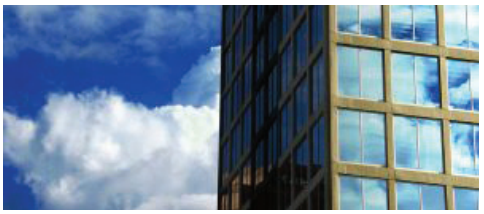
TEXAS: THE STATE OF MANUFACTURING



A Secretary of Manufacturing for the State of Texas

IC2 INSTITUTE

THE UNIVERSITY OF TEXAS AT AUSTIN

TEXAS: THE STATE OF MANUFACTURING

A Secretary of Manufacturing for Texas

In 1907, the Texas Legislature responded to the needs of Texas farmers by establishing the Department of Agriculture to better coordinate agricultural policy and services. Now, one hundred years later, it is time for a similar response on behalf of Texas manufacturers.

Manufacturing industries flourished in Texas in the 1990s; consequently the industry sector bust of 2000 delivered a harder blow to the State than the rest of the nation. Texas suffered massive layoffs in the manufacturing industries, and the sector continues to struggle in its efforts to regain historical growth rates. Most Texas manufacturing growth in recent years is associated with the State's success in international markets. Texas increased its share of U.S. exports from about 11 percent in 1997 to nearly 15 percent in 2005. The surge in overseas sales allowed Texas to supplant California as the nation's top exporting state in 2002.[1]

As Texas manufacturers engage in global competition to regain 1990s-style growth rates in the domestic market, they face unprecedented challenges that include:

- integration of technologies to achieve ever greater speed in the introduction of new processes and products
- shortage of a better educated and increasingly sophisticated workforce
- increasing competition in the United States and world markets
- increasing costs of transportation and energy
- compliance with government regulations

Competitive manufacturing today requires the relentless pursuit of innovation to produce successful new products. The roles of education and the public sector are crucial to meeting this challenge. Inside universities, companies may find the origin of their next product or the solution to a productivity challenge. Moreover, a new and improved transport system is vital to improve the speed with which Texas products reach the global marketplace.

The State's ability to compete globally is directly related to its ability to coordinate efforts from both private and public organizations to yield productive collaborations for the benefit of Texas business. A Secretary of Manufacturing can accomplish this task.

A SECRETARY OF MANUFACTURING FOR TEXAS

A Secretary of Manufacturing for the State of Texas would help Texas manufacturers address a myriad of issues raised by changes in economic conditions and technological advances—from policymaking and education to workforce training and business development. The position would also enhance Texas' competitive advantage in manufacturing nationally as well as internationally.[2] Moreover, Texas would be the first state to formally recognize the essential economic importance of manufacturing by creating a Secretary of Manufacturing position. A Secretary of Manufacturing for the State of Texas would serve as:

- **An advocate** for Texas-based manufacturers and their products in globally competitive markets.
- **A catalyst** for change in the manufacturing sector, supporting innovation in human capital and technology to increase the competitiveness of Texas industry.
- **A coordinator** bringing business, education, and government leaders together to address workforce development, investment, transportation, firm recruitment, training, and other issues in a rapidly changing industry of great importance to the State's economy.

Advocate

As an advocate, a Secretary of Manufacturing would celebrate Texas' manufacturing accomplishments, innovations, and initiatives in numerous forums. A Secretary of Manufacturing would be a champion to represent Texas manufacturers—small and large—in the

media, before government entities, and around the world. In addition, a Secretary of Manufacturing would serve as a main point of contact for manufacturing business development to lead negotiations and delegations, to attract trade and investment in the State, and to recruit and facilitate manufacturer relocations to Texas.

Catalyst

A Secretary of Manufacturing would work closely with State government and industry as a catalyst to identify the skills and technologies most critical for Texas manufacturing success and to assist in the development of programs and strategies targeted to drive growth in the sector. Recognizing that market access is also critical to the sustained commercial success of manufacturing in Texas, a Secretary of Manufacturing would participate in the development of strategies to increase the competitiveness of Texas manufacturers in domestic and international markets.

Coordinator

Inside government and education circles, a Secretary of Manufacturing would serve as a coordinator to encourage policymakers to address essential industry issues such as transportation both within the State and across international borders; workforce development and training; and innovation and technology transfer. It is vitally important that Texas manufacturers be represented at the highest levels of government on international issues. Since 40 percent of Texas exports go to Mexico,[3] it is crucial that Texas leaders, through a Secretary of Manufacturing, address manufacturing policy in cooperation with their counterparts in the Mexican border states (every Mexican border state with Texas has a Sub-Secretary of Industry and Commerce within a Secretary of Economic Development). A Secretary of Manufacturing would communicate and coordinate Texas initiatives and developments with the U.S. Department of Commerce, especially the office of the Assistant Secretary for Manufacturing & Services, and would work closely with industry groups such as the Texas Alliance of Manufacturing Associations (TAMA) and the Texas Association of Manufacturers (TAM).

MANUFACTURING IN THE UNITED STATES AND TEXAS

In 2004, a report titled *Manufacturing in America: A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers* was released.[4] This report focused on the overall structure of manufacturing in the United States and how this structure impacts productivity, job opportunities, and the overall economy. It also suggested strategies to enhance U.S. manufacturing competitiveness in the face of rapidly expanding manufacturing centers in China and elsewhere. Creating a Secretary of Manufacturing in Texas would allow the State to build on the suggestions provided in this report and enhance the competitiveness of the State's manufacturing sector.

Data show that between 1979 and 2004, the United States lost more than five million jobs in manufacturing. Total manufacturing employment losses in the United States have been particularly strong since the manufacturing downturn in 2000. Almost 2.9 million jobs were eliminated between 2000 and 2004. In Texas, 177,000 jobs were lost during the same period.[5]

The percentage of U.S. workers with manufacturing jobs has dropped from 20 percent in 1979 to about 11 percent today. This trend is partly driven by the lower cost of labor in foreign markets. At the same time, another significant transformation is underway in the United States manufacturing sector: growth in high-skilled occupations. Both trends are expected to continue,[6] at least in the short run, and the increasing demand for skilled workers is not likely to be satisfied unless corrective action is taken. In brief, there is a shortage of skilled workers to fill the opportunities currently developing within the manufacturing sector.

This shortage is corroborated by research—conducted by the National Association of Manufacturers' Manufacturing Institute for Workforce Success and Deloitte Consulting—that highlights an increasing gap between the supply of and the demand for skilled workers in manufacturing. The major finding of this research is that the significant shortage of qualified workers experienced by U.S. manufacturers is having a major impact on business and the ability of the United States as a whole to compete in the global economy. Specifically, the research revealed that

> …more than 80 percent of respondents noted that they are experiencing a shortage of qualified workers overall, with 13 percent reporting severe shortages, and 68 percent indicating moderate shortages. Also worrisome is the finding that 90 percent of respondents indicated a moderate to severe shortage of qualified skilled production employees, including front-line workers such as machinists, operators, craft workers, distributors, and technicians. As expected, the research showed that engineers and scientists are also in short supply, with 65 percent of manufacturers reporting deficiencies–18 percent severe and 47 percent moderate.[7]

Other research reveals that many of the statistics used to illustrate the erosion of the nation's ability to produce engineers and other technically skilled workers are exaggerated or misleading. For example, by one estimate, 137,437 engineers with four-year degrees graduated in the United States in 2004. India graduated 112,000 and China graduated 350,000 in a broader engineering category that included mechanics in other trades.[8] Although the disparity between United States and Indian and Chinese technical graduation rates may not be as dire as predicted, it is clear that both China and India are leveraging information technology and Internet connectivity to supply more, higher-quality, and industrially relevant education to more of their respective populations.[9] For Texas manufacturing to remain competitive, the State will have to produce more and better problem solvers with transdisciplinary expertise in mechanical, electrical, and computer engineering and control systems to design, develop, and operate better manufacturing systems.[10] A Secretary of Manufacturing would catalyze workforce development, education, and training to address the shortages of skilled workers with which many firms struggle and, in the longer term, boost manufacturing employment in the State.

Surveys of Texas Manufacturers

Findings from research conducted at the IC² Institute with Texas manufacturers mirror findings for the United States. A survey of manufacturers headquartered in Texas was completed in late January 2007. Almost 60 percent of the companies that responded to the survey had fewer than 19 employees, approximately 20 percent had between 20 and 99 employees, and about 10 percent had more than 100 employees. Ten percent did not provide employment data for their companies. The employment distribution of Texas manufacturers responding to the survey is virtually identical to that for the United States as a whole.

Manufacturers participating in the survey were asked to report their three major concerns ("List three major concerns that your company is facing at this time"). The answers given by the respondents are shown below, in order of frequency:

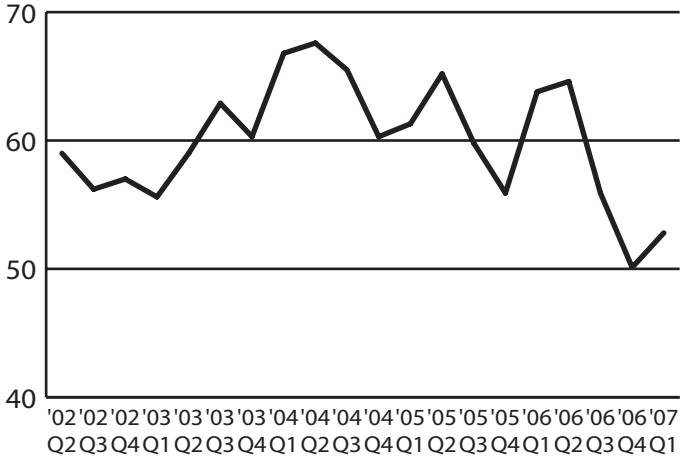
- Inability to find and retain qualified and skilled employees (42 percent)
- Increase in healthcare costs and worker compensation expenses (38 percent)
- Taxes, including property tax, franchise tax, and gross margin tax (32 percent)
- Foreign competition (19 percent)
- Inability to secure raw materials and their increasing cost (15 percent)
- Transportation costs including fuel (15 percent)
- Utility/energy costs for their facilities (13 percent)
- State and federal government regulations (12 percent)

A Secretary of Manufacturing would play a key role in addressing the concerns of Texas manufacturers and be an advocate to articulate their specific needs.

For nearly three years, the IC² Institute has researched and reported business leader confidence in Texas. Each quarter the Institute, in conjunction with Compass Bank, surveys 400-800 Texas business leaders about the future health of their industries and the State and national economies. The data are then aggregated into the Texas Business Leadership Confidence Index, an indicator of expectations for the coming quarter. As Exhibit 1 shows, the confidence of Texas manufacturers is currently at historic lows, even lower than expectations following September 11, 2001. The research shows that Texas manufacturers were typically optimistic about sales projections for their companies, as well as the future direction of the State and national economies. Recently, though, they have been less sanguine about hiring and capital expenditures. Indeed, they have the least optimistic view among the different economic sectors represented in the surveys.

EXHIBIT 1

Texas Manufacturing Business Confidence
Q2 2002 to Q1 2007



Note: An index number greater than 50 indicates expectation of economic growth, and an index number less than 50 indicates expectation of economic contraction.

EXHIBIT 2
Gross Domestic Product (GDP) from Manufacturing and Agriculture in Ten Most Populous States and United States, 2005 *(in millions of current dollars)*

State	*Population*	*Total GDP*	*Mfg GDP*	*% of Total GDP from Mfg*	*Agr GDP*	*% of Total GDP from Agr*
California	36,154,147	$1,622,116	$157,148	9.69%	$23,132	1.43%
Texas	**22,928,508**	**989,443**	**122,003**	**12.33**	**8,176**	**0.83**
New York	19,315,721	957,873	60,992	6.37	2,099	0.22
Florida	17,768,191	673,274	33,747	5.01	6,216	0.92
Illinois	12,765,427	560,032	74,826	13.36	2,071	0.37
Pennsylvania	12,405,348	489,025	73,944	15.12	2,837	0.58
Ohio	11,470,685	440,923	85,279	19.34	1,922	0.44
Michigan	10,100,833	376,243	69,186	18.39	2,038	0.54
Georgia	9,132,553	363,839	46,076	12.66	3,343	0.92
New Jersey	8,703,150	431,079	41,034	9.52	623	0.14
United States	296,507,061	12,409,555	1,426,218	11.49	119,066	0.96

Source: US Bureau of Economic Analysis, Washington, D.C., 2006

Texas in Comparative Perspective

According to the latest data available from the U.S. Bureau of Economic Analysis, the gross domestic product (GDP) of Texas in 2005 was $989.4 billion, second only to California's $1.6 trillion (see Exhibit 2).[11] Although Texas was second among states in total value of manufactured goods with $122.0 billion, it ranked 23rd in the percentage of GDP generated by the manufacturing sector (12.3 percent). California was 34th (9.7 percent) in this regard, but was first in total manufacturing value ($157.1 billion). Nationwide, the manufacturing sector contributed 11.5 percent of the gross domestic product of the U.S. economy in 2005.

For comparative purposes, Texas was also second in GDP generated by the agriculture sector ($8.2 billion), but ranked 30th in the percentage of GDP generated by agriculture (0.83 percent). California ranked 20th (1.43 percent), but was first in GDP from agriculture ($23.1 billion). The agriculture sector contributed just 0.96 percent of the gross domestic product in the United States economy in 2005. Exhibit 2 presents population and gross domestic product figures for the ten most populous states.

EXHIBIT 3
Per Capita Gross Domestic Product (GDP) from Manufacturing and Agriculture in Ten Most Populous States and United States, 2005 *(in current dollars)*

State	*Population*	*Per Capita GDP*	*Per Capita GDP from Manufacturing*	*Per Capita GDP from Agriculture*
California	36,154,147	$44,867	$4,347	$640
Texas	**22,928,508**	**43,153**	**5,321**	**357**
New York	19,315,721	49,590	3,158	109
Florida	17,768,191	37,892	1,899	350
Illinois	12,765,427	43,871	5,862	162
Pennsylvania	12,405,348	39,420	5,961	229
Ohio	11,470,685	38,439	7,435	168
Michigan	10,100,833	37,249	6,850	202
Georgia	9,132,553	39,840	5,045	366
New Jersey	8,703,150	49,531	4,715	72
United States	296,507,061	41,852	4,810	402

Source: US Bureau of Economic Analysis, Washington, D.C., 2006

GDP per capita data in Exhibit 3 show that Texas led California and was fifth among the ten most populous states in 2005. California's per capita GDP from agriculture was the largest of the ten most populous states; Georgia was second, and Texas was third.

Clearly, manufacturing plays a crucial role in the health of the Texas economy. A Secretary of Manufacturing would help maintain the sector's leading position by coordinating innovation, education, and investment policies of the State. No other state presently has such a position. With a Secretary of Manufacturing, Texas would initiate a pioneering lead among states to ensure that its manufacturing firms experience optimum growth in an increasingly competitive marketplace in per capita output, productivity, and employment.

CONCLUSION

The supporting data conclusively show not only that manufacturing is of critical importance to the Texas economy, but also that the manufacturing sector is changing rapidly. To remain competitive, Texas needs to develop the skills, technologies, and access to markets that are essential to a thriving manufacturing sector, as well as the overall economy of the State. A Secretary of Manufacturing would be an **advocate** for Texas companies in competitive markets; a **catalyst** to support innovation in human capital and technology; and a **coordinator** to promote the common goal of sustainable competitive manufacturing superiority among policymakers, national and international leaders, and enterprises. The future of manufacturing in Texas depends on enlightened, energetic leadership. The citizens of the State deserve nothing less.

Endnotes

1. Fiona Sigalla. "Texas Economy Shifts into Higher Gear," *Southwest Economy* (Dallas: Federal Reserve Bank of Dallas, January/February 2006).

2. It should be pointed out that this is not the first time the IC² Institute has brought the importance of manufacturing issues to the forefront. In 1992, the Institute hosted a conference titled "Building Teaching Factories for World-Class Manufacturing: Regional Deployment of Manufacturing Application and Education Networks." Moreover, the Digital Media Collaboratory at the Institute has received grants from the Texas Workforce Commission to enhance workforce development in Texas.

3. U.S. Department of Commerce, Bureau of the Census. 2006. (http://www.census.gov/foreign-trade/statistics/state/data/tx.html).

4. U.S. Department of Commerce. "Manufacturing in America: A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers." Washington, DC: U.S. Government Printing Office, 2004.

5. U.S. Department of Labor, Bureau of Labor Statistics. 2006. (http://www.bls.gov/ces/home.htm#data).

6. Richard Deitz and James Orr. "A Leaner, More Skilled U.S. Manufacturing Workforce," *Current Issues in Economics and Finance* (New York: Federal Reserve Bank of New York, February/March 2006).

7. Eisen, Phyllis (National Association of Manufacturers' The Manufacturing Institute), Jerry J. Jasinowski (The Manufacturing Institute) and Richard Kleinert (Deloitte Consulting LLP). "2005 Skills Gap Report – A Survey of the American Manufacturing Workforce." Washington, DC: Deloitte Consulting LLP, 2005 (http://www.nam.org/s_nam/bin.asp?CID=202426&DID=235731&DOC=FILE.PDF http://www.deloitte.com/dtt/cda/doc/content/us_mfg_talent_management_121405 percent281 percent29.pdf).

8. Gereffi, Gary and Vivek Wadhwa. "Framing the Engineering Outsourcing Debate: Placing the U.S. on a Level Playing Field with China and India." Pratt School of Engineering, Duke University, 2005 (http://memp.pratt.duke.edu/downloads/duke_outsourcing_2005.pdf).

9. Eisen, Jasinowski, and Kleinert. 2005.

10. Texas State Technical College. "Technology Briefs: Implications for Community and Technical Colleges in the State of Texas." Austin: TSTC, 2006.

11. U.S. Bureau of Economic Analysis, 2006. (http://www.bea.gov/bea/regional/gsp.htm).

The IC² Institute *(Innovation, Creativity & Capital Institute, www.icc.utexas.edu*) at The University of Texas at Austin was founded on the belief that science and technology are resources for economic development and enterprise growth. Its mission is to enhance research and education on the enterprise system in order to promote widespread wealth creation and shared prosperity. Established in 1977, the IC² Institute founded the Austin Technology Incubator (ATI) in 1984, and in 1996 launched the Master of Science Degree in Science and Technology Commercialization (MSSTC). Recently, ATI expanded to include the Austin Wireless Incubator, the Clean Energy Incubator, and Digital Media incubation. ATI's successful TechBA program assists Mexican technology companies in finding U.S. and global markets for their products. The Institute's Global Commercialization Program focuses on entrepreneurship development and bringing new technologies to market in many countries, including Hungary, India, Jordan, Malaysia, and Poland, among others. In 2005, the Bureau of Business Research, the oldest organized research unit at The University of Texas at Austin, became part of the Institute, bringing with it a staff with years of experience researching the Texas economy. The Institute has more than 235 international fellows in business, academia and government – peers of excellence who actively support the vision and mission of the Institute worldwide. The Director of the IC² Institute is Dr. John Sibley Butler, who is also the Director of the Herb Kelleher Center for Entrepreneurship at the McCombs School of Business, The University of Texas at Austin. ***Comments on this document should be directed to Dr. Butler at 512/471-4788, or john.butler@mccombs.utexas.edu.***

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