

A REPORT TO THE
GOVERNOR'S COMPETITIVENESS COUNCIL

IMPROVING THE COMPETITIVE POSITION OF THE
BIOTECHNOLOGY & LIFE SCIENCE,
COMPUTER & INFORMATION TECHNOLOGY,
ADVANCED TECHNOLOGIES & MANUFACTURING,
AND AEROSPACE & DEFENSE
INDUSTRY CLUSTERS

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1.1 BACKGROUND

Chief executive officers recently ranked Texas as the number one state to do business in the nation citing a strong and growing economy, low cost of living, and high quality of life.¹ Since 2005 nearly 1,000 new plants have been built in Texas by companies including Microsoft, Samsung, and Fujitsu and 345,000 new jobs were created by foreign-owned companies.² Over the twelve month period ending in April 2008, Texas added 262,000 jobs, more than half of the total jobs added in the U.S. Since July 2003, Texas has added over 1.2 million jobs and the most recent unemployment rate in April 2008 was 4.1 percent. Despite the tremendous growth and opportunity created, Governor Perry recognizes that the state must continually work to stay competitive in a fast-paced global economy.

“To remain competitive in the 21st century global economy, Texas must create a seamless system of opportunity and innovation, starting when young Texans enter grade school and continuing until they graduate from college, qualified for jobs that will keep our state at the forefront of the global market.”

~ Governor Rick Perry

In 2003 Governor Perry supported and signed Senate Bill 275, calling for the development of strategies to strengthen the competitiveness of several key industry clusters economists project will be the engines of job creation and economic development in Texas in the 21st century. Clusters are defined in the legislation as “a concentration of businesses and industries in a geographic region that are interconnected by the markets they serve, the products they produce, their suppliers, the trade associations to which their employees belong, and the educational institutions from which their employees or prospective employees receive training.”

From this legislation, the Office of the Governor (OOG) created the Texas Cluster Initiative. The objectives of the Texas Cluster Initiative were to identify the clusters that would be the engines of job creation in the 21st century, and to stimulate the long-term and sustained economic growth of the clusters by developing a growth strategy focusing state resources on cluster success. The six clusters identified by the Texas Cluster Initiative are:

- ★ Advanced Technologies and Manufacturing;
- ★ Aerospace and Defense;
- ★ Biotechnology and the Life Sciences;
- ★ Information and Computer Technology;
- ★ Petroleum Refining and Chemical Products; and
- ★ Energy.

1 Chief Executive Magazine, “CEOs Weigh In On Best, Worst States To Do Business,” December 2007.

2 The Wall Street Journal, “Texas v. Ohio,” March 3, 2008.

By focusing on the needs of these clusters, Texas will be able to maximize its limited resources and will be better positioned to compete nationally and internationally for jobs of the 21st century. Other industries linked to the target clusters will also benefit from this approach, as success in these core clusters increases long-term competitiveness and regional prosperity in other industries. As part of the initiative, the OOG, including the Economic Development and Tourism office, and the Texas Workforce Commission (TWC) have worked to form state and regional partnerships to foster growth and development in the six target clusters. The initiative has also led to the development of industry-based strategies for recruitment and expansion within the state.

In order to build upon and continue the efforts of the initiative, in November of 2007, Governor Rick Perry appointed 29 public and private sector leaders to the Governor's Competitiveness Council. He charged the Council with:

- ★ Identifying significant competitiveness issues and opportunities arising from the follow-up research on the six targeted industry clusters, and
- ★ Making recommendations to the Governor that establish an agenda for action for both the State of Texas and state agencies, whereby opportunities for increasing Texas' competitiveness are leveraged and barriers or weaknesses are eliminated or minimized.

In order to assist the Council in identifying cluster issues and potential recommendations for improvement, in January 2008, the OOG, in partnership with the TWC, tasked International Business Machines (IBM) with preparing a detailed analysis of the following clusters:

- ★ Advanced Technologies and Manufacturing;
- ★ Aerospace and Defense;
- ★ Biotechnology and the Life Sciences; and
- ★ Information and Computer Technology.

Specifically, IBM was tasked with assessing the trends in these clusters and Texas' competitive position compared to other global players; identifying barriers to cluster growth for sub-sectors within these clusters and for individual regions within Texas; and providing specific recommendations on both the priorities and programs that would enhance Texas' competitive position.

1.2 OUR APPROACH TO THIS TASK

Globalization has fundamentally changed the competitive business landscape. Global integration is the new playing field. The impact of the globally integrated economy and the rapid pace of change flowing from innovation in business models, processes, technology, and services apply to nations, states, regions, companies and individuals.

As a corporate competitor in this globally integrated economy, IBM had to transform to remain competitive. From regaining customer and shareholder confidence during the "burning platform" days of the early 1990s to building a new model for growth in the 21st century, IBM has more than a decade of experience in business transformation. This transformation has required a fundamental shift in how IBM approached strategy to remain competitive in this dynamic, globally integrated marketplace. As a result, IBM has created the IBM Business Leadership Model that serves as the basis of the strategy formulation and execution process within IBM. The IBM Business Leadership Model is a systematic way of aligning our



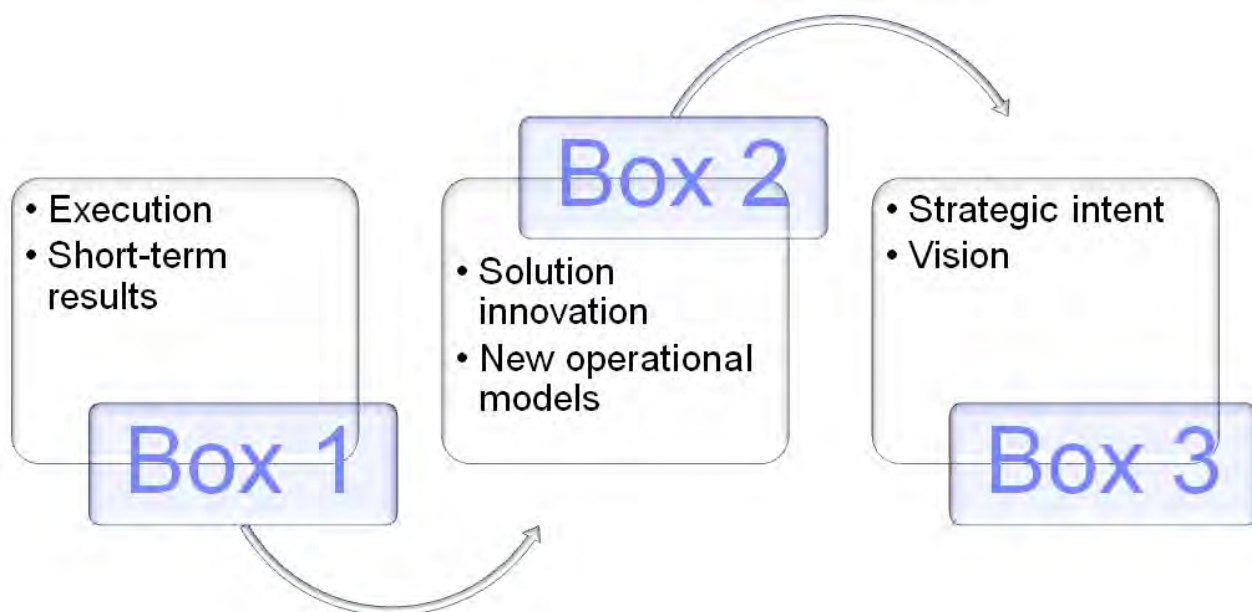
strategy and execution to achieve desired business results. This model is based upon the following guiding principles:

Good strategy and effective execution begins with leadership’s consistent attention to strategic issues and opportunities. Leadership conducts regular executive meetings focused on monitoring progress, tracking strategic issues and commissioning new projects to gain new insights and set new directions.

Strategy development begins with a clear understanding of the vision for the future and an articulation of the “gaps.” Gaps are discrepancies or shortfalls between the current results and those that are expected or desired.

Solutions must be aligned with a clear definition of the gap they are trying to close. Better execution of current processes and models may not be sufficient to realize an organization’s vision or strategic intent. New innovative solutions and/or competencies may be required to bridge strategic gaps. Figure 1 illustrates this concept through a typical “Three-Box” approach to strategy formulation.

FIGURE 1: THREE-BOX MODEL



Successful transformation requires strategy, solutions, and execution. Successfully linking strategy and execution is the key to success. A strategy without a realistic execution plan and management system to govern is bound to underperform or fail completely.

Strategy is ongoing action and effective strategy must be continuous. What is critical is the ability of strategy to adapt to changes in the global marketplace with a new business design and supportive organization. Strategy cannot be static.



Processes and organizational structures must be designed to build in the flexibility required to self-adjust to change. The most effective way to handle a moderate amount of change is to create processes and structures within an organization that can respond in a timely and effective manner. High-performing organizations can respond to market changes quickly because clear responsibilities have been delegated to key individuals that are knowledgeable and able to make appropriate decisions and actions.

IBM approached the task of identifying barriers to cluster growth and providing specific recommendations for improvement as a transformational strategy initiative. As such, IBM has coupled its Business Leadership Model principles and experience in economic development and site selection services to define an executable strategy for Texas to realize its vision of ensuring cluster success. The purpose of this report is to detail the findings of the analysis and share recommendations for improving Texas' competitive position in the four industry clusters. Specifically, this report addresses the following questions:

What are Texas' vision and objectives for economic development in these four industry clusters? This question is addressed based upon the strategic vision and direction outlined by Governor Perry and the Governor's Competitiveness Council.

What is the state of the competitive environment and what is Texas' competitive position in these industry clusters as compared to global competitors? In order to answer this question, in-depth competitive positioning and workforce analyses were prepared for each cluster and for three sub-sectors within each cluster. Importantly, for the three sub-sectors selected within each cluster, a detailed competitive positioning analysis was performed. This analysis is similar to that used to advise corporate clients trying to determine where to expand or relocate their business or a component of their business. This site-selector approach provides an invaluable external view of Texas' competitive position because it is based on external data available to site selectors, business, individuals and economic development consultants around the world who are making critical decisions about where to expand or relocate among many competing domestic and international locations. An overview of the competitive positioning analysis is provided in Section 3.6.

What gaps must Texas address to improve its competitive position in these industry clusters? This question is addressed based upon the findings of the competitive positioning and workforce analyses, as well as information received from members of the Governor's Competitiveness Council, Texas economic development leaders, and stakeholders interviewed across various regions in Texas. Listings of the stakeholders that contributed to this effort are included in the acknowledgements. Once the gaps were identified, they were organized around the following set of basic levers of economic development. Each lever represents an area where Texas can focus on making improvements in order to impact its competitive position:

- ★ Workforce;
- ★ Research, development and commercialization ;
- ★ Venture capital and business start-up support;
- ★ Infrastructure;
- ★ Government services and regulations;
- ★ Cluster management; and
- ★ Marketing and business development.

What potential solutions to these gaps exist and how are other competitors addressing these gaps? This question was addressed based on industry experience and the results of competitive research. Potential solutions to address these gaps are organized around the identified levers.

Where should Texas focus its resources to improve its competitive positioning in these industry clusters? A universe of potential solutions exists to address the various gaps identified; however, it is unrealistic for Texas to attempt to execute all of the possible solutions. Rather, Texas must focus its resources around a prioritized portfolio of investments. Therefore, the report includes a targeted set of recommendations where Texas will realize the greatest return on investment based upon the expected impact and complexity of implementation. The recommendations are organized around the following three themes:

- ★ **INNOVATION** – What Texas must do to improve its innovation capabilities (e.g., universities, research, and development, entrepreneurial activity)?
- ★ **WORKFORCE** – What Texas must do to improve the management and development of the Texas workforce to remain competitive in a globally integrated environment?
- ★ **BUSINESS MODEL** – What Texas must do now to optimize its business model for economic development so that the State will have the agility required to adapt to changes in a dynamic, globally competitive environment?

The sections that follow aim to the answer these questions.

SECTION TWO: TEXAS' VISION AND OBJECTIVES FOR ECONOMIC DEVELOPMENT

Governor Perry has called for an economic development strategy for Texas that focuses on fostering areas where Texas has the greatest growth potential. The Governor has stated that in today's globally integrated economy, "knowledge and capital are rapidly being deployed to parts of the world where the right combination of talent, technology, business climate, infrastructure, and markets converge." Although Texas views itself as a leader in many areas of economic development, it realizes that momentum alone will not ensure a prosperous economic future since it is no longer just competing with neighboring cities or states, but is a competitor in a larger, global marketplace.

Texas' vision is to stimulate long-term sustained growth and focus the allocation of state resources on key industry clusters that will have high job creation and be drivers of economic development in the 21st century. Additionally, Texas wants to assure that education, workforce and other state resources are aligned with future workforce needs.

Texas has established the following workforce system strategic goals:

- ★ Develop a globally competitive workforce.
- ★ Ensure an employer driven workforce system.
- ★ Support current and future worker employment needs.
- ★ Provide employers ready access to potential workers.
- ★ Support a wide range of sustainable employment opportunities for all Texans.
- ★ Provide relevant educational and training opportunities for current and future workers.
- ★ Support life-long knowledge acquisition and skills development.
- ★ Develop and coordinate partnerships among business, education, labor, government and other communities of interest.
- ★ Hold system partners accountable for the successful execution of their respective workforce development system objectives and the continuous improvement of the workforce development system.

In summary, Texas wants to remain one of the top skilled global competitors in six high-growth clusters of economic activity, while providing education and employment opportunities for all of its citizens.

3.1 INTRODUCTION

There are a variety of methods available to assess a cluster's competitive position and identify strengths and weaknesses. Some of these methods include reviewing past cluster work, analyzing the existing competitive environment, reviewing gaps in workforce needs, reviewing information from other third-party studies and utilizing a combination of IBM's Global Investment Location Database (GILD) and other information available to potential site selectors. All of these methods were used to determine Texas' competitive position and identify gaps.

In Section 3.2 key findings of the past Texas Industry Cluster Initiative are summarized.

In Section 3.3 an overview and analysis of the competitive environment are presented. Research from the IBM GILD which compiles current interstate and foreign investment decision data and serves as an indicator of current trends is also included.

In Section 3.4 the Texas workforce needs are analyzed for future gaps that may develop in cluster related occupations.

In Section 3.5 the Harvard Institute for Strategy and Competitiveness Cluster Mapping Project was used to prepare an analysis of certain Texas clusters and sub-sectors within those clusters. This analysis was only possible for areas where significant overlap existed between the Cluster Mapping Project's work and the clusters identified for analysis in Texas.

In Section 3.6 an overview of IBM's competitive positioning methodology is presented. This methodology considers a broader range of factors than the Harvard study and incorporates data that might be used by a site selector, corporation, or individual in performing an initial screening of locations for investment.

Section 3.7 presents some broad conclusions about Texas competitive position in each cluster and three sub-sectors within each cluster.

3.2 PAST TEXAS INDUSTRY CLUSTER REPORTS

The 2005 Cluster Assessment Reports, authorized by the Texas Legislature and driven by the OOG, brought together more than 250 stakeholders in the targeted clusters from across the state, including elected officials, industry leaders, and members of academia. Recognizing that world-class cluster development relies on "the continual advancement and investment of companies, infrastructure, and technology to maintain a competitive advantage", the reports addressed how Texas can continue to be competitive and improve its global position within the targeted clusters.

