8
Total state-local tax burden rate	9.90%	9.60%	4.2%	0.0%	4
Per capita total state-local taxes paid (US$)	$4,223	$3,701	35.8%	26.7%	3
Government debt as % of GDP/GSP	65.5%	7.1%	12.9%	29.1%	7
Per capita government spending (US$)	$14,327	$5,499	42.3%	19.2%	5
Nonfarm establishments (latest 2006)	7,601,160	110,684	7.5%	10.0%	2

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Oregon has one of the most favorable tax structures of the peer states. With the exception of income and unemployment insurance taxes, Oregon has kept its taxes fairly low, giving it one of the lower per capita tax burdens. However, the state's percentage of government debt to GSP increased roughly 30 percent during the study period, placing Oregon near the bottom compared with the peer states. The state's per capita government spending also increased during this period. But based on Oregon's strong 10 percent increase in new nonfarm establishments, its additional borrowing and increase in per capita spending was invested, at least in part, in job creation.

III. Leading business and economic indices: Oregon's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	2	10
Best & Worst States [to do business] Survey (Chief Executive Magazine)	4	24
Competitiveness Index (Beacon Hill Institute)	3	14
Economic Competitiveness Index (American Legislative Exchange Council)	5	29
2007 State and Local Tax Burden (Public Policy Institute of New York)	6	34
Economic Freedom Index (Pacific Research Institute)	5	29
Small Business Survival Index (Small Business & Entrepreneurship Council)	6	32
2007 Cost-of-Doing-Business Index (Milken Institute)	6	29
State New Economy Index (Kauffman Foundation)	5	15
State Technology & Science Index (Milken Institute)	6	23

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

Compared to the peer states, Oregon ranks in the middle to low range on the majority of indices, although its low corporate, property, and sales tax rates earn it some positive scores. Oregon's ranking on indices more focused on regulation is poor compared with peer state and even the nation. The level of regulation often correlates to the size and expense of government, which are also factors in the competitiveness-related indices. Oregon performs comparatively better nationally in terms of science and technology or new economy infrastructure, although it ranks low among peer states.

IV. Manufacturing indicators for U.S. and Oregon in 2007 and Oregon's ranking among the peer states

Manufacturing indicators	US	OR	% Change 2000 to 2007 US	% Change 2000 to 2007 OR	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	32.1%	-6.1%	65.8%	1
High-tech manufacturing share of real GDP/GSP	4.8%	25.1%	39.3%	153.6%	1
Manufacturing employment (thousands)	13,882.6	204.42	-19.6%	-9.13%	2
High-tech manufacturing employment (thousands)	2,468.7	49.5	-19.4%	-11.0%	3
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	2.00%	2.0%	10.5%	3
Manufacturing wage per employee (US$)	$53,804	$51,904	25.3%	18.7%	7
Manufacturers' capital expenditures (US$ billions)	$135.8	$1.8	-12.3%	-33.2%	8
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$3.3	13.3%	97.0%	1
Real manufacturing output (US$ billions)	$1,571.7	$46.1	10.2%	111.9%	1
Real manufacturing output per worker (US$ thousands)	$113.6	$226.7	37.9%	135.1%	1
Value added per production worker (US$)	$249,139	$316,417	48.8%	78.7%	1
Exports of manufactured goods (US$ billions)	$1,022.1	$13.7	44.4%	36.5%	6

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in the growth of Oregon's economy. Its manufacturing real GSP totaled $46.1 billion, or 32.1 percent of the state's real GSP in 2007. Oregon's manufacturing real GSP rose considerably—112 percent—from 2000 to 2007, mostly from high-tech manufacturing industries. Oregon benefits from its proximity to Washington, with its big aerospace industry and the Seattle/Tacoma ports. Industrial research and development spending grew by an astonishing 97 percent in the study period. However, manufacturers' capital expenditures declined by more than the U.S. average. This shows that Oregon manufacturers overall have reduced their investments in the expansion and upgrades of plants and equipment.

Oregon's manufacturing employment totaled 204,400 jobs in 2007, about the same as in 1990. The manufacturing sector also struggled when the tech bubble burst in 2000, given that computer and electrical products are its top manufacturing industries. Although the number of jobs was roughly the same both years, Oregon's share of the nation's manufacturing work force was slightly bigger in 2007, at 1.5 percent versus 1.2 percent in 1990. Oregon manufacturing maintained a relatively steady level of employment, recovering modestly from the 1991 and 2001 recessions when most states had not. Most of the recent gains in Oregon manufacturing were from transportation equipment (motor vehicle body and aerospace products and parts) and medical equipment and supplies. Oregon's share of U.S. high-tech manufacturing employment was 2.0 percent in 2007, the national average.

The average wage for the manufacturing sector in Oregon was $51,900 in 2007, a 19 percent increase since 2000, less than the national average. The value added per production worker in the state was $316,417 in 2007, more than the U.S. and California averages.

V. Oregon's public economic development incentives

Public incentives	Program
Corporate income tax exemption	(no tax)
Tax exemption on manufacturing machinery equipment	Yes[55]
State loans for equipment and machinery	Yes
Excise tax exemption	Yes
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	Yes[56]
Job creation tax credit	No
Research and Development tax exemption	Yes
State loan guarantees	Yes
Long-term state economic plan	Yes

Source: Site Selection Magazine, November 2008.

Oregon has the most comprehensive and long-term-focused set of initiatives among the peers states and likely the best economic strategy in the nation. The Oregon Inc initiative is based on a carefully thought-out plan that leverages the state's natural strengths and enhances them through multiple layers of collaboration among business, government, and academic sectors. For example, the Oregon Nanoscience and Microtechnologies Institute, sponsored by a combination of government and private-sector funding, is a seamless collaboration among three Oregon universities to develop and commercialize new products. Many states are attempting to create similar clusters for specific sectors with high-growth potential, but Oregon is one of the only ones providing planning grants and other resources to this end. In addition to the cross-industry and sector collaborations the state is fostering, Oregon is creating what it calls "leveraged learning networks" among firms in the same sector, some of which may be competitors but nevertheless share resources for their common benefit.

Oregon is truly an innovator in its approach to economic development, but many of the incentives Oregon provides, such as targeted tax credits, business assistance services, and low-cost access to capital, are common in leading states. What sets Oregon apart are the level of coordination between various agencies and jurisdictions, the depth of its collaborations across sectors and industry groups, and the emphasis on investing in the infrastructure that will pay high dividends to the economy over the long term. One of the most important aspects of the state's strategy, yet one of the hardest to quantify, is the level of creativity and ingenuity in its approach. And in specific regard to manufacturing, Oregon is the only peer state with a Web portal—and a useful one at that—dedicated solely to the needs of the manufacturing industry.

55. While facility is under construction only.
56. Ibid.

TEXAS

Top five indicators, 2007

Real gross state product	$903.4 billion
Per capita personal income	$37,083
Total exports of goods	$168.2 billion
Manufacturing's share of real GSP	15.8%
Real manufacturing output per worker	$153,086

I. Economic climate indicators for U.S. and Texas in 2007 and Texas's ranking among the peer states

Economic climate indicator	US	TX	% Change 2000 to 2007 US	% Change 2000 to 2007 TX	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$903.4	17.4%	24.2%	3
Total nonfarm employment (thousands, SA)	137,604.3	10,395.0	4.4%	10.2%	2
Total exports of goods (US$ billions)	$1,162.5	$168.2	48.7%	62.0%	5
Per capita personal income (US$)	$38,615	$37,083	29.4%	31.0%	1
Median household income (US$)	$50,740	$47,563	20.8%	19.1%	5

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

As the third-largest economy in the United States, Texas contributed 7.8 percent to the U.S. real GDP in 2007. Its annual economic growth rate averaged 3.3 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent. Texas has a large labor force with total nonfarm employment at 10.4 million in 2007. Per capita personal income rose to $37,083—a 31 percent increase over seven years—which was slightly less than the U.S. average. Median household income was also less than the national average at $47,563 in 2007.

Texas had the largest value of exports at $168.2 billion (based on the Origin of Movement series). The state's top three commodities were oil (non-crude) from petrol and bitum mineral, parts for boring or sinking machinery, and light oil and prep (non-crude) from petrol and bitum. The top three destinations were Mexico, Canada, and China.

II. Business climate indicators for U.S. and Texas in 2007 and Texas's ranking among the peer states

Business climate indicator	US	TX	% Change 2000 to 2007 US	% Change 2000 to 2007 TX	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	1.00%	0.0%	--	2
Individual income tax rate	10.0%-35.0%	none	-33.3% - -11.6%	--	1[57]
Property tax rate	1.38%	2.57%	--	--	8
Sales tax rate	none	6.25%	--	0.0%	5[58]
Employer unemployment insurance tax rate	0.66%	0.45%	24.5%	21.6%	2
Total state-local tax burden rate	9.90%	8.30%	4.2%	3.8%	1
Per capita total state-local taxes paid (US$)	$4,223	$3,428	35.8%	38.3%	2
Government debt as % of GDP/GSP	65.5%	2.1%	12.9%	-19.2%	1
Per capita government spending (US$)	$14,327	$3,791	42.3%	30.8%	1
Nonfarm establishments (latest 2006)	7,601,160	509,080	7.5%	8.0%	6

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Texas has aggressively reduced its overall tax burden, giving it the lowest tax profile in the nation. Although Texas has the highest property tax rate among the peer states, its per capita tax burden is one of the lowest even though the burden increased by the second-highest amount during the study period. The state also maintains tight fiscal controls. It has the lowest percentage of government debt to GSP and was the only peer state where the rate decreased. Per capita government spending is also very low. Despite this favorable tax climate, Texas ranked sixth in new nonfarm establishments.

57. Tied with Washington.
58. Tied with California.

III. Leading business and economic indices: Texas's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	1	8
Best & Worst States [to do business] Survey (Chief Executive Magazine)	1	1
Competitiveness Index (Beacon Hill Institute)	6	20
Economic Competitiveness Index (American Legislative Exchange Council)	1	1
2007 State and Local Tax Burden (Public Policy Institute of New York)	1	10
Economic Freedom Index (Pacific Research Institute)	4	17
Small Business Survival Index (Small Business & Entrepreneurship Council)	2	6
2007 Cost-of-Doing-Business Index (Milken Institute)	5	26
State New Economy Index (Kauffman Foundation)	6	18
State Technology & Science Index (Milken Institute)	6	20

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

Texas has the strongest rankings among the peer states in taxation, regulation, and competitiveness, and two indices ranked it best in the nation. These rankings reflect a sustained period of aggressive policymaking to reduce overall government intervention. Texas is less successful than its peers on indices benchmarking the knowledge economy infrastructure.

IV. Manufacturing indicators for U.S. and Texas in 2007 and Texas's ranking among the peer states

Manufacturing indicators	US	TX	% Change 2000 to 2007 US	% Change 2000 to 2007 TX	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	15.8%	-6.1%	23.8%	2
High-tech manufacturing share of real GDP/GSP	4.8%	6.3%	39.3%	86.1%	3
Manufacturing employment (thousands)	13,882.6	934.4	-19.6%	-12.5%	4
High-tech manufacturing employment (thousands)	2,468.7	184.1	-19.4%	-23.1%	8
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	7.46%	2.0%	-4.5%	8
Manufacturing wage per employee (US$)	$53,804	$60,421	25.3%	30.3%	1
Manufacturers' capital expenditures (US$ billions)	$135.8	$12.8	-12.3%	-16.3%	5
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$12.4	13.3%	38.8%	5
Real manufacturing output (US$ billions)	$1,571.7	$143.1	10.2%	53.9%	2
Real manufacturing output per worker (US$ thousands)	$113.6	$153.1	37.9%	75.7%	2
Value added per production worker (US$)	$249,139	$347,557	48.8%	74.5%	2
Exports of manufactured goods (US$ billions)	$1,022.1	$158.2	44.4%	59.5%	5

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing plays a major role in the growth of Texas's economy. Its manufacturing real GSP totaled $143.1 billion, contributing 15.8 percent to the state's real GSP—second to California—or 9.1 percent of the U.S. manufacturing real GDP in 2007. The state's manufacturing real GSP climbed 54 percent from 2000 to 2007. Industrial research and development expenditures in the state have grown by 38.8 percent from 2000 to 2007. However, manufacturers' capital spending declined by more than the U.S. average, showing that Texas manufacturers have reduced investments in the expansion and upgrades of their plants and equipment.

The second-largest manufacturing state in the nation, Texas employed 7 percent of the nation's manufacturing workers in 2007. The state's manufacturers provided more than 934,400 jobs, adding more than 43,000 jobs since 2004, when Texas manufacturing employment bottomed out. Though the state registered a net loss in manufacturing jobs from 2000 and 2007, both high-tech and non-high-tech manufacturing rebounded after 2004, with non-high-tech jobs growing faster.

Most job gains came from fabricated metal products (architectural/structural metals and screws, nuts, and bolts), machinery (agriculture, construction, and mining machineries), and transportation equipment (motor vehicle and aerospace products and parts manufacturing). Though Texas has added manufacturing jobs in recent years, it has lost more than 133,000 since 2000, mostly from the tech crash and layoffs at Dell and Compaq in 2001. Despite its large manufacturing base, Texas's share of manufacturing employment, especially in high-tech manufacturing, is slipping. Its piece of U.S. high-tech manufacturing employment was 7.46 percent in 2007, higher than the national average.

Because of the number of workers in high-tech manufacturing, Texas's average manufacturing wage was higher than in most states. Its average manufacturing wage was $60,400 in 2007, a 30 percent increase from 2000 and a 105 percent surge from 1990. Technological advances coupled with a high-skilled work force made Texas one of the top states in productivity. The value added per production worker was more than $347,557 in 2007, more than the California and U.S. averages.

V. Texas's public economic development incentives

Public incentives	Rank
Corporate income tax exemption	Yes
Tax exemption on manufacturing machinery equipment	Yes[59]
State loans for equipment and machinery	Yes
Excise tax exemption	No
Tax exemption on manufacturers' inventories	No
Property tax exemption	Yes[60]
Job creation tax credit	Yes[61]
Research and development tax exemption	Yes
State loan guarantees	Yes
Long-term state economic plan	Yes

Source: Site Selection Magazine, November 2008.

Texas depends heavily on the oil sector, which has created economic and fiscal challenges because the commodity is more susceptible to volatility in the global oil markets. To diversify, the state has created several funds to help build manufacturing and other sectors. The Texas Manufacturing Assistance Center, or TMAC, helps identify problems in manufacturing processes, recommends solutions and helps execute projects. Through a concerted effort across state government, Texas has created one of the most robust, diverse, and well-funded economic development funding platforms in the country. For example:

- The Texas Capital Fund Real Estate Development Program provides financial resources to communities not in enterprise zones. Funds must be used for real estate development (acquisitions, construction, and rehabilitation) to assist a business.

- The Texas Capital Fund Infrastructure Program is an economic development tool designed to provide financial resources to enterprise zone communities.

- The Texas Enterprise Fund provides the state's leaders with a "deal-closing fund." The fund can be used for a variety of economic development projects, including infrastructure and community development, job training, and business incentives.

59. Only if it is for use in newly annexed areas.
60. Applies only to newly annexed areas.
61. Within enterprise zones or "strategic" areas only.

- The Texas Legislature created a program to help develop large-scale manufacturing, research and development, and renewable-energy capital investment projects. Projects could be eligible for up to $100 million in tax incentives, depending on the level of matching private investment.

- The Texas Emerging Technology Program is designed to create jobs and grow the economy over the long term by expediting the development and commercialization of new technologies and attracting and creating jobs in technology fields. The $200 million fund is one of the largest in the country.

WASHINGTON

Top five indicators, 2007

Real gross state product	$261.1 billion
Per capita personal income	$41,203
Total exports of goods	$66.4 billion
Manufacturing's share of real GSP	10.5%
Real manufacturing output per worker	$95,078

I. Economic climate indicators for U.S. and Washington in 2007 and Washington's ranking among the peer states

Economic climate indicator	US	WA	% Change 2000 to 2007 US	% Change 2000 to 2007 WA	Rank (1-8)
Real gross domestic product (US$ billions)	$11,523.9	$261.1	17.4%	17.6%	5
Total nonfarm employment (thousands, SA)	137,604.3	2,933.7	4.4%	8.2%	3
Total exports of goods (US$ billions)	$1,162.5	$66.4	48.7%	106.0%	1
Per capita personal income (US$)	$38,615	$41,203	29.4%	29.7%	2
Median household income (US$)	$50,740	$55,628	20.8%	21.5%	5

Note: Data shown are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau, Milken Institute.

Washington's economy grew by 17.6 percent in seven years and contributed 2.3 percent to the U.S. real GDP in 2007. Its annual economic growth rate averaged 2.2 percent from 2000 to 2007, compared with the U.S. average of 2.3 percent during the same period. Washington's work force has grown modestly, with total nonfarm employment at more than 2.9 million in 2007. Per capita personal income in the state rose to $41,203—a 29.7 percent increase over seven years—and was more than the U.S. average. At $55,628, median household income also beat the national average.

Washington's exports more than doubled in the past seven years. The total value of exports (based on the Origin of Movement series) was $66.4 billion in 2007. The top three commodities were airplanes, airplane and helicopter parts, and soybeans, and the top three destinations were China, Japan, and Canada.

II. Business climate indicators for U.S. and Washington in 2007 and Washington's ranking among the peer states

Business climate indicator	US	WA	% Change 2000 to 2007 US	% Change 2000 to 2007 WA	Rank (1-8)
Corporate income tax rate	15.0%-35.0%	none	0.0%	--	1
Individual income tax rate	10.0%-35.0%	none	-33.3% - -11.6%	--	1
Property tax rate	1.38%	1.13%	--	--	2
Sales tax rate	none	6.50%	--	0.0%	7[62]
Employer unemployment insurance tax rate	0.66%	1.12%	24.5%	-0.9%	7
Total state-local tax burden rate	9.90%	9.10%	4.2%	7.1%	3
Per capita total state-local taxes paid (US$)	$4,223	$4,248	35.8%	34.0%	6
Government debt as % of GDP/GSP	65.5%	6.8%	12.9%	28.3%	6
Per capita government spending (US$)	$14,327	$5,738	42.3%	30.6%	6
Nonfarm establishments (latest 2006)	7,601,160	179,908	7.5%	9.7%	4

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst.
Sources: Bureau of Economic Analysis, The Tax Foundation, U.S. Census Bureau, U.S. Office of Management and Budget, Milken Institute.

Washington is the only peer state without corporate or income taxes. It also has one of the lowest property tax rates and a low total tax burden even though its per capita tax burden increased more than any other state during the study period. Despite Washington's low tax profile, per capita government spending is relatively high. The vast majority of revenue comes from sales taxes; Washington is tied with Minnesota for the highest rate. Because of its high per capita personal income, strong consumer spending and a high sales tax rate generate large amounts of sales tax revenue. However, the state also has one of the higher percentages of debt to GSP among the peer states.

62. Tied with Minnesota.

III. Leading business and economic indices: Washington's ranking among the peer states and nationally

Leading business and economic indices	Peer state rank	National rank
State Business Tax Climate Index (Tax Foundation)	4	11
Best & Worst States [to do business] Survey (Chief Executive Magazine)	7	40
Competitiveness Index (Beacon Hill Institute)	2	7
Economic Competitiveness Index (American Legislative Exchange Council)	2	5
2007 State and Local Tax Burden (Public Policy Institute of New York)	6	32
Economic Freedom Index (Pacific Research Institute)	6	31
Small Business Survival Index (Small Business & Entrepreneurship Council)	1	5
2007 Cost-of-Doing-Business Index (Milken Institute)	6	35
State New Economy Index (Kauffman Foundation)	1	2
State Technology & Science Index (Milken Institute)	2	5

Note: Indices cited were published in 2008, unless otherwise stated. Some index rankings results were reversed from published rank in order to make them consistent across the different indices as presented here. The rankings are among the eight peer states, 1 = best and 8 = worst.
Source: See appendix.

Because the indices differ in how they weight different taxes, Washington's rankings on similar indices vary. For example, despite having no corporate or income taxes, the state's high sales tax rate causes Washington to rank low in terms of tax burden. On the other hand, it ranks high on indices that give more weight to states with low business-related taxes. The state does get low rankings from the Economic Freedom Index, but that is likely because of more restrictive labor regulations and laws favorable to labor unions. In terms of knowledge economy infrastructure, Washington ranks higher than any other peer state and is one of the highest-ranked states nationally.

IV. Manufacturing indicators for U.S. and Washington in 2007 and Washington's ranking among the peer states

Manufacturing indicators	US	WA	% Change 2000 to 2007 US	% Change 2000 to 2007 WA	Rank (1-8)
Manufacturing share of real GDP/GSP	13.6%	10.5%	-6.1%	-7.8%	7
High-tech manufacturing share of real GDP/GSP	4.8%	5.1%	39.3%	1.4%	8
Manufacturing employment (thousands)	13,882.6	293.2	-19.6%	-11.7%	3
High-tech manufacturing employment (thousands)	2,468.7	110.2	-19.4%	-13.3%	5
Share of U.S. high-tech manufacturing employment	2.00% (U.S. avg.)	4.46%	2.0%	7.7%	5
Manufacturing wage per employee (US$)	$53,804	$60,515	25.3%	21.7%	6
Manufacturers' capital expenditures (US$ billions)	$135.8	$3.0	-12.3%	14.9%	2
Industrial R&D expenditures (US$ billions, 2005)	$226.2	$9.7	13.3%	5.1%	8
Real manufacturing output (US$ billions)	$1,571.7	$27.5	10.2%	8.5%	7
Real manufacturing output per worker (US$ thousands)	$113.6	$95.1	37.9%	23.2%	6
Value added per production worker (US$)	$249,139	$295,559	48.8%	62.6%	3
Exports of manufactured goods (US$ billions)	$1,022.1	$57.4	44.4%	100.3%	1

Note: Data are 2007 figures, unless stated otherwise. The rankings are among the eight peer states, 1 = best and 8 = worst, based on the growth rate from 2000 to 2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, The National Science Foundation, U.S. Census Bureau, Milken Institute.

Manufacturing is a key player in Washington's economic growth. Its manufacturing real GSP totaled $27.5 billion, or 10.5 percent of the state's real GSP in 2007, about half of it from high-tech manufacturing. Washington's manufacturing real GSP climbed 8.5 percent from 2000 to 2007. With the large presence of aerospace- and computer-related companies, the state attracts millions in venture capital investments annually, and industrial research and development spending has grown as well, by 5.1 percent from 2000 to 2007. Manufacturers' capital spending grew, one of just two peer states where that factor increased. This shows that Washington manufacturers increased investments in the expansion and upgrades of plants and equipment.

Manufacturing employment in the Emerald State totaled 293,200 jobs, or 2.1 percent of the nation's total in 2007, and 38 percent of it was in high-tech. Like California, Washington has a large aerospace presence. Both states suffered greatly in the 1990s when the industry severely contracted, and both have numerous computer and electronics manufacturers that lost thousands of jobs when the tech bubble burst. Washington manufacturing has rebounded modestly in recent years after bottoming out in 2004. Most of the gains were in aerospace products and parts manufacturing, which created 18,600 jobs from 2004 to 2007. A spike in orders at Boeing is largely responsible. Washington's share of U.S. high-tech manufacturing employment was 4.46 percent in 2007, well above the national average of 2.0 percent.

Because of the large number of workers in high-tech manufacturing, the average wage of $60,515, a 22 percent increase since 2000, was more than in most states. Technological advances coupled with a high-skilled work force make Washington one of the leading states in productivity. The value added per production worker in the state was $295,559 in 2007, more than the California and U.S. averages.

V. Washington's public economic development incentives

Public incentives	Rank
Corporate income tax exemption	(no tax)
Tax exemption on manufacturing machinery equipment	No
State loans for equipment and machinery	Yes
Excise tax exemption	Yes
Tax exemption on manufacturers' inventories	Yes
Property tax exemption	No
Job creation tax credit	Yes
Research and development tax exemption	Yes[63]
State loan guarantees	No
Long-term state economic plan	Yes

Source: Site Selection Magazine, November 2008.

Washington's incentives are highly favorable to the aerospace and software industries because of Boeing and Microsoft. As global forces have created a more competitive environment, both firms and industries have looked for lower-cost locations to grow. As a result, the state is constantly creating incentives for both. To accomplish much-needed diversification, the state has been investing in industries such as alternative energy, information technology services, and biotechnology. For example, it established a biotechnology and medical-device manufacturing sales- and use-tax deferral to attract related companies. To draw remote IT help desk services, particularly to rural Washington, the state created a tax credit for the purchase of related telecommunications, software, and hardware and a 100 percent tax credit on income received from providing those services. The state also has a variety of sales- and use-tax exemptions for machinery and equipment used in generating electricity using fuel cells, wind, solar, or landfill gas and for the labor and services to install such equipment. Washington provides one of the most generous development bonds among all the peer states—up to $10 million—for land acquisition, construction, new equipment, or the purchase of an existing facility. The bonds are exempt from federal income tax to the bondholder, resulting in lower rates for the borrower than conventional methods.

63 Tax deferment only.

Appendix 2

Leading Business and Economic Indices

Title: ***State Business Tax Climate Index***
Publisher: Tax Foundation
Summary: The SBTCI places 113 variables into five component indexes that each measure a different sector of a state's business tax climate. The five component indexes are the Corporate Tax Index, Individual Income Tax Index, Sales Tax Index, Unemployment Tax Index, and Property Tax Index. The total score for each state is calculated based on the scores on each of the five component indexes.
URL: www.taxfoundation.org/publications

Title: ***Best & Worst States Survey***
Publisher: Chief Executive Magazine
Summary: 543 CEOs were surveyed to evaluate their states on a broad range of issues, including regulation, tax policies, education, quality of living, and infrastructure. In addition, CEOs were also asked to grade each state based on the following criteria: 1) taxation and regulation, 2) work force quality, and 3) living environment.
URL: www.chiefexecutive.net

Title: ***Competitiveness Index***
Publisher: Beacon Hill Institute
Summary: Based on a broad set of 42 indicators divided into eight subindexes: government and fiscal policy, security, infrastructure, human resources, technology, business incubation, openness, and environmental policy. This broad view distinguishes the BHI index from more narrowly focused measures of competitiveness that target just one dimension such as taxation, high-tech, or economic freedoms.
URL: www.beaconhill.org/CompetitivenessHomePage.html

Title: ***Economic Competitiveness Index***
Publisher: American Legislative Exchange Council
Summary: Analyzes how economic competitiveness drives income, population and job growth in the states. The premise is that states with a high and rising tax burden are more likely to suffer through economic decline, while those with lower and falling tax burdens are more likely to enjoy robust economic growth.
URL: www.alec.org/am/pdf/ALEC_Competitiveness_Index.pdf

Title: ***2007 State and Local Tax Burden***
Publisher: New England Public Policy Center at the Federal Reserve Bank of Boston
Summary: Calculates the total state and local tax burden on a per capita basis and ranks states accordingly.
URL: www.bos.frb.org/economic/neppc

Title: ***Economic Freedom Index***
Publisher: Pacific Research Institute
Summary: The report focuses on state and local government actions as they relate to economic freedom, measuring data on 143 indicators per state, including tax rates, state spending, occupational licensing, environmental regulations, income redistribution, right-to-work and prevailing-wage laws, and tort reform.
URL: www.pacificresearch.org

Title: ***Small Business Survival Index***
Publisher: Small Business & Entrepreneurship Council
Summary: Index looks at an array of factors including taxation, employer mandates, utility costs, and the burden of government spending and ranks states accordingly.
URL: www.sbecouncil.org

Title: ***2007 Cost-of-Doing-Business Index***
Publisher: Milken Institute
Summary: Indicates each state's comparative advantages or disadvantages in attracting and retaining businesses. Each state is measured on the five individual categories, and those weighted scores are compiled to make the overall index. An index score of 100 means that the state is equal to the U.S. average in that particular category.
URL: www.milkeninstitute.org

Title: ***State New Economy Index***
Publisher: Kauffman Foundation
Summary: Measures states' economic structures, focusing on 29 indicators to rank each state on the extent to which its economy is structured and operates to compete effectively nationally and globally.
URL: www.kauffman.org

Title: ***State Technology & Science Index***
Publisher: Milken Institute
Summary: Ranks the 50 states in terms of their technology and science assets and their ability to leverage those resources to achieve economic growth. The index uses 77 indicators in five categories to measure how well a state will perform in a knowledge-based economy.
URL: www.milkeninstitute.org/tech

About the Authors

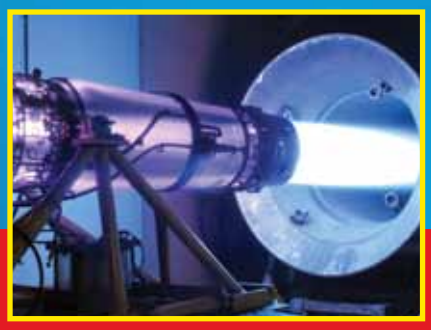
Ross C. DeVol is Director of Regional Economics and of the Center for Health Economics at the Milken Institute. He oversees the Institute's research efforts on the dynamics of comparative regional growth performance, and technology and its impact on regional and national economies. He is an expert on the new intangible economy and how regions can prepare themselves to compete in it. DeVol authored the groundbreaking study *America's High-Tech Economy: Growth, Development, and Risks for Metropolitan Areas*, an examination of how clusters of high-technology industries across the country affect economic growth in those regions, and created the *State Technology and Science Index*, which ranks the fifty states in terms of their technology and science assets. Prior to joining the Institute, DeVol was senior vice president of Global Insight Inc., where he supervised the Regional Economic Services group. DeVol supervised the respecification of Global Insight's regional econometric models and played an instrumental role in similar work on its U.S. Macro Model, originally developed by Nobel laureate Lawrence Klein. He is ranked among the "Super Stars" of Think Tank Scholars by *International Economy* magazine. DeVol earned his master's degree in economics at Ohio University.

Perry Wong is a Senior Managing Economist in the Regional Economics group at the Milken Institute. He is an expert on regional economics, development, and econometric forecasting, and specializes in analyzing the structure, industry mix, development, and public policies of regional economies. Wong designs, manages, and performs research on labor and work force issues, the relationship between technology and economic development, and trade and industry, with a focus on policy development and implementation of economic policy in both leading and disadvantaged regions. He is actively involved in projects aimed at increasing access to technology and regional economic development in California and the American Midwest. His work extends to the international arena, where he is involved in regional economic development in southern China, Taiwan, and elsewhere in Asia. Prior to joining the Institute, Wong was a senior economist and director of regional forecasting at Global Insight Inc. He received a master's degree in economics from Temple University.

Armen Bedroussian is a Research Economist with the Institute's Regional Studies group. His research focuses on econometrics, statistical methods, and other modeling techniques. Before joining the Institute, he was an economics teaching assistant in micro- and macroeconomics at the University of California, Riverside. Bedroussian has co-authored numerous studies, including *The Impact of 9/11 on U.S. Metropolitan Economies; Manufacturing Matters: California's Performance and Prospects; America's Biotech and Life Science Clusters; Biopharmaceutical Industry Contributions to U.S. and State Economies; The Greater Philadelphia Life Sciences Cluster*; and others. He co-authors the annual Best-Performing Cities and the Cost-of-Doing-Business indices. Bedroussian received a bachelor's degree in applied mathematics and a master's degree in economics from UC Riverside.

Candice Flor Hynek is a Senior Research Analyst with the Institute's Regional Studies group. She was associate economist of the LAEDC Kyser Center for Economic Research, where she worked for more than eight years, and specialized in the structure of leading industries in Southern California. She managed the Kyser Center's major economic reports and served as editor of the e-EDGE economic newsletter. She co-authored numerous reports, including *The Business of Sports in Los Angeles County* and *The Creative Economy of the Los Angeles Region*. She has contributed U.S. economic outlook articles to several industry newsletters. Flor Hynek is a member of the Leadership Advisory Council of the National Association for Business Economics (NABE) and is the 2008-09 president of the Los Angeles Chapter of NABE. She received her bachelor's degree in business economics from California State University, Long Beach.

David A. Rice is a Project Fellow in the Regional Economics group at the Milken Institute. Rice is the Director of Strategic Policy Concepts, which provides public policy consulting to think tanks, government agencies, nonprofit organizations, and other institutions. He is also co-founder of and senior adviser to the Micro Equity Development Fund—a "private and social equity fund" making micro investments in small to medium-size enterprises in emerging markets. Rice is also board chair of the MicroLoan Foundation USA—a nonprofit microfinance charity making low-interest loans to the extreme poor in sub-Saharan Africa. Previous positions include senior research analyst at Global Insight, senior project manager with the World Economic Forum, and political and policy adviser to two governors. Rice has taught as an adjunct professor at Bentley College and Suffolk University. He received his master's degree from Harvard University and has been a Fellow at the University of Vermont's Snelling Center for Government and the Center for American Progress.



MILKEN INSTITUTE

1250 Fourth Street • Santa Monica, CA 90401
Phone: 310.570.4600 • Fax: 310.570.4601
E-mail: info@milkeninstitute.org
www.milkeninstitute.org