Huron
CONSULTING GROUP

Strategic Economic Development

A Plan for the Georgia Institute of Technology

April 6, 2006

BOSTON
CHARLOTTE
CHICAGO
HOUSTON
LOS ANGELES
NEW YORK
SAN FRANCISCO
WASHINGTON DC

Acknowledgement

Georgia Tech and the Huron Consulting Group would like to acknowledge the corporate sponsors of this study and thank them for their support and advice.

Southern Company
Bell South
Bank of America
Scientific Atlanta
Earthlink
Imlay Foundation
C.B. Richard Ellis
Internet Security Systems
Waffle House
Moseley-Kelly-French Corporation
The University Financing Foundation
Georgia Tech Foundation

Huron
CONSULTING GROUP

Table of contents

Huron
CONSULTING GROUP

Executive Summary

Nearly 120 years ago, the southern states were struggling to adapt to the rapid pace of industrialization spreading across the nation. In an effort to address this concern, the state of Georgia in 1885 established the Georgia Institute of Technology with the primary objective of helping Georgia transition from an agrarian economy into the emerging Industrial Revolution. The Georgia legislature recognized that an institution focused on providing education and economic output to the state and region would provide the impetus for creating a stronger future for the state.

Today, an equally dramatic change is taking place. Technological advances provided the wherewithal to create a global economy at the very time that political winds blew favorably in that direction. Up-and-coming nations from Ireland to India and China are moving rapidly to compete with the United States for world economic leadership. As the global economic playing field becomes more level, the United States must learn to compete in a global environment in which both the largest technology markets and technological workforces are in Asia, in which we are producing only one of every four or five break-through discoveries or inventions, and in which the cost of our wages and health care are higher than those of our competitors. The only way to succeed will be to become much more deliberate about developing and aligning the resources required for innovation.

Many of these resources for innovation are provided by research universities, which are increasingly emerging as drivers of high-end economic growth. As Batelle Memorial Institute Vice President Walter Plosila wrote in the foreword of *Innovation U: New University Roles in a Knowledge Economy*:

> Globalization of the economy means that the only way that American firms can compete with lower-paying economies worldwide is with technology and talent, both of which require active collaboration with higher education institutions, whether it be in education and training, research and applications, or other innovation roles, including new firms and new products.

It is once again time for Georgia to leverage its investment in Georgia Tech to foster the transition to a new economic era, and the Institute has emerged as a leader in technology transfer. During the past decade, Georgia Tech has been instrumental in driving economic growth in metro Atlanta and the state of Georgia, creating new jobs, spawning the formation of many new companies, and creating an environment conducive to innovation. For example:

- Georgia Tech has an estimated $3.9 billion annual impact within the state of Georgia.
- Georgia Tech operates the state's Advanced Technology Development Center, whose member companies employed 5,500 and generated $1.7 billion in revenue in fiscal year 2004.
- Georgia Tech directly and indirectly supports approximately 44,400 jobs throughout the state.
- More than fifty companies have been started based on technology developed at Georgia Tech since 1990.
- Researchers at Georgia Tech received more than $357 million in research awards in fiscal year 2005, most of which came from outside the state.
- The Institute files hundreds of invention, software, and copyright disclosures each year and executes dozens of software and invention licenses.
- Georgia Tech is deliberately developing a global presence, with research and education platforms in France and Singapore, an office of the Georgia Tech Research Institute in Ireland, and expanding partnerships with institutions such as Imperial College in Great Britain and Shanghai Jiao Tong University in China.

While many research universities can claim some of these types of impacts, few, if any, can exhibit the range and depth of those that are attributed to Georgia Tech.

An Emerging Evolution of the Role of Public Research Universities

As states and regions strive to compete in the global economy and as research universities assume a greater role in that endeavor, universities are finding themselves in a much more competitive environment. This is particularly true for Georgia Tech, which is now ranked as one of the nation's best universities and finds itself competing with not only the top public universities, but also leading private universities such as MIT and Stanford. The competition for research universities in attracting students, faculty, and research funding and fostering technology transfer is no longer just among peers across the nation, but now extends to world-class universities around the globe. Universities that are successful in developing international partnerships and a global presence as well as increasing their technology transfer capabilities will be particularly well positioned to make a positive contribution to their states' ability to thrive in a global economy. As *The Economist* noted in a September 2005 article titled "The Brains Business," "The emerging global university is set to be one of the transformative institutions of the current era."

At the same time, however, growing demands on state budgets have led to reductions in the funding available for public higher education. Georgia Tech, for example, has seen its state funding decline from a third of its operating budget to less than a quarter over the past decade. The pressures on funding for higher education are likely to increase during the coming decade due to anticipated pressures in state healthcare commitments and similar demands on public funds to support K-12 education and public infrastructure needs.

The collision of these two trends has resulted in the recognition that it is time to rethink how the environment in which public universities operate might be made more effective. It goes without saying that treating public research universities as traditional state agencies diminishes their ability to compete effectively and contribute to economic growth. The state of Michigan was far ahead of the curve when it constitutionally modified the governance structure of the University of Michigan in 1850, enabling it to optimize its effectiveness and become one of the most economically viable public universities in the country. More recently, other states have passed similar legislation with the intent of unleashing the economic potential that their research universities have to offer. For example:

- In Virginia, the governor signed a bill in April 2005 that fundamentally changed the operating requirements for the state's public research universities. The media has reported that it is "one of the most sweeping changes to public higher education in decades."
- In Colorado, new legislation has been introduced to enable public colleges to free themselves from restrictions on spending and revenue generation.
- In Florida, the state has granted to public universities increased control of the tuition-setting process.
- In Texas, the legislature recently developed a plan that provides public universities with the ability to establish their own tuition rates.

Regional and State Competition in Emerging Technologies will Significantly Impact Georgia Tech and Metro Atlanta

Understandably, much of the publicity associated with state and regional economic development focuses on the successes achieved in creating jobs and developing start-up companies in key industries. However, a search of economic development initiatives in any of the country's top twenty-five cities yields a staggering array of investments being made in emerging industries such as biotechnology, bioscience, nanotechnology, and other promising areas. Nearly all the references indicate that the investments are being made with the hope and expectation that the city, region, or state will emerge as a leader in one of these hot new industries. The competition for the leading edge of the economic sector is increasingly fierce. It is clear that Atlanta and Georgia need to shape and align their assets for this future if they are to be successful.

A thorough assessment of each regional investment would undeniably indicate that there would be more failures than successes. Although there are many reasons for a city or region to succeed or fail in pursuing economic development, there is at least one common denominator among the nation's premier regional economies: all can point to the role of strong research universities with well defined links to their communities within their midst. There also is a pattern of investment in these institutions that helps them create a competitive advantage.

The Boston/Route 128 sector, with Harvard, MIT, and a heavy concentration of medical research institutions, is unquestionably among the most successful regional economies in the world. The academic institutions in Boston have been a major reason for drawing pharmaceutical, biotechnology, and other emerging industries to the area. Similar results have occurred in the Silicon Valley, with Stanford and the University of California institutions at Berkeley and San Francisco. North Carolina's Research Triangle has been an enormous success, largely due to the close proximity of Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University.

The state of Georgia has itself made significant investments in its research universities through the Georgia Research Alliance, the Georgia Cancer Coalition, and the broadband design initiative. As Georgia Governor Sonny Perdue explained in his January 11, 2006, State of the State Address:

> In the twenty-first century global economy, we have only two options. Georgia can lead or Georgia can be left behind… To lead, we must innovate. That means we must become a state of innovation. That means making innovation our competitive advantage in every area of our economy: in our existing industries, in our homegrown small businesses and in the growth industries of the future, such as life sciences and nanomanufacturing.

However, as noted above, many other states and cities, including Phoenix, Seattle, Northern Virginia, and Austin, are also investing with goals to bring their regions to the forefront of economic growth. Some have surpassed Georgia's level of investment. What strategic actions should the state of Georgia and metro Atlanta take to address this highly competitive economic environment? One obvious answer is to strengthen the ability of the state's research universities to participate as leaders in creating an economic environment that is most conducive to growth in key industries. Emory University is a growing power in the state, utilizing its flexibility as a private institution. However, the state's public research universities continue to operate under an administrative structure that has changed little for many years and that limits their ability to play a more significant role in responding to today's competitive environment.

Governor Perdue recognized the importance of updating the state's administrative structures and created the Commission for a New Georgia to provide a fresh perspective for the task of overhauling and streamlining the state's administrative functions. According to the Administrative Services Task Force of the Commission:

> Five years into the twenty-first century, state government is still stuck in the 1990s, '80s, and even '70s in many of the ways it operates. Government business operations are bogged down in outmoded practices and obsolete technologies, running up millions of dollars in the overhead costs of inefficiency.

This is also an apt description of the constraints under which Georgia's public research universities must presently operate. If they are to realize their potential to drive the state's economic development in the future, they must be institutions that are flexible, agile, and responsive to change and new directions.

Recommended Actions for the State Government and the University System

This report recommends that the state of Georgia and the University System of Georgia work with Georgia Tech and the other three state research universities to create an approach that will allow them to compete at the highest level while serving in an enhanced role to optimize the state's economy. The recommendations are captured under four themes: investment, increased flexibility in decision making and operations, enhanced ability to control revenues, and accountability.

1. Investment

Georgia wisely recognized before many other states the value of investment in research and development, facilities, and matching funds to enhance the ability of its research universities to compete nationally and grow commercialization activities**. It is recommended that these investments be encouraged and expanded in strategically designated areas that will allow the state to compete for its share of the high-growth sectors such as biotechnology, nanotechnology, logistics, and health sciences.**

2. Increased Flexibility in Decision Making and Operations

The present administrative structure for Georgia Tech within the University System of Georgia has not changed substantially for decades. Policies for procurement, personnel and benefit regulations, creation of collaborations and partnerships with other universities, and facilities, leases, and construction require multiple levels of approval that are inefficient and add significantly to costs both in terms of dollars and time. **It is recommended that many of these be delegated to the universities while providing for appropriate levels of accountability and coordination.** This will result in substantially increased efficiency, cost savings, and improved use of personnel time.

For example, cumbersome state processes involved in constructing buildings can easily lead to a delay of one or more years in completion of a project. It is estimated that even a one-year delay in construction of an academic building at Georgia Tech results in $30 million in lost research revenue, not counting losses incurred due to increased costs due to inflation and oversight. Over time, as this is repeated with each new building, the cumulative losses can mount into the hundreds of millions of dollars at Georgia Tech alone, much less considering the impact of buildings at the state's other public research universities.

The example of Technology Square stands as a testament to what can be done using a new approach. This $190 million, five-building complex, built entirely without state funding, was planned, designed, and constructed without the requirement for adherence to state approval and oversight processes. The entire process from beginning to end took just three years. Although not required to observe traditional state processes and meet approval levels for Technology Square, Georgia Tech kept the Board of Regents and the chancellor's staff informed at all critical stages and provided them with the opportunity for comment. The rapid completion of the project was possible because of the delegation of authority for decision making.

3. Enhanced Ability to Control Revenues

Georgia Tech and the state's other research universities have multiple sources of revenue, with tuition being a key element. Research universities in Georgia have a differential tuition structure relative to the other thirty-one colleges and universities of the University System of Georgia today and are allowed to recover the expense of high-cost executive education programs. **It is recommended that this authority be extended to the ability to set tuition rates for undergraduate and graduate programs that more appropriately reflect costs of education and the nature of the competition research universities face.** A growing number of states use this approach, with appropriate balances in place regarding access. Tuition at Georgia Tech, for example, should reflect the costs of the extensive requirement of laboratories and design courses for most majors.

4. Accountability

Georgia Tech and other public universities that are granted degrees of autonomy and flexibility should be expected to adhere to objective measures of performance and success. This would provide the state with a mechanism to ensure that its oversight responsibilities are met and to keep the universities compliant with state policy and law. A scorecard can be established that covers a diverse set of metrics including R&D growth, balance between resident and non-resident students, graduation rates, patents, job creation, capital expenditures, bond rating, budget variances, and other measures as needed**. It is recommended that the state, the University System of Georgia, and Georgia Tech work together to develop an accountability and responsibility scorecard that reflects the activities delegated to the Institute.**

Expected Outcomes and Benefits from Recommended Changes

Without change from the present circumstances, Georgia Tech's ability to compete with the nation's best public and private universities will be limited. Its potential to assist the state and Atlanta in the increasingly competitive world economy will be marginalized. However, if the recommendations are adopted, visible benefits will occur:

More Job and Company Creation – The high-paying jobs of the future will derive from new companies and existing innovative companies that are positioned to compete in sectors of growth. Working with the state, Georgia Tech can serve as a key agent in the advance wave of economic development both within the state and in areas of the world where its global connections can serve the state's advantage.

Improved Access to Intellectual Capital – The leading researchers hired at Georgia Tech and their ability to work interactively with industry builds the state's reputation nationally and worldwide as a capital of innovation. This will help enhance the ability of the state to attract the headquarters and R&D units of leading-edge companies to locate here.

Development of the Workforce of the Future – Over the past decade, Georgia Tech has increasingly recruited exceptionally talented students to its undergraduate and graduate programs. The impact of graduates of this caliber on places such as Silicon Valley is the stuff of legend. Building on the success of the past will allow Georgia to have access to the workforce of the future.

Expansion of a Vibrant Research Enterprise – Combined, the research enterprises of Georgia's research universities bring more than $900 million annually into Atlanta and Georgia. Georgia Tech is the largest contributor to this total. There is potential to grow this important component of economic development and to continue to improve the competitive position of the state.

Creation of New Private-Public Partnerships - The flexibility to form innovative public/private partnerships has proven invaluable to economic growth and vitality. The unique Emory/Georgia Tech partnership in biotechnology serves the best interests of both institutions and brings the power of Emory's programs in closer proximity to the public sector and its interests and aspirations. This is but one example of such linkages that are important to Georgia and its future. Others lie in the partnerships Georgia Tech is forming internationally.

Expansion of Infrastructure for Economic Growth – Georgia Tech is home to many world-class facilities in research and economic development, but growing this infrastructure is important to the future. The new Technology Enterprise Park is an example of a concept that will serve to keep young companies home in Georgia and bring R&D units from other companies here. Future developments of this type will create expanded opportunity for the state.

Savings of Money and Effort That Can Be Applied to Productive Purposes – New efficiencies will allow valuable resources presently expended in non-valued-added processes to be used to advance the essential activities of Georgia Tech and its economic development endeavors.

Conclusion

Georgia Tech has been important to the economic development of Georgia since its founding. Its influence has become even more significant over the last decade, and this study shows Georgia Tech's economic impact now approaches $4 billion annually with upwards of 45,000 jobs linked to these activities. With the pervasive growth of technology in society, Georgia Tech's importance to the economy should be even greater in the future. However, what has worked in the past is unlikely to be effective in the days ahead given dramatic changes occurring in the global economy and growing competition from other cities, states, and nations around the world. These challenges also come at the same time when states are seeing their ability to invest in higher education under pressure due to increased demands of health care, social systems, K-12 education, and prisons. What is clear is that institutions such as Georgia Tech must become more innovative, responsive, and agile if they are to compete at the highest levels and optimize their economic impact. The present systems of administration within which Georgia

Tech must work were developed years ago and need to be re-thought. This study proposes a series of recommendations—many of which will cost the state no money—that will lead to a more effective and competitive Georgia Tech. These recommendations can be extended to the state's other research universities as well, with similar positive benefits for them and the state. The sponsors of this study urge the state and the University System of Georgia to work with Georgia Tech to make the needed changes so that we are prepared to succeed in the challenging times that lie ahead.

Full report available online at: http://www.gatech.edu/president/eis.pdf

I. Introduction

This report was prepared by Huron Consulting Group with funding provided by twelve major corporations in Atlanta and the state of Georgia to describe Georgia Tech's contribution to economic development within the Atlanta region and the state of Georgia and to identify opportunities for the Institute to significantly expand its role as a leader in the creation of economic growth. The corporate funding supporting this report is attributable to recognition among the state's business community of the impact that Georgia Tech will have on the future growth and performance of the Georgia economy and a desire to enhance that performance through partnerships with the business community. These corporations recognize that strong research universities are essential partners in initiating and developing the innovations, technologies, and scientific breakthroughs that form the cornerstone of the emerging technological and innovation-based economic system.

A. Project Objective

The objective of this report is to document the economic benefits that Georgia Tech brings to the Atlanta region and the state of Georgia and to make recommendations that will optimize its future impact. To achieve the objective, this report:

- identifies the economic impact that Georgia Tech has had on the state and regional economies,
- outlines the key factors that have enabled other research institutions and regions to be leading economic performers,
- reviews the unique circumstances that exist in Georgia that relate to future economic development in a technology-based global economy, and
- identifies strategies and recommendations that will enhance Georgia Tech's contribution to the future growth and development of the Atlanta and Georgia economies.

B. Impetus for the Study

What strategies will give Georgia Tech the traction to use its scientific and innovation-based assets to enhance the economic growth trajectory of the Atlanta region and the state of Georgia?

Nearly every major research university in the United States has participated in an economic impact study during the past five years. The number of studies focused on the economic contribution of universities has grown, in part, because many public universities desire to demonstrate the economic value stemming from the use of public funds in an environment where state budgets are extremely tight. Despite the clear evidence of economic contribution by research universities, state funding for these institutions has declined so significantly that in recent years some institutions have begun transitioning into new business models that will enable them to better contribute to their region's economic future while also competing for students, faculty and staff, and extramural financial support.

C. Project Approach and Methodology

Georgia Tech's future is, in many ways, tied to the future of the Atlanta region and the state of Georgia (and vice versa). The Institute's ability to be a leader and make a larger impact on economic development in the region is dependent on a similar commitment from both public and corporate sectors. Understanding the unique relationship that major research universities have with their regions provides a context for considering the dynamic that exists in the Atlanta region with Georgia Tech.

This report provides insight into understanding and expanding economic growth opportunities, including the following:

- A description of the economic strengths and challenges facing metro Atlanta and the state of Georgia.
- A focus on the successes other regions have had in building economic clusters and creating jobs and new companies in technology-focused areas.
- An assessment of conditions that could form a model for the Atlanta region to follow.
- A focus on a selected group of research universities that have established themselves among the nation's leaders in triggering economic development and growth in their communities. Understanding the economic contributions to their respective regions and the conditions under which these institutions operate will provide a valuable framework for Georgia Tech to consider as it strengthens its leadership position in the state's economic development strategy.
- A rationale for prioritizing the Atlanta region's innovation-based "assets," core strengths and competitive advantages so that it can pursue a global economic development strategy. By examining the relationships that other regions have with their research universities, the report considers how Georgia Tech can add to the region's economic growth and development.

II. The Global Economic Imperative

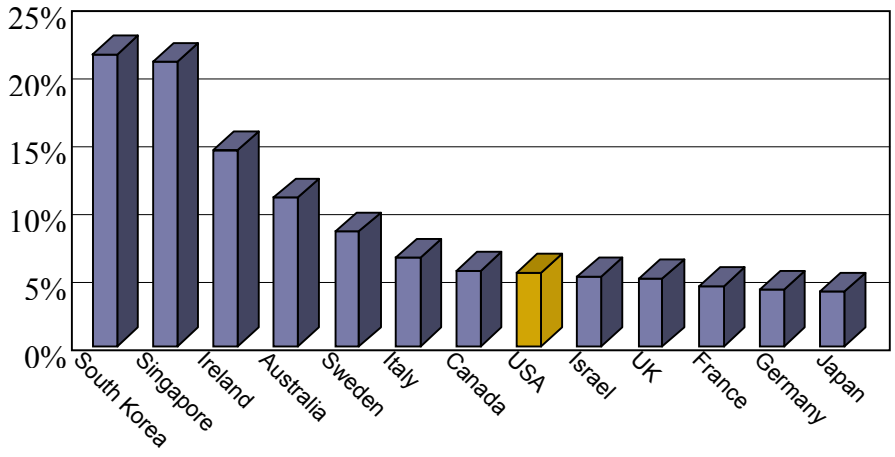
As a context for this report, it is essential to recognize that Georgia Tech competes within a global arena. Gone are the days when Georgia Tech's reputation, research, and economic influence were largely limited to the Southeast. Today, Georgia Tech is a research powerhouse, ranked high on a national scale, attracting faculty, students, and external funds nationally and internationally. Despite this success, Georgia Tech needs to maintain its competitiveness, a desire shared by the major research universities against which the Institute competes for talent and funding.

The global economy that is evolving in the twenty-first century is increasingly based on innovation, science, and technology. Many international economies have made great strides over the past decade in key areas relating to investment, technology, and research and development, catching—and in some cases, passing—development in the United States. For example:

- Foreign-owned companies and inventors account for nearly half of all U.S. patents.
- Sweden, Finland, Israel, Japan, and South Korea each spend more on R&D as a share of GDP than the United States.
- China overtook the United States in 2003 as the top global recipient of foreign direct investment.
- Only six of the world's twenty-five largest technology companies are based in the United States; fourteen are based in Asia.
- In 2004, Asia spent as much on nanotechnology as the United States.

Intellectual capital and entrepreneurial energy in the United States have driven our country's historical success and will continue to be key drivers of the emerging knowledge economy. However, as illustrated in Exhibit 1, the United States is not alone as a global leader in emerging technologies. Other countries are making rapid gains in research and development strength, thus underscoring their commitment to innovation.

Exhibit 1: Compound Annual Growth Rate in R&D



Source: National Science Foundation, Science & Engineering Indicators 2000.

Recognizing that achieving economic leadership depends on a well-coordinated regional economic development strategy, many regions, including Atlanta, are looking for better ways to prosper in the global economy. The need for an emphasis on innovation is of particular importance in southern states, which began their economic development traditions by touting low cost of production as an initial driver of growth. Today, low-cost strategies are under attack from countries such as China and India, which have

embraced a combination of producing goods and offering services at even lower costs, along with developing very competitive indigenous research, engineering, education, and training capabilities.

As a result, American research universities are increasingly called upon to be drivers of high-end economic development through producing the nation's talent, conducting a significant portion of its research, and commercializing the discoveries and new technologies that result. As Batelle Memorial Institute Vice President Walter Plosila wrote in the foreword of *Innovation U: New University Roles in a Knowledge Economy*:

> Globalization of the economy means that the only way that American firms can compete with lower-paying economies worldwide is with technology and talent, both of which require active collaboration with higher education institutions, whether it be in education and training, research and applications, or other innovation roles, including new firms and new products.

Dr. Wayne Clough, president of Georgia Tech, in his speech titled "The Innovative Imperative and the Research University," responded to this specific issue when he discussed the increasingly important role of American research universities as the country is challenged to compete in a rapidly moving global, innovation-based economy.

"In this new economy, it would be unrealistic for the United States to think that we will continue to dominate the high-tech end of the economy as we have in the past. We, including U.S. universities, must learn to compete in an environment in which:

1. we produce only one of every four or five major inventions,
2. our wages and cost of health care systems are higher than those of our global competition,
3. the largest markets for technology products are in Asia, and
4. the largest technological workforce resides in other nations.

If we are to succeed in the future, we need to reconcile ourselves to the new circumstances while there is time for us to build on our natural strengths."

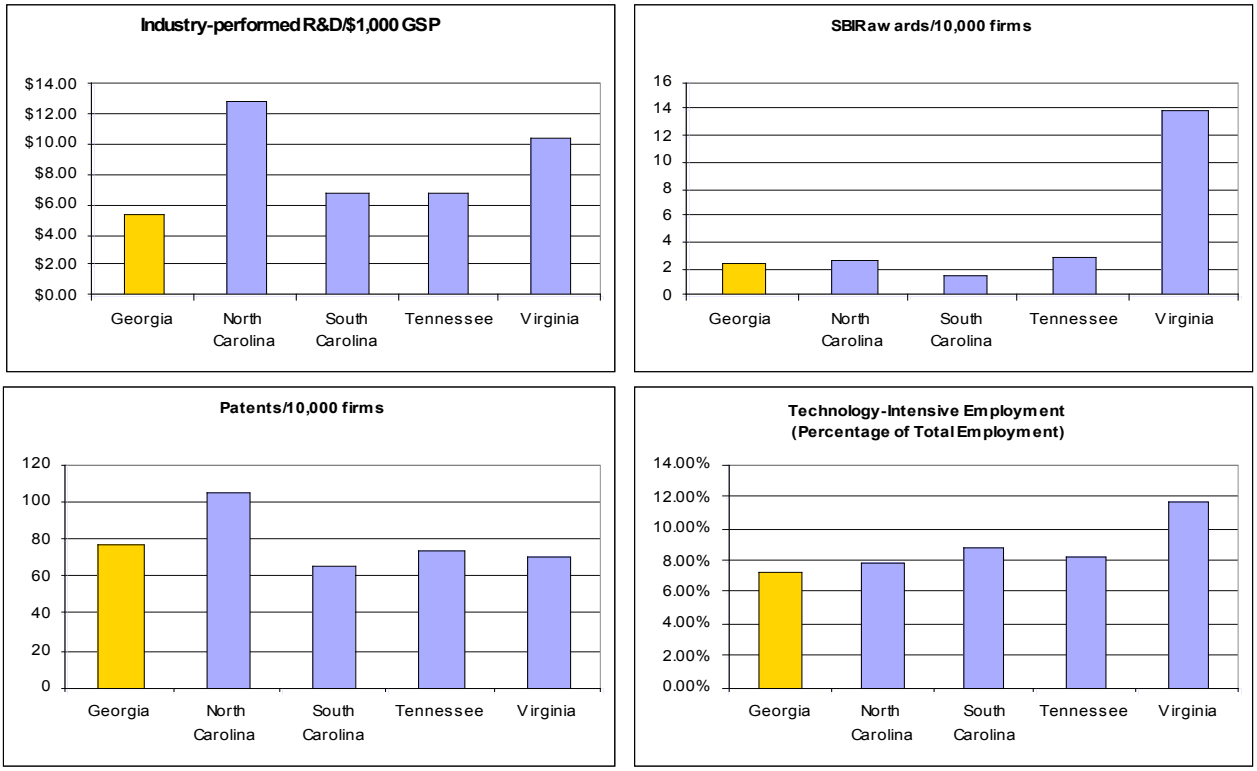
III. Implications of Global Economic Competition for Atlanta and the State of Georgia

Nearly every state actively promotes its economic vibrancy and opportunities for business growth. For example, a quick Internet search for "business incubators" reveals numerous cities and states touting their attractive economic climate and business environment. An honest assessment of the true success of those marketing pronouncements would yield a far different view than the promotional material would indicate.

The focus of this report is to move beyond the marketing cases and regional studies and focus on the reality that global competition is a serious issue affecting many of our nation's states and regions. In the state of Georgia, the issue of global competition is critical as nearly 40 percent of the state's economy is supported by the quickly diminishing manufacturing industry. While Atlanta and the state of Georgia have proven to be a global leader in logistics, transportation, and telecommunications, a growing concern is the region's ability to invest in and develop "new economy" markets in innovation-based and high-tech industries.

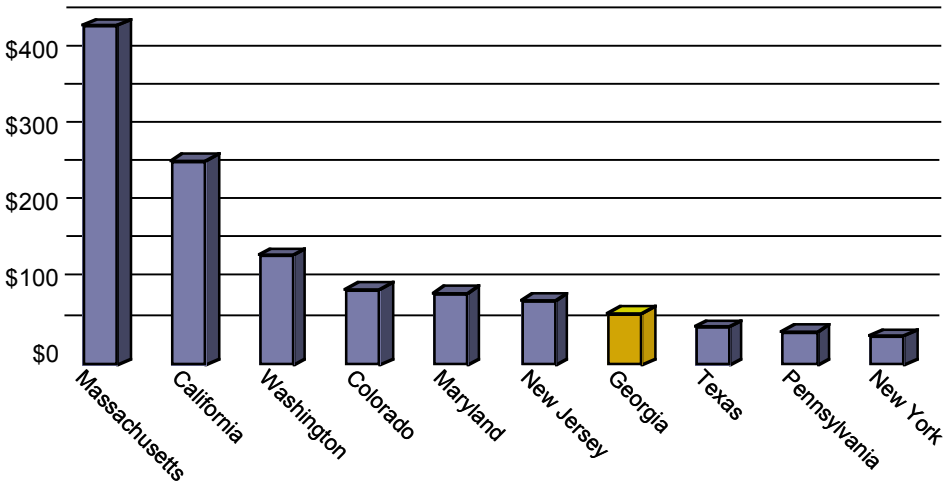
Exhibit 2 highlights several key indicators such as industry-based R&D, venture capital, and overall patent levels that illustrate how Atlanta and the state of Georgia lag behind other states in the Southeast that are aggressively pursuing a position in the global innovation economy. The pace at which Georgia institutions developed patents was half that of other states. Similarly, the rate of federal Small Business Innovation Research (SBIR) awards per 10,000 business establishments in Georgia was only 31 percent of the national average.

Exhibit 2: Georgia's Innovation Indicators Compared to Other Southern States



Source: Southern Technology Council, Not Invested Here, 2004

.**Exhibit 3: Venture Capital by State per Capita (Census 2004)**



Source: PricewaterhouseCoopers MoneyTree

Exhibit 3 further highlights the region's competitiveness by illustrating Georgia's competitive position nationally as it relates to venture capital investments. The venture capital amounts shown above for 2004 were only one-fourth of what they were in 2000. Venture capital investments in biotechnology, while significant on a national level, were almost nonexistent in Georgia.[1]

These indicators show that Georgia lags most states in key areas that are typically associated with economic strength in the emerging high-tech industries. With focused strategies and resources (including investments in people and facilities and an industry commitment to research and development), Georgia may still be capable of achieving status as a leader of global innovation. It will be essential, however, for Atlanta and the state of Georgia to reassess their competitive position and long-term investment strategies in the emerging global economy in light of significant economic successes and continued investments in other regions and states.

A. A Perspective on Atlanta's Position in Key Areas of the Innovation Economy

Over the past decade, the Atlanta region has transformed itself into a national and international center for logistics, software, and telecommunications, valued industries in the new economy. BellSouth, Coca-Cola, Cox Communications, Delta Air Lines, Equifax, Georgia-Pacific, The Home Depot, Southern Company, United Parcel Service, CNN, and Turner Broadcasting Network are among those companies headquartered in metropolitan Atlanta.

While the logistics, telecommunications, and software industries represent the core of Atlanta's new economy, these fields are only one segment of what is often characterized as the high-tech, innovation-based economic system considered desirable for future growth. Manufacturing industries are still at the heart of the Georgia economy, as 45 cents of every dollar of services expenditures in the state come from the manufacturing sector. [2] Atlanta still lacks sufficient market share in industries that are considered the hotbeds of discovery and innovation, such as nanotechnology, biotechnology, optics, and photonics.

[1] PriceWaterhouseCoopers, Venture Economics, National Venture Capital Association, MoneyTree Survey: 1995-2004.

[2] Business InSight Partnership 2004 Annual Report.

Atlanta and the state of Georgia have pursued several initiatives that target these emerging innovative industries. The Georgia Research Alliance, for example, is a partnership between business, research universities, and government that has invested more than $400 million in technology development centers and core research facilities in Georgia since 1990. The Georgia Cancer Coalition, funded with $235 million from the state's tobacco settlement through fiscal year 2006 and supplemented by federal funding and private gifts, is focused on making the state a center for cancer research and treatment. The state has also made significant investments in broadband design research over the past six years, aimed at strengthening Atlanta's status as a national hub for electronic communications and data traffic. The most recent initiative involves state support for an $80 million Nanotechnology Research Center Building on the Georgia Tech campus, which will be the leading cleanroom facility in the Southeast and the nation's first cleanroom facility designed for research combining nanotechnology and biotechnology. Citing examples like these in his January 11, 2006, State of the State Address, Governor Perdue said:

> In the twenty-first-century global economy, we have only two options. Georgia can lead or Georgia can be left behind… To lead, we must innovate. That means we must become a state of innovation. That means making innovation our competitive advantage in every area of our economy: in our existing industries, in our homegrown small businesses, and in the growth industries of the future, such as life sciences and nanomanufacturing.

Additionally, two university-based technology incubators within Atlanta, EmTech Bio, a joint project of Emory and Georgia Tech, and the ATDC at Georgia Tech, have served as catalysts for the development of emerging biotechnology enterprises. As a result of these initial investments, Georgia and Atlanta's bioscience economy has grown 150 percent during the past decade, with more than 200 bioscience companies and research institutes employing more than 15,000 now in the region.[3]

While these accomplishments are significant, Georgia's investment levels are significantly lower in comparison with the leading high-tech regions (see "Leading Region's Investments" section). Furthermore, global competition continues to increase at a rapid pace as national and international entities pursue a greater market share and a new identity as a "hot spot" within the new high-tech economy. Atlanta will be well served by considering the histories and strategic approaches of regions that are recognized as having achieved considerable economic success.

[3] "Region's Biosciences Poised for Growth", by Dr. Michael Johns, *Atlanta Business Chronicle*. October 6, 2003.

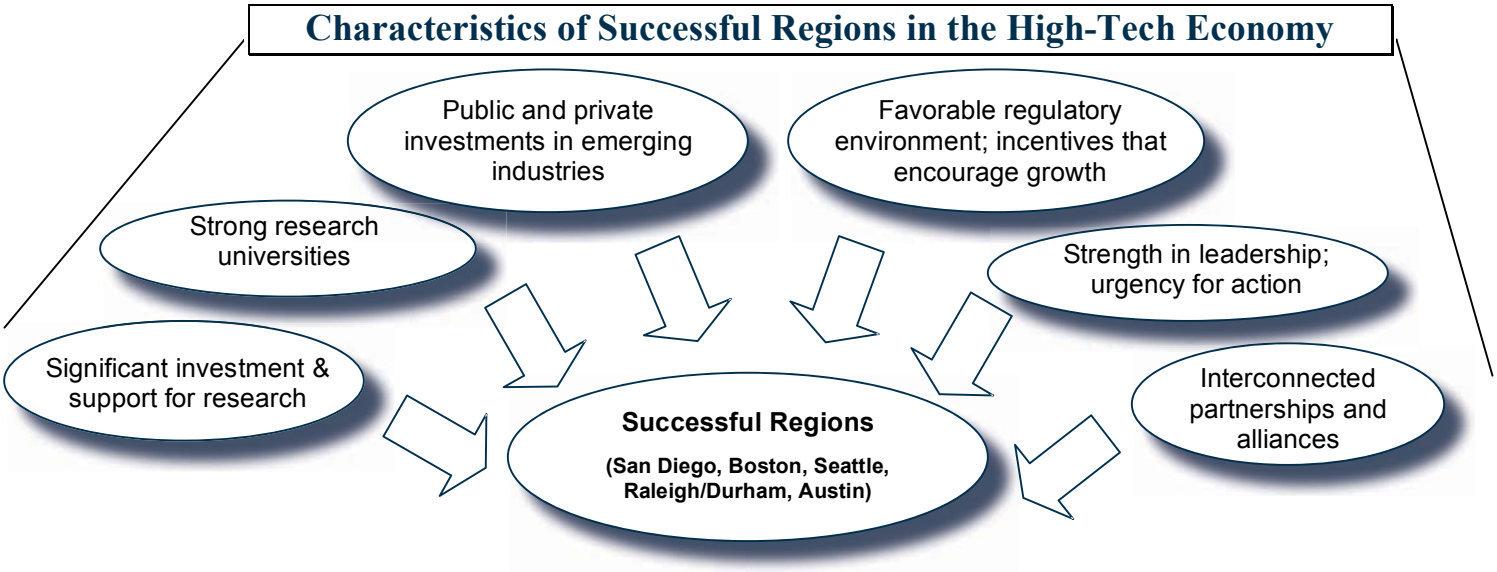
B. Comparing Atlanta to Other Regions That Have Thrived

There are many regions that have sought to gain traction in the pursuit of a high-tech economy. Despite much publicity, only a few regions have successfully fulfilled their objectives to stimulate growth in innovation-oriented industries. Regions such as the Silicon Valley, the Pacific Northwest, Route 128/Boston, Raleigh/Durham, and Austin, Texas, have been successful in creating the infrastructure that links intellectual, financial, and human capital—ingredients necessary for developing regional clusters of innovation.

These leading regions focused early on executing strategies aimed at developing technology-based economies, thereby benefiting from a "first move advantage." However, by examining these regions and identifying the strategies and investments that have led to their success, an aspiring region such as Atlanta may be able to successfully create its own economic development plan.

The primary characteristics in the regions that have been the most economically successful are illustrated in Exhibit 4.

Exhibit 4: Characteristics of Successful Regions in the High-Tech Innovative Economy



The leading high-tech regions that have been successful in building an innovative economy have actively pursued targeted investments for many decades. For example, Silicon Valley began its growth trajectory in the early 1950s with significant investments and companies like Hewlett-Packard. The Research Triangle achieved its early growth upon the arrival of an IBM R&D facility in the early 1960s.

Today, the most successful regions have proactively pursued new opportunities aimed at establishing a "first mover" advantage in new, emerging industries. California, for example, is actively engaged in planning a groundbreaking concept in future energy sources and a well-publicized stem cell initiative. The "hydrogen highway" is targeted at attracting companies that specialize in hydrogen fuel as well as building the world's first hydrogen fueling stations.

Other regions are established leaders in key emerging industries. Investors looking for the greatest return on their investment often look to regions where talent and resources are already established. Atlanta's pursuit of a regional economic development plan may have the potential for greater success if it leverages existing assets or strategically invests in emerging areas that have not yet been dominated by a competing region.

Although slightly outdated, an insightful report released by the U.S. Conference of Mayors during the height of the tech boom in 1999 illustrates a region's high-tech share or percentage of gross metropolitan area (Exhibit 5). At the time, Atlanta was ranked 100th, significantly behind its peer regions, with only a 10 percent share of high-tech GMP compared to the leading region, San Jose, with 57.8 percent.

Exhibit 5: High-Tech Metro Leaders – By High-Tech Share of GMP

Rank	High-Tech Metro Leaders	High-Tech Share of GMP
1	San Jose (Silicon Valley)	58%
3	Denver	40%
6	Austin	36%
10	Raleigh/Durham (Research Triangle Park)	34%
20	Seattle	24%
29	Boston (Route 128)	21%
38	San Diego	17%
49	San Francisco (Silicon Valley)	14%
100	Atlanta	10%

Source: U.S Conference of Mayors, Standard & Poor's DRI

Since 1999, the highest-ranked regions have continued to invest and expand their high-tech innovative economies and infrastructure, solidifying their leadership positions in the race for a high-tech innovative economy.

While many other aspiring regions have studied the feasibility of growth in these high-tech industries, only a few regions have the intellectual capital, infrastructure, and top research universities necessary to succeed. Despite several historically weak indicators, Atlanta and the state of Georgia are in a strong position to harness their intellectual capital and economic strengths to propel the region forward. With meaningful and consistent investments in new initiatives and top research universities, Atlanta is capable of being among the most powerful emerging regions for economic growth and commerce in the new economy. Atlanta's current challenge will be to focus on the right investment strategies and to evaluate where gaps exist in order to transform the region from second tier to world class.

C. Role of Research Universities in the Leading High-Tech Regions

Research universities have unquestionably been significant contributors to regional economic growth, most notably in the emerging high-tech innovative economy. Establishing a direct correlation of a region's strength in the high-tech industries with the quality of the institutions located there is difficult, but strong evidence exists that connects these two concepts. Nearly forty of the top one hundred universities (based on federal funding levels for science and engineering awards) were located within the twenty largest regions in terms of gross metropolitan product per capita in 2003.

Exhibit 6 and Exhibit 7 provide further insight into the relationship between strong economies and strong universities.

Exhibit 6: Top Economically Performing Regions based on GMP Per Capita and Federal Science and Engineering Awards.

Top Economically Performing Regions
Highlighted Regions Show Strong Correlation b/w GMP & Federal S&E Awards

Rank	Region	GMP Per Capita	Region	Federal S&E Awards
1	Boston	$67,861	Baltimore	$1,415,000
2	Raleigh Durham	$54,556	Los Angeles/Orange County	$1,019,000
3	San Francisco/Oakland	$52,549	San Francisco/Oakland	$1,018,000
4	Dallas	$49,837	New York/Nassau/Newark	$895,000
5	Washington DC-MD-VA-WV	$49,339	Boston	$843,000
6	San Jose	$47,146	Raleigh/Durham	$773,000
7	Denver	$46,805	San Diego	$603,000
8	San Diego	$45,845	Seattle	$577,000
9	Los Angeles/Orange County	$45,659	Detroit	$561,000
10	Minneapolis-St Paul, MN-WI	$45,473	Houston	$541,000
11	Seattle	$41,197	Denver	$500,000
12	Cleveland	$40,733	Chicago	$494,000
13	Houston	$40,421	Pittsburgh	$488,000
14	Chicago	$40,227	Philadelphia	$480,000
15	Atlanta	$40,195	Madison	$394,000
16	Phoenix	$39,700	St. Louis	$381,000
17	New York/Nassau/Newark	$39,120	Atlanta	$338,000
18	Tampa-St. Petersburg	$38,439	Cincinnati	$336,000
19	Detroit	$36,316	New Haven	$334,000
20	Philadelphia	$35,593	Minneapolis-St Paul, MN-WI	$327,000

Sources: The U.S. Conference of Mayors; US Census; U.S. News and World Report 2005; National Science Foundation 2002

Exhibit 7: Top Economically Performing Areas Based on Federal S&E Awards and Their Local Universities

Top Economically Performing Regions Based On Federal S&E Awards Highlighted Areas Show Strong Correlation between GMP per Capita and Major Research Institutions		
Rank	**Region**	**Research Universities**
1	Baltimore	Johns Hopkins, UM-College, UM-Baltimore
2	Los Angeles/Orange County	UCLA, USC, UC-Irvine
3	San Francisco/Oakland	Stanford, UC-San Fran, UC-Berkeley
4	New York/Nassau/Newark	Columbia, NYU, Mt. Sinai MS, CUNY
5	Boston	Harvard, MIT, Boston U.
6	Raleigh/Durham	Duke, UNC-CH, NC State
7	San Diego	UC-San Diego, Scripps Research Inst.
8	Seattle	Univ. of Washington
9	Detroit	U. Michigan, Wayne St.
10	Houston	Baylor Medical, U. Texas HS, UT-Houston
11	Denver	Univ. of Colorado
12	Chicago	Northwestern, U. Chicago, UI-Chicago
13	Pittsburgh	U. Pittsburgh, Carnegie-Mellon
14	Philadelphia	U. Pennsylvania
15	Madison	U. Wisconsin
16	St. Louis	Washington University
17	**Atlanta**	**Georgia Tech, Emory**
18	Cincinnati	Case Western, U. Cincinnati
19	New Haven	Yale
20	Minneapolis-St Paul, MN-WI	U. Minnesota

Sources: U.S. News and World Report 2005;

Emory University and Georgia Tech have been key contributors to Atlanta's economic successes. The strength of the Atlanta region will only improve as investments increase in these world-class research universities.

D. Leading Regions' Investments in Research and Emerging Industries

Although Georgia has made significant investments in the Georgia Research Alliance, the Georgia Cancer Coalition, and the broadband design initiative, which have helped it attract increased federal research funds, the competition from other states is keen and growing. The leading regions share a disproportionate amount of federal and state investments in comparison to their peers. For example, innovation-based and high-tech-driven regions in California received an added boost when voters passed Proposition 71, providing $3 billion in state funds over ten years for stem-cell research.[4] While other states debate the ethics of stem cells, California has been proactive, obtaining the first-mover advantage in this emerging segment of the biotechnology industry. California stands to gain major additional funding, an influx of talented scientists, and new infrastructure to help support the cause of the research.

The case of California underscores the ability of a state to aggressively pursue funding for innovation-based enterprises. Other states, such as Washington, Maryland, and Ohio, are leveraging tobacco settlement monies with additional public and private funds to develop, attract, and retain emerging industries. Additional examples of state initiatives are shown below to provide context for the situation in Georgia, where public support for new facilities or initiatives has been limited.

- **Alabama:** The legislature recently approved more than $70 million in funding from the state's Capital Improvement Trust Fund to pay for expanding facilities at state research universities.
- **Arizona:** The state has set up a program that provides nearly $20 million annually in technology and research infrastructure funding. This funding supports the development of several new research facilities at Arizona's public research universities. And, a recent voter-approved referendum (Proposition 301) will pay the debt service on $185 million in revenue bonds to support new research facilities at Arizona State.
- **California:** A $3 billion commitment to stem cell research, $500 million provided in seed money to support biotechnology initiatives. A seed capital fund, called CaliPERS Biotechnology Program, has been established with $500 million in state funds. Centers related to this program will be located in San Diego, Los Angeles, and San Francisco.
- **Connecticut:** On May 31, 2005, the state's House of Representatives gave final approval to a ten-year, $100 million plan to fund stem cell research. The Senate has already approved the measure and it is expected to be signed into law by Governor Jodi Rell.[5]
- **Florida:** The state has initiated a $30 million Technology Development Fund that creates three university-based centers of excellence. Centers of excellence will be established regenerative health biotechnology at the University of Florida, photonics at the University of Central Florida, and biomedical and marine biotechnology at Florida Atlantic University.[6] In 2003, Florida committed $510 million in state and local funding to establish a branch of the Scripps Research Institute. Scripps Florida is expected to bring in more than 6,500 jobs and increase the state economy by $3.2 billion.
- **Maryland, Virginia, and Washington, D.C.**: Officials in Maryland, Virginia, and the District of Columbia agreed in 2005 to form the Chesapeake Nanotechnology Initiative (CNI), a collaborative effort to strengthen the region's capabilities in nanotech research, development and commercialization. To build a nanotech business cluster for the Mid-Atlantic region, CNI will establish closer working relationships among science, technology, and business leaders from private industry, academia, and federal, state, and local governments. The initiative

[4] "California Universities Start Preparing for Windfall in Stem-Cell Research," by Jeffery Brainard. *The Chronicle of Higher Education.* November 12, 2004.

5 "Conn. House OKs Stem Cell Research," by John Bacon. USA Today. June 1, 2005.

6 "The Competition: Other State Initiatives," prepared by the Minnesota Partnership for Biotechnology and Medical Genomics.

hopes to build off the many existing academic, industrial, and federal research strengths in the region.[7]

- **Massachusetts:** In a state that is generally considered to have the highest level of private investment in science and technology, public officials continue to solidify this position for the future. Governor Mitt Romney recently unveiled a $600 million plan to boost job growth in the innovation economy. The Massachusetts Technology Collaborative, which was created by the governor and state legislatures, operates as a catalyst at the intersection of industry, academia, and government to create new economic opportunity and identify the region's barriers for growth in the new economy. Furthermore, as a landmark economic stimulus in 2004, the Massachusetts state legislature invested $35 million to create the John Adams Innovation Institute, which was founded to promote the growth of Boston's innovation economy.
- **Michigan:** Governor Jennifer Granholm has established a biotech initiative to diversify Michigan's industry and reduce its reliance on automotive manufacturing, traditionally a major employer in the state. The governor has asked the state legislature to create a $2 billion fund to invest in cutting-edge technology businesses. To attract more high-tech companies built on innovation, a nonprofit regional collaboration dubbed SPARK hopes to transform Ann Arbor into an entrepreneurial hub and triple the number of technology jobs within five years.
- **New Jersey**: Acting Governor Richard J. Codey recently announced $10.5 million in state funding to support stem cell research grants, help recruit leading scientists and help set up clinical trials. The acting governor in January 2005 unveiled a $380 million stem cell research initiative. As Senate president, he introduced separate bills that would allocate $150 million in unused bond capacity to construct a building to house the Stem Cell Institute and authorize the legislature to ask voters to approve a $230 million bond referendum to fund stem cell research grants.[8]
- **North Carolina:** In 2004, a new plan to grow North Carolina's biotech industry to 48,000 jobs by 2013 and 125,000 by 2023 through a $650 million investment over five years was released by the North Carolina Biotechnology Center, a state-supported nonprofit organization. The report's 54 action steps span a variety of objectives, including the enhancement of universities to conduct innovative research and transform new ideas into commercial opportunity and the encouragement of universities to support and reward faculty entrepreneurial activities. The state's commitment to biotech was jumpstarted in 2003 when the Golden LEAF Foundation and industry pledged $64.5 million to help build a statewide network of bio-manufacturing training centers. Other initiatives slated for funding include $75 million for the One North Carolina Fund and $50 million to recommit to endowed faculty chairs and establish a general fund for faculty start-up packages.[9] In 2000, North Carolina voters approved the issuance of $3.1 billion in bonds to improve facilities at the state's 16 public universities and 58 community colleges.
- **Ohio:** The Wright Centers of Innovation support large-scale research and technology development platforms designed to accelerate the pace of Ohio commercialization. A total of $10 million will be available to provide operating grants to the existing non-bioscience-related centers. An additional $40 million from the state's capital budget will be available to support the new Wright Centers of Innovation. The capital bill also included $13.6 million for new Wright Projects, which support specifically defined near-term commercialization projects

7 Ibid., Excerpted from http://www.ssti.org/Digest/2005/headlines05.htm

8 Ibid., Excerpted from http://www.ssti.org/Digest/2005/headlines05.htm

9 Ibid., Excerpted from http://www.ssti.org/Digest/2004/022704.htm#NC

requiring major capital acquisitions and improvements at Ohio higher education institutions and nonprofit research organizations.[10]

- **Oklahoma:** In March of 2005, Governor Brad Henry signed legislation establishing a $475 million bond issue for a slate of higher education projects, much of which targets research and laboratory facilities. The Oklahoma Higher Education Promise of Excellence Act of 2005, which the governor called "desperately needed," was one of his top legislative priorities for the year. The bill containing the bond issue, H.B. 1191, also provides $25 million in the form of a bond bank to finance future improvements at the state's colleges and universities. Projects slated for the University of Oklahoma include construction of a chemistry and biochemistry teaching and research-laboratory complex, infrastructure improvements for the University Research Campus, and construction of new engineering and technology facilities. Oklahoma State University will receive $76 million for projects that include a new science and technology research center and renovation of existing research laboratory and office space. The measure is estimated to have an initial economic impact of $737 million and to result in more than 4,000 new construction jobs. Financing to repay the bond will be derived from lottery proceeds and a new gross production tax.[11]
- **Texas:** In 2005, the legislature approved $100 million of the original $300 million requested by Governor Rick Perry for the Emerging Technologies Fund (ETF). Another $100 million is expected to be available from the state's rainy day fund if revenues exceed forecasts. The ETF aims to foster emerging technologies, enhance university-industry collaboration, and promote technology commercialization.[12]
- **Washington:** In 2005, Governor Christine Gregoire signed a bill creating the Life Sciences Discovery Fund to support life sciences research using $350 million in strategic payments over a ten-year period. By leveraging funds from private and federal sources, the fund's total impact is expected to exceed $1 billion and is anticipated to drive important healthcare innovations, new company formation, and job creation across the state. The bill was backed by a coalition of leaders from business, civic organizations, and research institutions from across the state, including the University of Washington, Washington State University, and the Pacific Northwest National Laboratory in Richland.[13]

10 Ibid., Excerpted from http://www.ssti.org/Digest/2004/061404.htm

11 Ibid., Excerpted from: http://www.ssti.org/Digest/2005/headlines05.htm

12 Ibid., Excerpted from: http://www.ssti.org/Digest/2005/headlines05.htm

13 Ibid., Excerpted from http://www.ssti.org/Digest/2005/headlines05.htm

E. Favorable Regulatory Environment and Incentives that Encourage Growth

The relationship between states and public higher education is changing for a variety of factors, including the decreasing pool of state funds, the heightened level of competition among private colleges and universities, dramatic shifts in enrollment projections, and increasing pressure from public officials to drive the state's educational, civic, *and* economic development. Compounding such challenges are the already-tight state budget cycles that dramatically complicate long-range planning at public research universities.

In response, several institutional leaders of large, highly competitive, public research universities are seeking greater flexibility to be competitive, often in exchange for a combination of reduced state support and increased accountability. Many have based arguments on the evolving model of the public university. Though once grounded in the land-grant tradition, public research universities have progressed into a new model focused on research for economic development, public/private partnerships, and entrepreneurship. Thus, research universities may now better advance the public good by serving more as an engine of economic development than as an instrument of social responsibility.

Most sought after is flexibility and freedom from unproductive and anti-competitive regulations. Public research universities envision more efficient and effective operations if released from the state-mandated procedures that result in higher building costs, additional complexity to already burdensome budgeting and reporting requirements, and cumbersome purchasing regulations that limit the number of pre-approved vendors. Emulating the success of their private counterparts, public research university leaders argue that if freed to run their institutions more effectively, the state would get a better return on its investment from an academic and economic development perspective. There is an emerging appreciation of the competitive disadvantage that public research universities have when compared to private research universities, many of whom compete with and are peers of Georgia Tech. Recognizing the distinction between research universities and state agencies, some legislatures and governors have endorsed a new paradigm for public research universities. In California and Michigan, for example, public research universities are, in essence, "constitutionally free" from state control and operate with significant flexibility to compete with private research universities.

While the approaches vary—from deregulation, decentralization, and tuition vouchers to performance-contingent funding, public corporation status, and charter colleges—the outcomes typically involve some form of revenue and tuition flexibility, procedural and operational autonomy, enhanced accountability, funding formulas, or performance contracts.

The following summarizes recent examples of public research universities that have begun to achieve increased effectiveness through additional operational freedom.

- **Colorado:** In addition to a voucher-like program, an agreement was established between the state's public colleges and the Colorado Commission on Higher Education to develop four-year performance contracts in which institutions pledge to meet specific goals, such as improving graduation and retention rates, in return for greater latitude in setting tuition and issuing their own bonds. The new law took effect on July 1, 2005.[14]
- **Florida:** Over the past several years, Florida's universities have been given increased administrative and financial autonomy by the legislature. For example, they have been granted local boards of trustees, the flexibility to manage personnel systems, the ability to deposit funds outside the State Treasury, the authority to carry forward year-end fund balances, the ability to develop their own financial management systems rather than being required to use the state's systems, the responsibility of collectively bargaining at the local level, the authority to control their own positions and rate, the ability to expend funds directly

[14] Excerpted from http://www.chronicle.com/weekely/v51/i45/45a02901.htm

from grants-in-aid appropriation categories, and the authority to exercise the right of eminent domain with approval of the State Board of Education. Recently, the University of Florida and Florida State University spearheaded an effort to receive approval to change their status from "state-operated" to "state-related" and to negotiate lump-sum payments in exchange for guaranteed outcomes. In 2005, a legislative bill was signed into law that outlined the powers and duties of the legislature, including the setting of tuition and fees, and the powers and duties of the Board of Governors, including the monitoring of facilities, programs, and strategic planning at the universities.[15] Additionally, the bill protects the exemptions currently held by the universities from state agency status.

- **Massachusetts:** Governor Mitt Romney attempted to radically reform higher education—including privatizing the public Massachusetts College of Art and Massachusetts Maritime Academy. Though the broader reforms failed, the colleges were able to leverage this situation into an agreement that changed their state funding formula and created new autonomy. In part, the new agreement stipulates that the colleges will receive a level-funded block grant and retain all of their tuition revenues (unlike other public institutions in the state), and they now have the ability to expand out-of-state admissions. In return, the colleges agreed to keep in-state tuition affordable (through grants and loans) and to match every out-of-state student with an in-state admission. Legislative leaders, who tired of colleges asking for more money each year, view this as a pilot program for a new model of state funding and control.[16]
- **Missouri:** House Bill 742, the Higher Education Student Funding Act, has been introduced in the Missouri House of Representatives to change the laws regarding state funding of higher education. Performance contracts of up to five years, based on improving access, quality, efficiency, and addressing state needs, must be entered into by public higher education institutions and by any qualified private institution providing services under a fee-for-services contract. Performance contracts will exempt an institution from certain purchasing regulations and from academic program approval, as long as the programs fit the institution's mission. Proposed tuition increases must be reported to the board. Although HB 742 did pass the Higher Education Committee and is on the House calendar, an interim committee will first review the findings and recommendations.[17]
- **North Carolina:** The UNC system's Board of Governors has convened a new tuition study group to investigate how UNC Chapel Hill and N.C. State—the state's two primary research institutions—might receive some special treatment in the way they are funded. The new tuition task force is comprised of system board members as well as the chairs of UNC Chapel Hill and N.C. State's boards of trustees. Another provision, still pending, would have allowed UNC Chapel Hill and N.C. State to set their own tuition rates without the approval of the system's governing board. A task force reviewing this matter was scheduled to conclude its work in the fall of 2005.[18]
- **Oklahoma:** The state legislature has long debated curbing the tuition-setting authority it granted to its Board of Regents in the 2001 session. In 2003, the legislature removed a 7-percent cap on resident tuition hikes and allowed state universities to set their own fees and tuitions. After the bill passed, tuition at the University of Oklahoma rose 27.7 percent, and Oklahoma State University raised its tuition 26.4 percent. Less than a year later, a bill was introduced to restore legislative oversight, but was voted down.[19]

[15] Excerpted from http://www.fsu.edu/~govrel/legisletter2005/legisletter_5_31_05.pdf

[16] Excerpted from http://www.acenet.edu/bookstore/pdf/2004_shifting_ground.pdf

[17] Excerpted from http://www.house.state.mo.us/bills051/bilsum/intro/sHB742I.htm

[18] Excerpted from http://www.heraldsun.com/orange/10-635689.html

[19] Excerpted from http://www.futuresproject.org/publications/Compact%20Policy%20Brief%20Final.doc

- **South Carolina:** In 2003, Governor Mark Sanford unveiled a proposal that would enable South Carolina's public colleges and universities to privatize and become not-for-profits, free from state regulation by the Commission on Higher Education. Sanford's proposal, open to any public research or teaching university, would enable those institutions looking for more flexibility to exercise self-governance in areas such as procurement, human resources, capital planning, and fundraising. The proposal would transfer all buildings, real estate, and capital improvements from the state to those institutions that choose to accept the offer, which in turn would forego any direct appropriations from the state, organize under IRS Code 501(c)(3), and agree to charge a preferred tuition rate for qualified South Carolina residents (a permanent covenant).
- **Texas:** Two years ago, legislators bestowed on public universities the power to set their own tuition and operate under reduced reporting requirements. Some lawmakers have voiced concerns about how quickly tuition has risen at public colleges since they were given more freedom to set their own rates; last year tuition at the institutions went up by an average of 16 percent. The legislature rejected a measure to eliminate universities' tuition authority.[20]
- **Virginia:** The College of William and Mary, the University of Virginia, and Virginia Tech began pushing a proposal to sever many of their ties with the state and become state-assisted charter universities, a new kind of institution. In exchange for less regulation and a smaller share of the appropriation, the state's public institutions would have to develop six-year financial, academic, and enrollment plans to outline how they will help meet state needs. Colleges, for instance, would have to detail such factors as how much tuition they would charge each year under different state-funding scenarios and how they planned to forge closer ties with elementary and secondary schools. The legislation approved by the General Assembly became law on July 1, 2005.[21]
- **Washington:** With support from former University of Washington President Richard McCormick, former Governor Gary Locke several years ago proposed giving the University the authority to set tuition for resident undergraduate students to help make up for gaps in state funding. The state legislature has always rejected the idea, though, fearing tuition would increase faster than financial aid and squeeze out students who can't afford the cost. Modeled after the Miami of Ohio plan, University of Washington President Mark Emmert has resurrected a conversation about boosting tuition while increasing financial aid to lower-income students. The University of Washington would also like more control over tuition for resident undergraduates, such as the authority to increase tuition up to the national average rate of tuition increases. Governor Christine Gregoire says she'll seriously consider the idea in her comprehensive study of how Washington funds education.[22]
- **West Virginia:** Marshall University and West Virginia University received legislative authority that provides the institutions more control over setting tuition and fees and making decisions about purchasing and capital improvements. The bill allows both schools to participate in a pilot investment program; clarifies responsibilities of the attorney general in approving contracts, leases, etc.; and provides conditions for additional flexibility to certain other state institutions. University leaders argued that the legislature should not micromanage all the details of billion-dollar entities, down to such decisions as the size of fines for violations of campus parking rules. The bill was approved by legislature and signed by the governor in spring of 2005.[23]

---

[20] Excerpted from http://chronicle.com/weekly/v51/i39/39a01901.htm

[21] Excerpted from http:// www.chronicle.com/weekly/v51/i25/25a00101.htm

[22] Excerpted from http://archives.seattletimes.nwsource.com/cgi-bin/texis.cgi/web/vortex/display?slug=tuitioned24&date=20050624&query=Means-testing+tuition%2C+an+idea+not+yet+here

[23] Excerpted from http://www.herald-dispatch.com/2005/April/10/LGList3.htm

- **Wisconsin:** Motivated by a decade of static or declining state support for the University of Wisconsin System, the Board of Regents concluded a year-long study in 2004 with the release of a final report that recommends additional efficiencies and revenue streams. The study recommends additional autonomy regarding the streamlining of overly burdensome and time-consuming capital building program processes (project enumeration, competitive services, flexible bidding, process improvements, and financing), creating flexibility in the procurement process (pricing and processing), creating the authority for the UW System to assume all university cash management and investment responsibilities (investments and banking contracts), creating the authority to retain and reinvest the proceeds from the sale of buildings or land if acquired or built with program revenue or gift funds, and extending the UW System's position control authority (ability to create and abolish positions) to include program revenue operations not previously listed in the statutes.[24]

The following case study illustrates in greater detail the process and outcome of three public universities in Virginia in their effort to achieve greater operating and organizational flexibility.

Case Study: Virginia and Its Pursuit of Flexibility for Its Public Universities

In Virginia, the governor has signed a bill that fundamentally changes the operating requirements for the state's public universities. Recognizing that a consistent decline in public funding has had a detrimental affect on the ability of the state's public universities to compete, Virginia lawmakers, in collaboration with leaders from the University of Virginia, Virginia Tech, and William and Mary, established a model that allows for more freedom from regulations and more flexibility from burdensome state policies.[25]

Virginia, like many states, has historically expected its public universities to comply with state purchasing rules, personnel job classification and salary systems, limits on the size of construction contracts, and regulations that define how a university can or cannot invest its capital. Alternatively, private universities have flexibility to purchase, build, and invest in ways that best serve their interests regardless of restriction, so long as its trustees are satisfied that fiscal responsibility is being exercised.

Virginia's example may provide a model for other states that are challenged by how to support their universities that increasingly need more funding and more "freedom" in order to compete with their private peers. A recent legislative session saw the initiative both reduced and broadened in scale as compromises were made and the specifics were worked out in order to win support in the legislature.[26] At its core, the initiative gives great autonomy in exchange for comprehensive six-year plans that detail strategies for academic improvement, financial sustainability, and an achievement of enrollment expectations.

Under the new legislation, three levels of autonomy are provided as incentives to each institution; the more criteria that are met, the more flexibility and regulatory relief an institution may receive. The highest level of autonomy, for example, would require that an institution have a minimum AA- bond ratio (or equivalent) in the past five years. Other criteria include ensuring access, affordability, timely graduations, programmatic offerings, quantifiable evidence of economic development efforts, and initiatives to collaborate and support K-12 education in the state.[27]

Efforts of this kind require significant compromise and negotiation. In Virginia, it was a two-year effort that required significant participation by the presidents as well as top designees from the three universities working tirelessly to achieve a suitable resolution. Exhaustive one-on-one lobbying of legislators, strong institutional leadership, and ultimately a commitment to remaining public were essential.[28] Through good will and a positive collaborative spirit, the universities helped create a new system that commits them to better management practices and greater accountability. And the state of Virginia prevails by endorsing a strategy that will improve public higher education for its citizens by granting its universities the flexibility to truly compete with their private university peers.

[24] Excerpted from http://www.uwsa.edu/srvpadm/study/report.htm

[25] "Statehouse Digest." Prepared by Karin Fischer, Sara Hebel, and Peter Schmidt for *The Chronicle of Higher Education.* February 18, 2005.

[26] "Led by Colorado, States Weigh New Approaches to Financing Colleges, by Sara Hebel. *The Chronicle of Higher Education.* March 26, 2004.

[27] "More Autonomy Possible for Virginia Public Colleges." *NACUBO online*. February 28, 2005.

[28] Interview with Minnis Ridenour, Executive Vice President and Chief Operating Officer at Virginia Polytechnic University.

F. Summary

While continuing historical efforts to dominate in the logistics, telecommunications, manufacturing, and software industries, the State of Georgia's future sustainable economic growth will rely heavily on industry diversification and investment in the emergent high-tech, innovation-based industries such as nanotechnology, biotechnology, optics, energy, health systems, and photonics.

Though several indicators place Georgia behind most regions for investment in emergent industries, a comprehensive economic growth strategy that focuses on business incentives and consistent investment can position Georgia as a leader in global innovation. Strong high-tech infrastructure (including research universities, research parks, incubator space, and other facilities), a shared vision, retention and utilization of intellectual capital, and significant financial investment will be the "engines" that drive economic growth and regional prosperity.

With a nationally heralded research university dedicated to the pursuit of science and technology, the state can capitalize on Georgia Tech's assets in ways analogous to those of other leading regions (Boston/Route 128, Silicon Valley, etc.). In the Atlanta region, Georgia Tech and Emory University are best equipped to provide the primary inputs necessary to expand the region's high-tech capabilities.

IV. Georgia Tech's Economic Impact on the Region

From an economic perspective, one of the most significant benefits stemming from Georgia Tech is the flow of funds into Georgia from outside the state's borders. This revenue influx has an impact on job creation and economic activity that goes beyond Georgia Tech's direct employment and purchases of goods and services.

Using a widely recognized methodology, an analysis was conducted to estimate the economic impact that Georgia Tech has on the state and regional economy. The precise economic impact is of less importance than the overall magnitude of the economic benefit.

The economic impact analysis is divided into five sections: Overall Economic Impact Analysis, Technology Impact, Research Impact, Alumni Impact, and Other Impacts.

A. Overview of Georgia Tech's Economic Impact

Highlights from this section include:

- In 2004, Georgia Tech's total revenue was $889 million, including:
  - $209 million in state operating funds
  - $55 million in state capital funds
  - $625 million in non-state-appropriated funds
- The state of Georgia's investment of $264 million (operating and capital) created $3.9 billion in economic activity within the state of Georgia, a return of nearly $15 for every $1 provided by the state.
- A total of $450 million—more than 50 percent of Georgia Tech's total revenue—was attracted from sources outside the state of Georgia.
- Georgia Tech spending stimulated an economic impact of $3.9 billion.
- Georgia Tech stimulated the creation of approximately 44,400 jobs in the state of Georgia, including the 12,525 direct jobs created by Georgia Tech.
- Georgia Tech students graduating in 2004 will contribute more than $6.75 million back to the state in income tax revenue, an amount comparable to the tuition those graduates paid for their final academic year.
- Companies created or supported through the ATDC (Georgia Tech Incubator) employed more than 5,500 people in 2004, generating almost $1.7 billion in revenues. Those companies also received almost $117 million in venture investment.

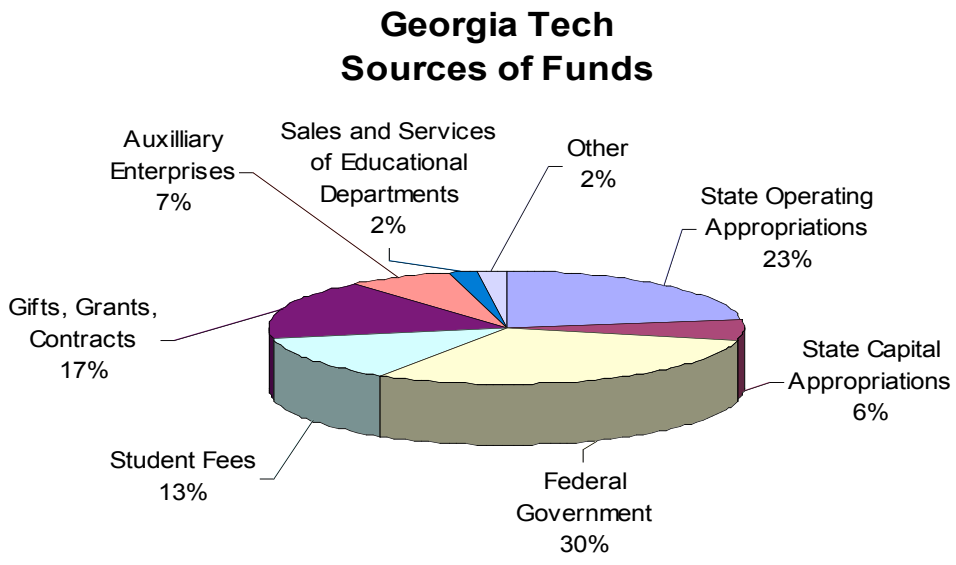
B. Sources of Operating and Capital Funds, FY 2003- 2004

In 2004, Georgia Tech received more than $889 million in revenue from a wide range of sources including $264 million from the state of Georgia and $625 million from sources other than the state. These revenues would not have flowed to the state of Georgia if it were not for the presence of Georgia Tech. See Exhibit 8 and Exhibit 9.

Exhibit 8: Financial Details of Georgia Tech's Revenue Sources

Georgia Institute of Technology 2004 Sources of Revenue (in millions)		
State Support		
Operating Appropriation	$209	
Capital Appropriation	$55	
Total		**$264**
Federal Government		$266
Student Fees		$116
Gifts, Grants, Contracts		$153
Auxiliary Enterprises		$61
Sales and Services of Educational Departments		$15
Other		$14
Total		**$889 Million**

Exhibit 9: Georgia Tech's Revenue Sources



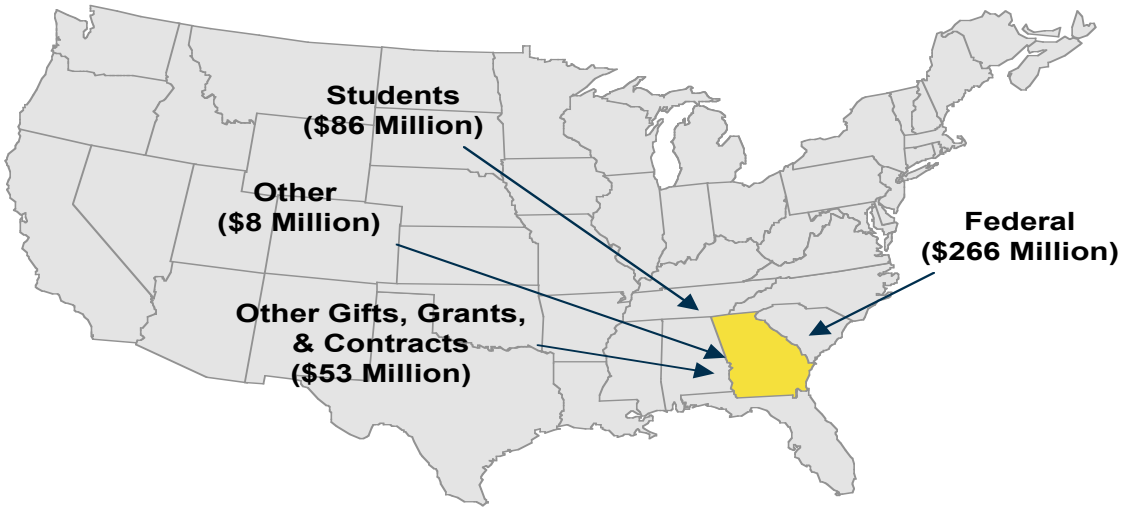
C. *Revenue from Non-State Sources*

With approximately $625 million of Georgia Tech's revenue coming from non-state sources, 85 percent, or $535 million, came from three major sources:

- Federal Government Grants & Contracts ($266 million), provided normally in the form of grant and contract awards. Major sources included:
  - National Science Foundation
  - U.S. Department of Defense
  - U.S. Department of Energy
  - NASA
  - U.S. Department of HHS
  - U.S. Air Force
  - U.S. Army
  - U.S. Navy
- Student Fees ($116 million), paid by resident and non-resident students
- Gifts, Grants, and Contracts ($153 million), from individuals, corporations, and foundations

Exhibit 10 illustrates the sources for the $450 million Georgia Tech has attracted in funds from outside the state.

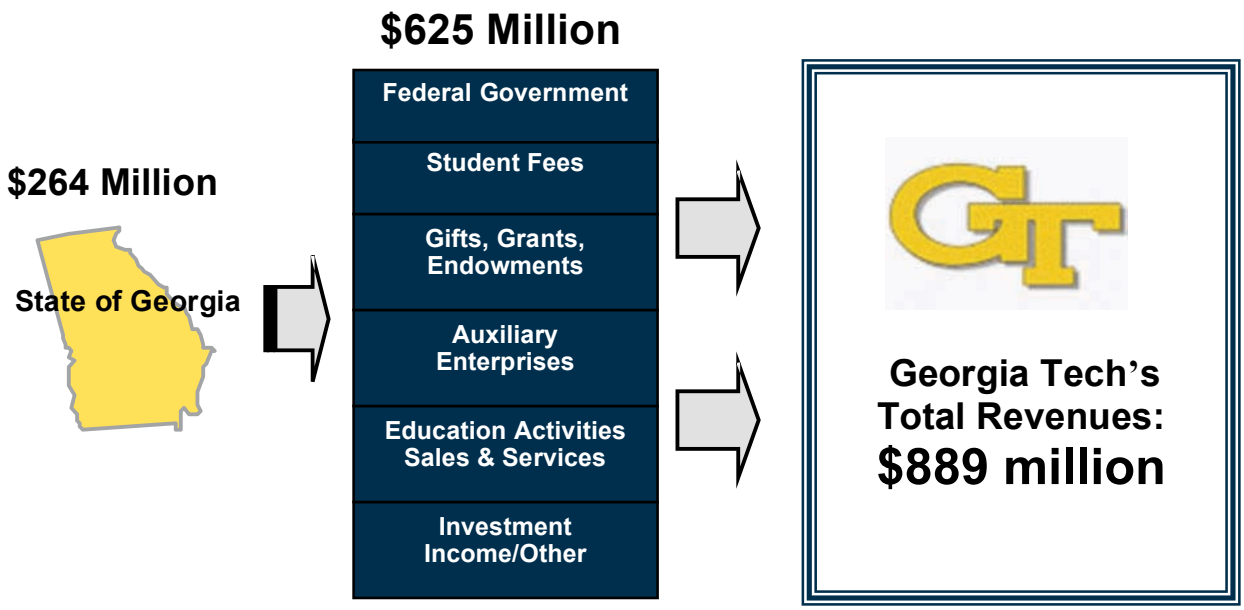
Exhibit 10: Revenue Generated from Outside the State



D. Leveraging State Support

Georgia Tec leveraged the $264 million it receives in State funding to attract an additional $625 million from other sources. (Exhibit 11). These revenues would not have flowed to the State of Georgia if it were not for the presence of Georgia Tech.

Exhibit 11: Georgia Tech's Leverage of State Support



E. Economic Impact Analysis

A widely recognized methodology was used in this analysis to estimate the economic impact that Georgia Tech has on the Atlanta regional economy.

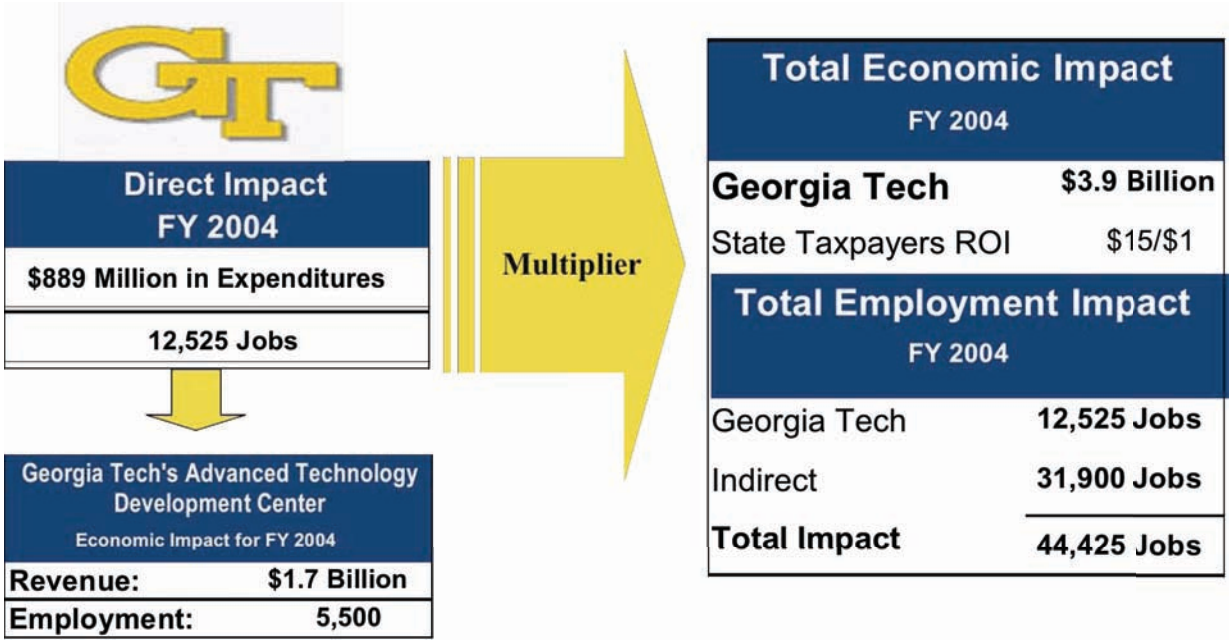
This analysis evaluates direct, induced, and total economic and employment impacts using the U.S. Department of Commerce, Bureau of Economic Analysis' (BEA) RIMS II multipliers. Direct impacts are expenditures that secure services and goods of regional households, governments, investors, and businesses in order to meet additional demands created by the institution. Induced economic impacts occur due to the effects of direct impact expenditures being respent within the region. The total economic and employment impacts are the sum of direct and induced impacts.

By using the RIMS II multipliers, it is possible to estimate the total impact of the money Georgia Tech spends as it ripples through the region's economy. Multipliers are developed to estimate the impact of each dollar on the output and employment of a particular region. The use of multipliers is based on the concept that dollars introduced into an area generate additional economic activity. In this study, regional multipliers were developed based on the Atlanta Census Metropolitan Statistical Area (MSA), which consists of twenty local counties.

In order to determine the total economic impact of Georgia Tech on the Atlanta regional economy, the appropriate multiplier is applied to direct output figures. According to the RIMS II information provided by the BEA, Georgia Tech's economic output multiplier is 2.4907. By applying this multiplier to Georgia Tech's direct economic output, Georgia Tech's total economic impact in the regional economy is approximately $2.2 billion.

RIMS II data also provides multipliers and methods to estimate the employment impact of a research university on its regional economy. In this study, the employment impact multiplier is 29.7069. Based on the Institute's spending in the community and the spending of its employees, Georgia Tech supports an induced impact of an additional 26,409 jobs in the region. In total, the Institute supports 38,934 jobs including direct and induced employment impacts.

Exhibit 12: Georgia Tech Input-Output Model for Economic Impact (using FY04 figures and data)



F. The Impact of Technology Transfer

Research universities have made significant efforts to create an environment where internally developed ideas and technology can be transferred as quickly as possible to the commercial marketplace. Technology transfer generates independent revenue streams for the Institute and creates the potential for job creation and new commercial ventures.

One of the key economic benefits for the state of Georgia and the Atlanta region are the dozens of new companies that have been grown, developed, incubated, and spun out of Georgia Tech. Whether Georgia Tech laboratories are producing new technologies or the ATDC is lending support and guidance for the development of new businesses, the infrastructure for developing viable entrepreneurial opportunities is significant. Exhibit 13 further underscores the success of Georgia Tech in this area. Each of these companies employs Georgians or is managed, in part, by Georgia Tech alumni. Most have investors who are located in the Atlanta region, and a majority of the companies produce goods, services, tax payments, and jobs that benefit the economy.

Exhibit 13: Representative Sample of Georgia Tech Start-Up Companies

Based on technologies developed in whole or in part at Georgia Tech					
Name	**Product**	**Year Founded**	**Name**	**Product**	**Year Founded**
DVT Corporation	Sensors	1991	Bluespan	Networking	2001
Wang Electronics	Signal Processing	1991	Quellan	Telecomm	2001
Custom Composites	Manufacturing	1992	Ray-Gun	Software	2001
Photonic Systems	Sensors/Biochem	1992	SynterMed	Software	2001
AGT	Internet/Telecom	1993	ScanTech	X-ray Inspection	2001
AkroMetrix	Manufacturing	1995	Vocalocity	Software	2001
Cyber-care	Telemedicine	1997	Ultranetics	Sensors	2001
KBI BioPharma	Biotech	1997	WiKID Systems	Software	2001
CAMotion	Sensors	1998	DentAART	Medical devices	2002
Georgia Composite	Manufacturing	1995	Medanoia	Medical devices	2002
Salumedica	Medical devices	1998	Microception	Security	2002
Biovalve	Biotech	1999	Cambia	Software	2002
Systine	Biomed	1999	Radatec	Sensors	2002
Virtually Better	Software	1999	Encounter	Telephony/Internet	2003
Ardext	Manufacturing	2000	Structured Alloys	Manufacturing	2003
ENKIA	Software	2000	Innovative Fluidics	Electronic cooling	2003
Nexidia	Software	2000	Stheno Corp.	Biochem	2003
Qcept.	Sensors	2000	Medsensor	Sensors	2004
Robust Automation	Software	2000	Maya International	Internet	2004
BroadSource	Software	2000	Orthonics	Biomed	2004
Sensatex	Medical devices	2000	Gtronix	Semiconductor	2004
CarioMems	Biotech	2001	Vivonetics	Biotech	2004
EG Technologies	Telecom	2001	Jacket MicroDevices	Biotech	2004
Hoyos Simpil	Telecom	2001	Wispy.net	Wireless ISP	2004
			BionTTech	Biotech	2004

Sources: Georgia Tech Office of Technology Licensing and Advanced Technology Development Center

The ATDC, together with Georgia Tech's Office of Technology Licensing, provide Georgia Tech with two different yet similarly focused organizations. Both have objectives to help new companies grow and, eventually, integrate into the economy of the state and the Atlanta region.

Georgia Tech runs ATDC for the state of Georgia, and its relationship with the Institute provides a significant economic benefit for the city and region. Since 1987, nearly 250 ATDC-spawned companies have created more than 42,000 man-years of employment and have generated more than $9.3 billion in revenue. Seventy-five percent of ATDC's companies are still in business or have been acquired by other businesses that are leveraging technologies incubated at ATDC.

A recent economic impact study measured many of the same metrics discussed in this report and further emphasizes the significant value that ATDC, a Georgia Tech-managed and state of Georgia-funded collaborative, has had on the economy.[29]

ATDC's key findings include:

- 2004 employment level of more than 5,500 from ATDC-spawned companies
- $1.7 billion in revenues
- Received nearly $117 million in venture investment
- Delivered a 6.8 percent return on funding

Georgia Tech's Office of Technology Licensing has also had a significant impact on the state of Georgia through the development of start-up companies, patents, licenses, etc. Exhibit 14 provides a summary of Georgia Tech's technology transfer operations.

Exhibit 14: Summary of Selected Measures of Georgia Tech's Technology Transfer Operation

Tech Transfer Measure	2001	2002	2003	2004
Start-up companies formed	8	7	10	15
Inventions, software, and copyright disclosures	141	188	226	277
U.S. patents issued	35	40	41	35
Software licenses executed	16	39	37	22
Invention licenses executed	13	25	28	35
Office of Technology Licensing total licensing income (in $000,000s)	4.6	2.24	2.4	2.32

Sources: Georgia Tech Research Corporation, Office of Technology Licensing, and Office of Institutional Research, and the Association of University Technology Managers 2003 Survey.

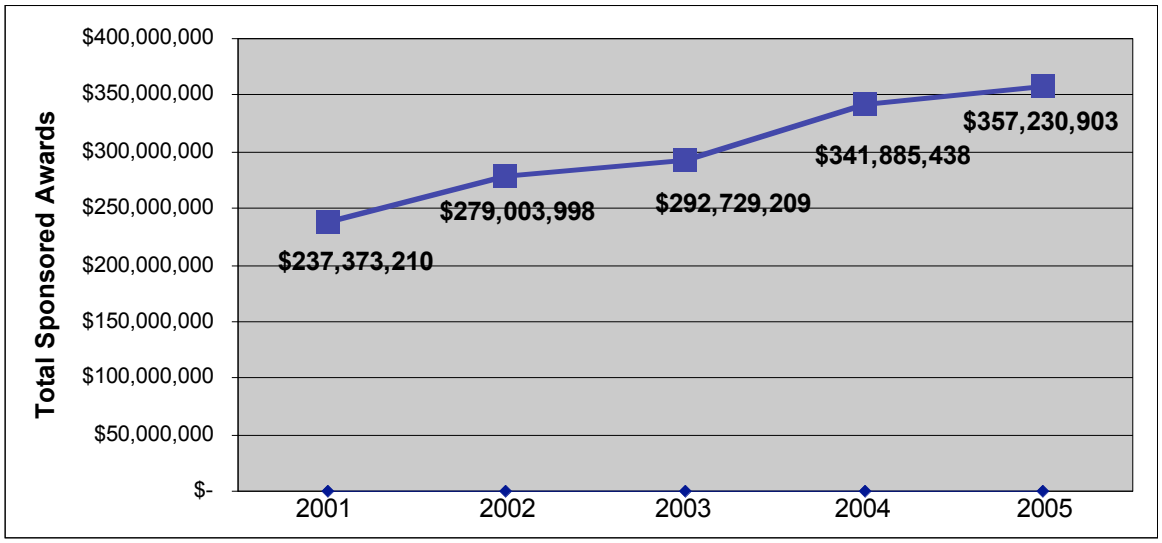
[29] Fiscal and Economic Impact Analysis of the Advanced Technology Development Center 1987-2004

G. Research is a Significant Contributor

Georgia Tech's economic impact stems from a broad number of variables. However, the size and scope of the research enterprise is the most essential component of the economic impact calculation. Georgia Tech has had significant success in attracting extramural R&D support. In FY 2004, total R&D awards were approximately $342 million.

Each dollar invested in research at Georgia Tech not only contributes to the Institute's economic impact, but also represents possibilities for breakthroughs, discoveries, and inventions by Georgia-based companies. Exhibit 15 illustrates Georgia Tech's total R&D growth over the past five years.

Exhibit 15: Trends in Georgia Tech's Total R&D Growth, in $000's



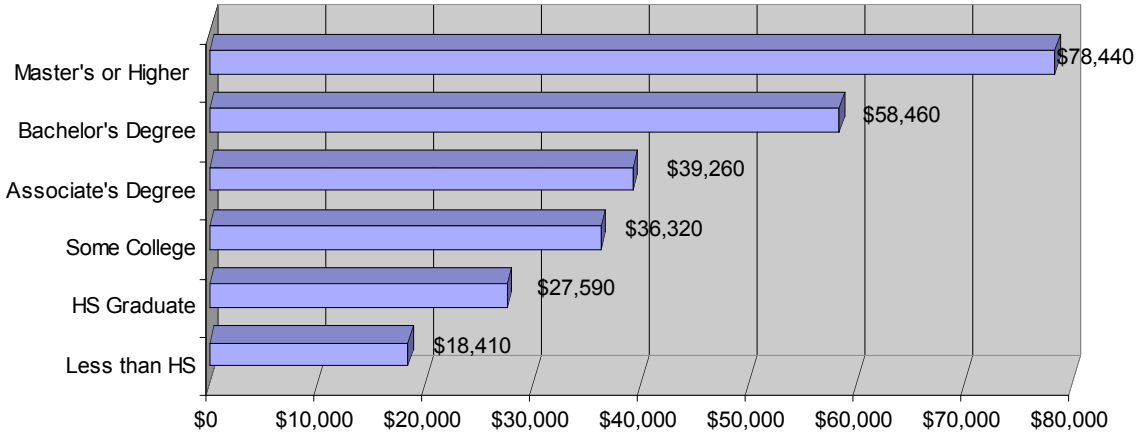
H. Other Economic Impacts

There are several other revenue sources flowing into Georgia Tech that the Institute is able to leverage into less quantifiable, yet equally substantial economic impact. The following describe the important, yet less tangible aspects that contribute to Georgia Tech's economic impact.

1. Alumni Impact

In 2003, researchers at the Atlanta Regional Consortium for Higher Education (ARCHE) released a study, "Value of University System of Georgia Education," which concluded that an individual who had earned a baccalaureate degree from the University System of Georgia earns an average of $14,000 a year more than a high school-educated individual could expect. In alignment with national studies, this projection approximates more than $1 million in additional earnings over the course of a lifetime for the baccalaureate recipient as opposed to the high school-educated. In Exhibit 16, based on 2000 census data, the average personal income in Georgia is $18,410 for someone with less than a high school diploma, $27,590 for those who completed high school, $36,320 for those who have completed some college, $39,260 for those with an associate degree, $58,460 for those with baccalaureate degrees, and $78,440 for graduates with a master's degree or higher. While clearly benefiting students who achieve higher levels of academic success, the benefits accruing to the state are also impressive.

Exhibit 16: Georgia's Average per Capita Personal Income (by degree level)



For example, in estimating an immediate impact for 2005, consider that Georgia Tech conferred 2,594 bachelor's, 1,393 master's, and 311 doctoral degrees in fiscal year 2004. According to the Office of Career Services, approximately 51 percent of Georgia Tech students remain in Georgia for their first job following graduation, for which they receive average starting salaries of $41,000 at the bachelors level, $63,000 for the master's level, and $80,000 for the doctoral level.

Thus, the 2004 graduates of the Institute who remained in Georgia will earn an estimated combined salary of $111,133,000. Although much of this income will be infused back into the state's economy through the purchase of goods and services, the 2004 graduates alone will contribute $6,789,580 back to the state in income tax revenue, an amount comparable to the tuition those graduates paid for their final academic year.

When considering the compound effects of each graduating class, the alumni of the Institute have a substantial financial impact on Georgia's economy.

Beyond the earnings and tax revenue potential, graduates and the state benefit from the quality-of-life enhancements resulting from a college education: the increased likelihood to volunteer in the community, to vote, to have health insurance, and to live above the poverty line. Though difficult to quantify, the financial security and civic engagement of Georgia Tech's students and alumni contribute significantly to Georgia's economic development.

2. Community

Georgia Tech can point to revival efforts for formerly depressed areas (e.g., Midtown Alliance, Home Park Neighborhood, Upper West Side Livable Centers initiative) as evidence of its commitment to growing the surrounding communities. In recognizing that economic development goes beyond the expansion of innovation-based industries, Georgia Tech has demonstrated that it understands its role as a "citizen" in Atlanta and has made significant investments to ensure Atlanta's vitality.

Economic Development and Technology Ventures (EDTV) is an organization that has fourteen field offices around the state that help regional economies beyond Atlanta address economic development issues. Locally, Georgia Tech hosts the Center for Quality Growth and Regional Development, a research center with the mission to study metro Atlanta "as a living laboratory for mixed-used development and related issues."[30]

These ongoing initiatives will continue to revitalize lower socio-economic areas and expand Atlanta's economic infrastructure.

3. International

Georgia Tech is also having an impact on the region's economy through its activities abroad. For example, The Logistics Institute - Asia Pacific (TLI) is a collaboration between the National University of Singapore (NUS) and Georgia Tech for research and education programs in global logistics. TLI - Asia Pacific is modeled after The Logistics Institute (TLI) at Georgia Tech, which has wide industry recognition as one of the best institutes for education and research in logistics. This collaboration provides logistics expertise that caters to the logistics needs of the industries focusing on global logistics, information technology, industrial engineering, and supply chain management.

Another example of the Institute's growing international presence is its campus in France. Georgia Tech offers a suite of graduate and undergraduate programs at Georgia Tech Lorraine (GTL), its European campus located in Metz, France. At GTL, students from around the world take courses taught in English by Georgia Tech faculty. Georgia Tech Lorraine students become the engineers, scientists, and managers of the future, fully aware of and sensitive to the challenges of the new global market and the emerging European academic, research, and industrial arena.

Programs and initiatives like these allow Georgia Tech to place international relationships and connections at the service of the state's economic developers, making a positive contribution to Georgia's ability to thrive in the global economy. As *The Economist* noted in a September 2005 article titled "The Brains Business," "The emerging global university is set to be one of the transformative institutions of the current era."

[30] Center for Quality Growth and Regional Development website

I. Summary

Georgia Tech prepares many Georgians for the demanding workforce of today and tomorrow while also attracting hundreds of millions of research dollars each year from across the country and around the world. When combined, the extramural support for research and development, state appropriations, tuition revenue, and auxiliary income provide an enormous flow of capital into the Atlanta and Georgia economy. This revenue influx has an impact on jobs and economic activity that goes far beyond Georgia Tech's direct employment and purchases of goods and services.

In 2004, Georgia Tech received more than $889 million in revenue from a wide range of sources: $264 million came from the state for operations and capital projects and an additional $625 million came from non-state sources, including $266 million from the federal government. In leveraging these funds, Georgia Tech stimulated a total economic impact of more than $2.2 billion, creating and supporting more than 38,934 jobs, attracting visitors, supporting affiliated institutions and businesses, and increasing the earning power of its students and alumni.

Clearly, Georgia Tech has demonstrated that it understands its role as a global "citizen" and economic engine in Georgia by making significant investments to ensure Atlanta's sustainable growth. With its mission and vision, Georgia Tech is well equipped to continue helping the region and the state become leaders in the global, innovation-based economy of the new century.

V. The Economic Impact of Other Leading Research Universities

Research universities are important participants and contributors to most regional economic development plans. Aside from being major employers, research universities attract millions of dollars of external funding through tuition and fees, sponsored research, education and economic development programs, and industry collaborations. Spending from employees, students, and visitors also has a major financial impact on the local economy.

While many factors affect economic expansion, the nation's largest public research universities have played critical roles in contributing to economic growth within their geographic regions. Funding from federal and private sources that is spent on university-based research supports businesses and jobs, providing direct economic benefit and driving long-term economic growth at a time when many other components of the economy are sluggish in cyclical downturns. Research universities often serve as anchors to most thriving regional economies.

Georgia Tech has achieved notoriety for its well-developed program of economic expansion and innovation leadership. The Institute, however, is not alone in its continuous efforts to make an impact on the local economy. Economic development initiatives at many of Georgia Tech's peers are also creating value and opportunity in their local regions, including the Massachusetts Institute of Technology (MIT), Stanford University, Duke University, University of North Carolina at Chapel Hill (UNC), North Carolina State University (NCSU), as well as the University of Michigan (UM) and the University of Texas at Austin (UT).

A. Research and Development Expenditures

Universities that have been able to demonstrate the greatest impact on their local area are also those with significant research and development funding. The nine universities highlighted in this section of the study are among the top forty in total research and development expenditures, according to National Science Foundation statistics for fiscal year 2002.

Exhibit 17: Fiscal Year 2002 Total Sponsored Research and Development Expenditures

Ranking	University	Total R&D Expenditures (in thousands)
3	U of Michigan	$673,724
8	Stanford	$538,474
15	MIT	$455,491
16	Duke	$441,533
29	UNC	$370,806
31	**Georgia Tech**	**$340,347**
33	UT Austin	$320,966
35	NCSU	$290,018
42	Emory	$271,238

Source: National Science Foundation Total R&D and Industry-sponsored expenditures at universities and colleges, fiscal year 2002.

B. Technology Transfer Success

Institutions making substantial contributions to their local economy are among the leaders in commercialization and technology transfer activity. A Council on Governmental Regulations guide to the Bayh-Dole Act indicates that in 1980 (the year the Act was passed) only twenty-five to thirty universities were actively patenting and licensing inventions; in 2000, the number had increased ten-fold.[31] Stanford University, which has been actively pursuing discoveries, marketing them to interested companies, and collecting royalties since the early 1970s, today has one of the country's most active university offices dedicated to technology transfer and is viewed as a benchmark for other universities. Because Stanford is asked by other organizations to assist in their technology transfer efforts so often, they have established a separate wholly owned limited liability company that acts as a licensing agent for other organizations.

The U.S. Patent and Trademark Office recently released its preliminary list of top patenting activity at U.S. universities, and four of Georgia Tech's peer institutions were in the top ten. Patent activity at Georgia Tech ranked it among the top twenty.

Exhibit 18: 2004 Preliminary List of Top Patenting U.S Research Universities

Ranking	University	Number of Patents
1	University of California*	424
2	California Institute of Technology	135
3	Massachusetts Institute of Technology	132
4	University of Texas	101
5	Johns Hopkins University	94
6	Stanford University	75
7	University of Michigan	67
8	University of Wisconsin	64
9	University of Illinois	58
10	Columbia University	52
19	**Georgia Tech**	**37**
42	**Emory**	**28**

Source: Top Patenting by U.S. Universities in 2004 (U.S. Patent and Trademark Office) http://www.uspto.gov
**The University of California reports a patent level for its entire system rather than individual schools.*

[31] "The Bayh-Dole Act. A Guide to the Law and Implementing Regulations." Council on Governmental Relations, October 1999.

Technology transfer success at Georgia Tech and its peer institutions can also be assessed by comparing information from the Association of University Technology Managers' annual survey. Exhibit 19 summarizes the responses from the nine institutions for fiscal year 2003.

Exhibit 19: Fiscal Year 2003 Licensing Revenues and Patent Activity

Institution	Licensing Income	Licenses and Options Executed	Start-Up Companies Formed	U.S. Patent Applications Filed	U.S. Patents Issued
Stanford	$43,154,111	128	12	334	117
MIT	$24,252,109	114	15	469	152
Emory	$22,737,389	16	0	113	32
Michigan	$7,423,419	76	9	209	64
NC State	$4,602,665	66	7	172	49
UT Austin	$3,919,605	20	6	82	28
UNC at Chapel Hill	$3,808,043	54	2	86	34
Duke	$2,715,801	39	1	155	50
Georgia Tech	**$2,316,516**	**30**	**12**	**67**	**41**

Source: The Chronicle of Higher Education – Licensing Revenues and Patent Activity, Fiscal Year 2003. Based on survey responses by the Association of University Technology Managers (AUTM).

While the exhibit above shows that Georgia Tech lags behind its peers in terms of licensing income, it is among the leaders of the group in terms of start-up companies formed. In fact, Georgia Tech, along with the University of California System, the University of Florida, the University of Pennsylvania, Cornell, Stanford, and MIT, triggered one-quarter of all the start-ups created by universities in 2003.[32] Georgia Tech has also had success converting patent applications into patents issued.

C. State-of-the-Art Research Facilities and Space to Support Innovation

Institutions that have historically made significant investments in technology parks and other facilities that may support innovative activities are among the leaders in economic development. Research parks play an important role in promoting research and development by a university in partnering with industry, assisting in the growth of new ventures, and promoting economic development.[33] Despite the clear importance in encouraging science and innovation-based breakthroughs, the state of Georgia has only one research park (the Georgia Medical Center Authority affiliated with the Medical College of Georgia) out of the seventy-three registered with the Association of University Research Parks in its recent 2003 survey. The lack of a research park on campus is a clear disadvantage to Georgia Tech. By comparison, the Raleigh-Durham area has 8.5 million square feet of lab space with 660,000 square feet available.

Georgia Tech's peers are operating research parks that have been in existence for decades. For example, concerned about the lack of job opportunities for engineering graduates, the dean of Stanford's School of Engineering in the 1940s promoted the idea of a research park to bring

[32] "Colleges Seek a Record a Record Number of Patents," by Goldie Blumenstyk. *The Chronicle of Higher Education.* December 3, 2004.

[33] Association of University Research Parks. January 2003.

companies closer to campus.[34] The Stanford Research Park, established in 1951, served not only as a prototype for other research parks (including Research Triangle Park), but also became the incubator for the Silicon Valley. Today, Stanford estimates that the park is home to more than 140 companies with about 23,000 employees in electronics, software, biotechnology, and other high-tech fields.[35]

North Carolina State University's 1,300-acre Centennial Campus[36] is home to more than 100 technology companies and agencies.[37] The availability of adjacent land allows universities to maximize their growth potential, as spin-off companies tend to locate nearby. In order to take advantage of this opportunity, however, universities must have both the financial resources and the physical space to expand, both of which are increasingly hard to come by for Georgia Tech.

Research parks provide a campus-based location where scientists can innovate. Despite universities being responsible for 26.2 percent of the financing for research parks in the United States, private organizations comprise 82.9 percent of the tenants, with government (7.2 percent) and university employees (9.9 percent) occupying the remainder of the space.[38] Most universities see the investment as an important component of an integrated economic development strategy. And they benefit from having world-class researchers located in close proximity to their own.

D. Proximity to Other Research Universities

Institutions that are close to other large research universities have taken advantage of this proximity to enhance their economic development. Stanford's notable collaboration with the University of California at Berkeley resulted in the recombinant DNA cloning technology that is central to the biotech industry. Stanford licensed the technology to nearly 500 companies on behalf of both universities and estimates that the associated royalties have exceeded $250 million.[39]

MIT, along with the numerous other research universities in the Boston area, has had a tremendous impact on the local economy. A 2003 study by Appleseed concluded that the universities' (i.e., Tufts, Harvard, Boston University, Boston College, Brandeis, etc.) proximity to each other helps them to attract the very top scientists and students to the area, encourages collaboration across the schools, connects them to a network of other local research institutions, and allows them access to private businesses focused on innovation, more so than any of these universities could do independently.[40] The same holds true for Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University, which have taken advantage of their proximity to draw more than 100 research and development organizations to Research Triangle Park.

[34] Tajnai, Carolyn. "From the Valley of Heart's Delight to the Silicon Valley: A Study of Stanford University's Role in the Transformation". Computer Forum at Stanford University, December 1996.

[35] Stanford Facts 2004 (http://www.stanford.edu/home/stanford/facts/)

[36] Centennial Campus: Quick Facts (http://centennial.ncsu.edu/overview/quickFacts.html

[37] About NC State University (http://www.ncsu.edu/aboutncstate.html)

[38] Ibid.

[39] Top 10 Stanford Inventions (http://corporate.stanford.edu/innovations/invent.html)

[40] "Engines of Economic Growth: The Economic Impact of Boston's Eight Research Universities on the Metropolitan Boston Area." Appleseed, 2003.

E. Other Keys to Success

Other distinguishing characteristics of universities that have successful economic development initiatives include the following:

1. **Large employers and spenders** – In addition to their impact as leaders in innovation, universities have a great impact on their city and state by being large employers and taxpayers, donators, as well as large spenders in the local area. Universities employ thousands of people and tend to be more stable during periods of economic uncertainty than other employers. Students, faculty, and visitors also make large contributions by spending hundreds of millions of dollars in the local economy. Many universities have also undertaken initiatives aimed at making purchases in the local area a priority. MIT's "Cambridge First" purchasing program resulted in more than $39 million to local businesses in 2004.[41]
2. **Significant capital expenditures** – Building and maintaining state-of-the-art facilities for research, patient care, and instruction requires significant capital expenditures that have a positive impact on the local economy. According to a study on the economic impact of the University of Texas System, System institutions are projected to spend $5 billion on construction projects over the next six years. The study estimates additional expenditures as a result of these purchases to add an additional $2.7 billion to the Texas economy.[42]
3. **Top-ranked faculty and students** – Universities compete internationally for the best and brightest faculty and students, and those at the top of their fields help to further university contributions by attracting more funding, discovering new technologies, and bringing more companies to the local area.
4. **Nationally recognized programs in engineering, science, and business** – Universities with strong programs in engineering, science, and business yield intellectual capital in areas most germane to the innovation economy, enhancing the likelihood that such capital will remain in the local economy.
5. **Net importer of talent to the local area** – Universities that are able to keep students in the local area after graduation and prevent a "brain drain" make considerable contributions to the local area. A recent Bank Boston study found that while only 9 percent of MIT undergraduates were from the Commonwealth of Massachusetts, nearly 40 percent of the approximately 150 new MIT-related companies formed each year are located in the Commonwealth. According to the 1,300 entrepreneurs surveyed for the study, these firms were located in Massachusetts to allow them ongoing access to MIT and other Boston universities. These firms maintain regular contact with MIT to consult with faculty members, enhance employee professional education, and recruit new employees.
6. **Culture that stresses innovation and entrepreneurship** – The universities that have the greatest impact on their local areas are those that have a culture that stresses innovation and entrepreneurship. The Bank Boston study found that MIT faculty impact the local area by stressing entrepreneurship and by encouraging students to take risks. MIT faculty members have strong research and industrial ties and provide consulting and research opportunities for their students, who use this exposure to found new companies, many of them shortly after graduating. The study found that one in six companies founded by MIT students was founded within five years of graduation.

[41] MIT Facts 2005 – MIT and the Community (http://web.mit.edu/facts/community.shtml)

[42] "Economic Impact Study. A Study of the Economic Impact of The University of Texas System." Institute for Economic Development, The University of Texas at San Antonio, Fiscal Year 2004.

7. Alignment with city and state initiatives

"Universities and their communities may think they lead separate lives, but in truth their lives are inseparable, and we all benefit when we work together for the common good." - Richard H. Brodhead, Duke University President[43]

Universities with strong economic development programs have aligned their goals with those of their local community. Duke University's Duke-Durham Neighborhood Partnership is aimed at improving life in twelve neighborhoods that surround the campus and to boost achievement in seven nearby public schools. The University of Michigan is hoping to capitalize on its collective efforts with business, government, and community leaders to make Ann Arbor one of the top regions for business creation. Subsequent to the emergence of Palo Alto (with significant input from Stanford) emerging in the late 1990s as the "information engine to California," a group of Michigan professors began assembling private industry, government, and education organizations to form the Ann Arbor IT Zone.

The alignment of university assets, skills, and expertise with regional industry clusters maximizes the regional benefit. Some regions may have a substantial research presence, but companies in the surrounding region are not able to absorb the resulting technology. In these cases, innovation is more likely to flow out of the region. In order to have an impact on a regional industry cluster, the university must have a significant base of research aligned with the needs of that cluster.[44]

F. Emory University

Georgia Tech and Emory University historically have collaborated on a number of fronts, including the joint biomedical engineering department and degree programs, the EmTech BioScience joint biotech incubator program, and other academic and non-academic programs. Additional collaboration directed at the strengths of the two institutions and at the strengths of the region will enhance the future competitiveness of both the Atlanta and Georgia economies.

G. Summary

As seen through the comparisons above, Georgia Tech is clearly not alone in its continuous efforts to make an impact on the local economy. Economic development initiatives at Georgia Tech's peers are also creating value and opportunity in their local regions, and Georgia Tech shares many of the same characteristics of these leading institutions. Institutions making considerable impact have demonstrated their value through formalized studies, are among the highest rank in terms of research and development funding as well as science and technology programs, have actively pursued and licensed technologies resulting from research, and have cultures that support and encourage economic development and entrepreneurship.

[43] Duke-Durham Neighborhood Partnership (http://community.duke.edu/)

[44] "Aligning Universities and Industry Clusters," by Jerry Paytas, Ph.D. et. al. *The Heinz School Review.* Carnegie Mellon University.

VI. Assessing Georgia Tech's Ability to Generate Greater Economic Impact

This study demonstrates that the value of a major research university such as Georgia Tech reaches far beyond common economic impact statistics and into the overall institution's ability to be successful in building an infrastructure through its influence on the region's intellectual capital, research enterprise, and economic development initiatives. Several key attributes characterize Georgia Tech's role in economic development, including:

- Economic development mission, going back to 1885
- Entrepreneurial culture focused on economic development
- Significant inflow of revenue and generation of economic activity into the local region
- Effective technology transfer/commercialization capabilities
- High-quality science, engineering, and business programs
- World-class faculty, staff, and students
- Interdisciplinary culture
- Existing infrastructure including quality research facilities
- Interconnected partnerships and alliances (see Appendix 3)

Despite these strengths, Georgia Tech's overall economic impact and ability to lead economic development are constrained. The formula for increasing an institution's economic impact depends on its ability to create more jobs, generate revenue, and increase the size of its research enterprise. These objectives may be difficult to achieve so long as Georgia Tech is subject to its current operating model with the state.

There are a number of factors that affect Georgia Tech's ability to make timely, competitive decisions, respond to changes in the market, participate in entrepreneurial opportunities, and develop initiatives that may yield economic benefit. Several key challenges (structural, strategic, and operational) and other factors that are constraining Georgia Tech's ability to create a greater economic impact are discussed below.

A. Structural Issues Outside of Georgia Tech's Control

Georgia Tech can point to many significant articles, studies, and rankings that validate its strong national and international reputation. However, there are some basic limitations that impact the Institute's ability to be competitive with the elite research universities in the United States, including:

- Stature as a public university: Georgia Tech's status as a public university creates specific issues that many of its aspirational peers (e.g., MIT, Stanford, other leading private universities, and selected public universities) need not dedicate resources to address. Private peers are not constrained by state and University System governance and policies or additional layers of decision-making authority. Private institutions are not bound by state regulations or multi-university cooperative arrangements, which often have disparate financial models, structures, and missions.
- Stature as a state agency: There are state regulations that define the rules Georgia Tech must follow for many key financial transactions and processes (e.g., construction, personnel, procurement) that impact its ability to be competitive and contribute economic benefits to the state.
- Availability of state funding: It is likely that economic challenges, including Medicaid and infrastructure projects, will constrain the amount of funding made available to higher education.

B. Issues Capable of Being Addressed by Georgia Tech

There are a number of actions that are capable of fundamentally changing Georgia Tech's operating structure and strategy for enhancing economic development. These activities are focused on areas where Georgia Tech may be able to directly affect its ability to further enhance its position as a national leader in economic development and a major contributor to the implementation of the state's economic development future.

- Strategic coordination: Georgia Tech is one of many local public (and private) organizations that have economic development objectives. Georgia Tech is already playing a leadership role in collaborating among these organizations, enhancing its image as a supporter of state and local initiatives. Emory is an internationally known private research university that has significant strengths in medicine and other life science areas. Georgia Tech's pursuit of co-sponsored science-based initiatives (e.g., biomedical engineering) with Emory represents significant potential for both institutions and the region.
- Perception: There is insufficient appreciation and understanding of the strengths and potential of Georgia Tech to lead economic development in the state of Georgia. Many Georgians are unaware of the growing economic development infrastructure at Georgia Tech, and very few are aware of its mission to be a leader in economic development. The Institute's marketing efforts are not sufficient to effectively tell Georgia Tech's "story." Additionally, Georgia Tech's alumni and administrators are not significantly involved in political organizations throughout the state, as evidenced by the fact that fewer than five members of the state legislature are Georgia Tech graduates.
- Research park: Though Tech Square is a recognized hub of Georgia Tech's incubation and commercialization activities, the lack of a state-supported, operational research park is a clear disadvantage vis-à-vis aspirational peers who have research parks as a centerpiece of their economic development infrastructure.
- Strategic focus: From an economic development perspective, universities are best served when they focus on current strengths and take strategic risks in emerging or innovative industries. Striving for economic leadership in emerging industries, whether led by Georgia Tech or through collaborative public/private efforts, creates some significant challenges. There is a clear first-mover advantage among regions that have achieved success in many high-tech industries. Georgia Tech's strategic plan and innovative initiatives have focused on its strengths, but state investments are also needed to attain meaningful first-mover status.

C. Other Factors Constraining Economic Development

- Venture funding: While Atlanta (the leading city of the Southeast) is ranked among the nation's top ten cities for venture funding, a significant disparity in funding is revealed when the data are analyzed from a state and regional perspective. In particular, California and Massachusetts collectively receive nearly 50 percent of all venture capital, leaving the remaining forty-eight states to compete for the remaining 50 percent. Limited external investment affects Georgia Tech's ability to commercialize or launch incubated companies and keep them in the region.
- Geographical constraints: Some peer universities are less geographically constrained and do not face some of the same challenges as Georgia Tech related to developing its local infrastructure. Economic development personnel at Georgia Tech suggest that space for new facilities is limited and the population growth in the Atlanta region is focused on the suburbs, although recent data suggest that this trend is beginning to reverse (Midtown Atlanta has experienced rapid growth in the past three to five years). This may affect investor perceptions of where dollars should be spent.
- Quality of life: While the Atlanta community has a comparatively low cost of living, keeping top talent in Atlanta is challenging due to issues such as congestion, environment, and education. The Center for Quality Growth and Regional Development at Georgia Tech has been established to consider many of these issues affecting Atlanta. Without solutions to challenges facing city planners, educational leaders, and political decision makers, perceptions of Atlanta as a place to grow and establish long-term connections may be affected.

VII. RECOMMENDATIONS

Many public universities are beginning to rethink their relationship with the state agencies that provide oversight and policy authority. Some are proposing a new operating dynamic that shifts the university away from traditional government agency structures to an environment that provides increased operating autonomy. The objective of such moves is not to move away from commitments to the public. Instead, the initiatives include a willingness to accept greater responsibility and accountability to their stakeholders, including providing reasonable access for students and maintaining constraints on tuition. Many universities believe that increased operating flexibility will further advance their mission, ensure educational quality, and create opportunities for greater economic development.

A proper balance must be struck between increased flexibility and accountability to the state's constituents. As pointed out in the case study on the state of Virginia (page 24), some universities are hindered by governmental or state system policies that affect public universities, sometimes limiting flexibility to grow the research enterprise or other key elements of their educational mission. Regions where private universities or more autonomous public universities are located are likely to experience more effective economic development from those institutions.

Revising administrative procedures to meet the challenges of the twenty-first century is not a new idea for Georgia. Governor Perdue recognized the importance of updating the state's administrative structures and created the Commission for a new Georgia to provide a fresh perspective to overhauling and streamlining the state's administrative functions. According to the Administrative Services Task Force of the Commission:

> Five years into the twenty-first century, state government is still stuck in the 1990s, '80s, and even '70s in many ways as it operates. Government business operations are bogged down in outmoded practices and obsolete technologies, running up millions of dollars in the overhead costs of efficiency.

Implementation of the following recommendations will facilitate Georgia Tech's ability to drive economic growth for the region and the state, while preserving an appropriate oversight role for the state relative to its investment in public universities. Our recommendations fall within two major categories: 1) investments and 2) addressing operational constraints.

A. Increase Investments in Major Research Universities

At Georgia Tech, ten not-for-profit organizations have been established to enable the Institute to have greater flexibility in acquiring and spending resources to carry out its mission more efficiently and effectively. These organizations were established to enhance the ability of the Institute to receive and invest gift monies, fund and construct buildings, acquire equipment, operate research and development programs, create technology transfer organizations, manage childcare centers, and sustain athletic programs. With few exceptions, private universities are not compelled to complicate their organizational structure in order to accommodate the varying activities that take place under the university's umbrella. The establishment of these affiliated organizations is expensive, in legal costs and organizational complexity. Although their existence helps the Institute, there is an implicit cost to every transaction between Georgia Tech and one of the affiliated organizations.

The State's budget constraints have limited the level of financing it provides for buildings and equipment, creating the need for non-profit corporations to meet critical infrastructure needs. The Board of Regents has constitutional authority to sell bonds, but has not used this authority to accomplish these objectives. This adds to the Institute's need to leverage its affiliated organizations to work around such impediments. The ability to spend, invest, and grow seed capital, essential for developing start-up companies, is also constrained by state policy that limits the terms of the

investments and the liability of the Institute in certain deals. Alternative financing means are also limited since the authority to approve the sale of stock (even a single share) rests with BOR.

Additionally, the state's investment in its innovation-based economy has been limited. Several statistics in this document illustrate the substandard financial support that has been made in the key industries that characterize the high-tech economic system. Appropriations for leading research universities (such as Georgia Tech) have decreased. Since 1995, just 21 percent of the more than $886 million in capital expenditures at Georgia Tech have been state-supported. Georgia Tech has proven its ability to self-finance many initiatives to expand its R&D capabilities, but the lack of state support has limited the Institute's economic development potential. Targeted and sustained investments in research universities will greatly enhance the quality and competitiveness of the Atlanta region and the state of Georgia

B. Addressing Operational Constraints

Colleges and universities that seek new operational relationships with their states are specifically targeting increased flexibility for operational functions that may allow them to be more responsive. At the forefront of this issue is the concept that public universities must abide by rules and policies enforced at the state level and in the University System office. At Georgia Tech, decision making is hampered by restrictions that require approval from offices and personnel that reside in agencies that are mostly disconnected from the day-to-day and strategic operations of the Institute. At Georgia Tech and most other public universities, the ability to manage and successfully compete in this operating environment is fundamentally limited and compromises responsiveness and performance.

In addition, Georgia Tech is at a competitive disadvantage in growing its research enterprise and economic development efforts as compared to its nationally recognized private research university peers. Georgia Tech is burdened due to several key administrative support functions and processes that constrain flexibility and inhibit its competitive position. To preserve and enhance the value of Georgia Tech's economic development pursuits, the General Assembly, the University System of Georgia, Georgia Tech, and the Governor's Office should strengthen their collaboration to fortify and improve the competitive position of Georgia Tech so that it can help craft and ultimately lead the state's strategy for improving the innovation-based economy for all Georgians.

Flexibility is necessary to maximize the impact of Georgia Tech's university-based research on state economic growth and leverage these science-based assets to expand economic opportunity in the Atlanta region and the state of Georgia. Economic development activity (including R&D, business incubation, commercialization, international partnerships, entrepreneurial public-private partnerships, and targeting investments in new sciences) at Georgia Tech can have a significant positive impact on the growth trajectory of the Atlanta regional economy.

1. Allow Georgia Tech More Flexibility in Setting Personnel and Benefit Regulations

Current regulations and policies do not adequately address the unique characteristics of a major research university. First and foremost, it must be recognized that when competing for key faculty and researchers, Georgia Tech competes against private universities such as Stanford and MIT, internationally based research institutions, and engineering- and technology-focused corporations. It is severely detrimental to apply compensation and benefit policies to Georgia Tech that are more appropriate to Georgia state agencies. Additionally, the cumbersome hiring policies that affect employees across many job classifications further restrict Georgia Tech's ability to quickly secure top scientists and researchers. Georgia Tech's comprehensive Human Resources policies are an outlier vis-à-vis other top public research universities, let alone when compared to private research university peers.

a. Job Classification and Salary

Constraining this effort is a policy environment that dictates that the majority of employees at Georgia Tech are subject to the same or similar compensation structure and job classification as employees at other state agencies and the thirty-five schools within the University System. Additionally, the ability of Georgia Tech to aggressively recruit leading researchers is constrained by rules and regulations that require time-consuming job classification processes, exception approvals, and significant paperwork by state agencies to help finalize offers and compensation packages.

Undue process constraints also affect Georgia Tech's ability to retain retirees. Retirees are often used as inexpensive supplemental staff to fill temporary roles (i.e. teaching a class or participating as a researcher on a specific grant). The president and the Board of Regents must approve every retiree that Georgia Tech hires. Though one has never been rejected, this added step places a burden on the effectiveness of the Institute's operations.

The BOR must also approve every faculty member and senior administrator that Georgia Tech employs and must approve all mid-year salary increases (in excess of 10 percent based on added duties and responsibilities). Despite only having one request denied in the past two decades, Georgia Tech must still engage in the time-consuming approval process mandated by BOR.

b. Benefits

The benefits that Georgia Tech's employees have access to are insufficient when compared to its peers. Other states offer a broader breadth of healthcare options, contribute larger amounts to retirement accounts, and have lower average annual out-of-pocket expenses for the typical employee's family. When compared to public university peers, Georgia Tech may not have a competitive health plan. And when Georgia Tech considers the options available to employees at private institutions, the competitive disadvantage is greater. Appendix 3 provides a Benefits Scorecard that compares Georgia Tech to several other public and private research universities.

A key issue affecting Georgia Tech's competitiveness is the fact that 70 percent of its employees (all non-faculty and non-administrative personnel) are forced to participate in a defined contribution plan that has a ten-year vesting period. The other 30 percent (i.e. faculty status employees) can opt for the Optional Retirement Plan, which provides immediate vesting, and/or they may select not to participate at all. This affects Georgia Tech's ability to hire top candidates. Temporary employees are also subject to the Georgia Defined Contribution Plan even though there is a ten-year vesting period. This typically means that a temporary employee collects only simple interest.

Additionally, Georgia Tech has very limited input into the design, structure, or configuration of its available physician network for its benefits program. The Georgia Department of Community Health controls all bids for health insurance and related plan design. There has been some dialogue at the state level to combine all University System institutions. This would further constrain Georgia Tech given its unique qualities and the importance of research.

Finally, the Board of Regents has chosen not to modify its policy regarding the Family Medical Leave Act. Whereas the federal government has indicated that an organization can count sick time and vacation against the provisions of the Act, the University System does not endorse this policy. Consequently, Georgia Tech is often burdened by significant payouts when employees terminate their employment at the Institute.

While Georgia Tech has some independence from the state personnel system and there may be a reduced "legal impediment," there are political limitations on how quickly candidates can

be employed and how much they can be paid. Some aspects of the benefits plan offered to families are positive. For example, Georgia Tech pays a fixed percentage of total costs regardless of the size of a family or the cost of a plan. However, the key factor for Georgia Tech's ability to compete is often responsiveness and speed. The process remains cumbersome and contributes to strategic limitations on Georgia Tech that constrain the ability to employ top talent capable of leading new scientific breakthroughs and advances.

2. Allow Georgia Tech Increased Flexibility in Procurement, Policies, and Procedures

State purchasing regulations should be modified so that Georgia Tech has the flexibility to assess the merits and benefits of state-term purchasing contracts. When there are cost, quality, and/or service advantages, Georgia Tech should have the option as to whether to leverage state-term contracts. In many other states, universities have the flexibility to choose alternative vendors when lower costs, higher quality, or superior service are available. Such flexibility enables Georgia Tech to maintain greater flexibility and competitiveness. Under the existing system, a requisition process involving the procurement of goods that are subject to Board Of Regents or state review has taken more than three times as long as an average requisition managed internally using sealed bids. Increased independence from state regulations on procurement would create cost reduction opportunities and would encourage greater budget management accountability for Georgia Tech.

a. Purchasing Issues

These limitations most commonly affect the research community. Researchers are often conducting sophisticated, high-tech research and need items that are either very expensive or are highly specialized and possibly only produced by one vendor. The justification for sole-sourced items is cumbersome and time consuming. The Board of Regents reviews any purchase order that exceeds $100,000. When purchases exceed $250,000, there are at least two other layers of approval needed. BOR policy is such that the specifications for equipment must comply with the Georgia Technology Authority, an organization that has established much of the procurement code in accordance with the Department of Administrative Services. Often, decisions to approve or not approve purchases hinge on a two-person relationship between the top technology person at Georgia Tech and an official at the BOR office. Were it not for a quality working relationship, the process would be significantly encumbered by a significant process burden.

b. Contracts

Because the state budget cycle is annual, public agencies (like Georgia Tech) are limited to having only one-year contracts with vendors. This creates significant challenges for the Institute to secure quality vendors who are willing to enter into these comparatively short-term contracts. Because Georgia Tech cannot "incentivize" vendors with long-term deals, the bargaining position of the University is limited and costs are often higher. Vendors, such as food, bookstore, and other auxiliary services, are asked to enter into one-year contracts and carry additional risk. These vendors are sometimes asked to make tenant improvements, uncertain as to whether they will still be doing business with the Institute in the future.

This issue also affects research contracts that are often multi-year. To address this issue within the research enterprise, Georgia Tech leverages the Georgia Tech Research Corporation (GTRC) to manage research contracts. While this has created a process that ultimately enables Georgia Tech to administer research consistent with most research universities, the need to work through a separate legal entity adds complexity and cost. Internal processing and shifting of resources are often necessary to complete a transaction that channels research contracts through the university into the GTRC. Institutions that are

not subject to such state-imposed limitations can respond much more quickly and with significantly less process-intensive effort.

3. Enable Georgia Tech to More Directly Manage Its Key Sources of Revenue, Including Tuition

Georgia Tech has several sources of revenue that drive its ability to generate economic benefits for the region and state. Primary among them is tuition. However, Georgia Tech (and other major research universities in the state) has no ability to set tuition rates. The state should modify regulations and existing constitutional authority regulating how tuition is determined and managed by its universities. Redefining tuition policy so that Georgia Tech is more engaged in the price-setting process will enhance the Institute's ability to achieve its strategic objectives and, ultimately, provide more financial resources to pursue those objectives.

a. Tuition Flexibility

Tuition is a key revenue driver at many public universities, but Georgia Tech, like may other public research universities, does not have authority to set tuition levels to serve its financial, strategic, and operational needs. With 80 percent of tuition (graduate and undergraduate) coming from students that matriculate from outside of Georgia and in-state tuition ranking in the bottom half (thirty-fifth) among all fifty states, the ability to affect overall revenue through tuition would enable the Institute to more effectively plan for achieving its long-term goals. Many universities that have operated with operational freedoms (including tuition flexibility) have been able to reduce their dependence on state appropriations.

Since Georgia Tech currently receives approximately 25 percent of its operating revenue from appropriations, if the state allowed Georgia Tech to set tuition rates for undergraduates at the top of the second quartile of states for both resident and non-resident students, the Institute would be able to add nearly $30 million annually to enhance its ability to compete with its peer institutions and maximize its economic contribution to Atlanta and the state of Georgia. This has implications for the HOPE scholarship and would, therefore, have to be carefully evaluated, but the return in economic impact terms should more than offset the cost to the state.

Georgia Tech's undergraduate resident and non-resident tuition and fees remain lower than many of its peer institutions. Exhibit 20 and Exhibit 21 show Georgia Tech's annual tuition and fee level for non-resident and resident students, respectively. Out-of-state tuition is well below the weighted average of its peer schools (FY04 annual tuition and fees of $16,268 for Georgia Tech, compared to $17,144 peer average). Georgia Tech's tuition and fees for resident students is even lower in comparison to its peers.

Exhibit 20: Resident Tuition Comparison Among Selected Georgia Tech Peers – FY2004

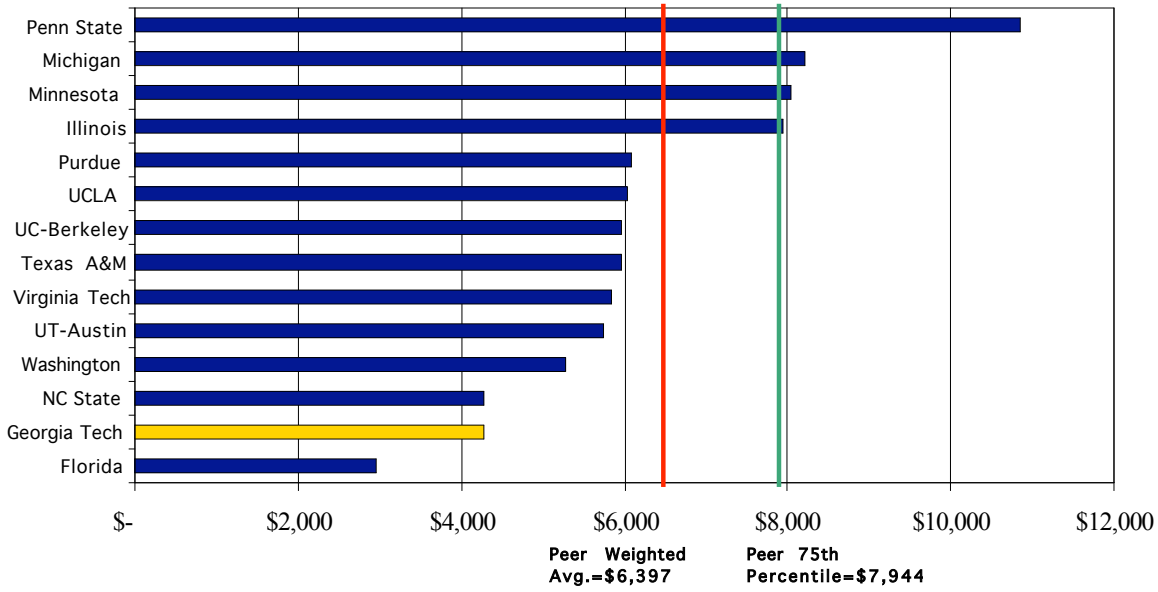
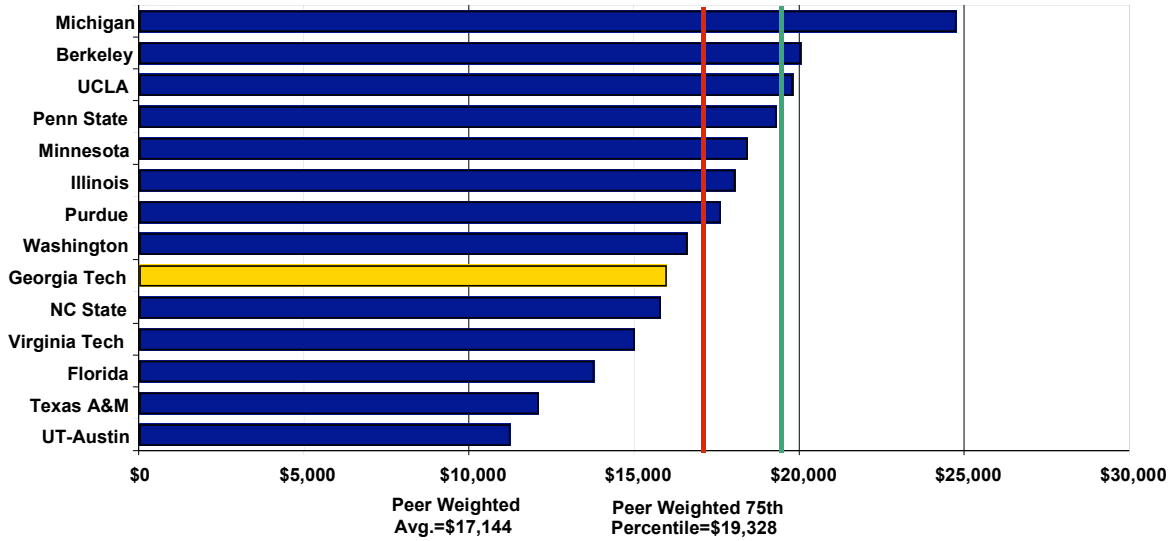


Exhibit 21: Non-resident Tuition Comparison Among Selected Georgia Tech Peers – FY2004



4. Modify State Policies on Facilities, Leases, and Construction

The Board of Regents and the General Assembly should work to ease existing policies (e.g., bid thresholds, length of contracts, approval processes) on construction and leasing arrangements. The growth of Georgia Tech's R&D and economic development infrastructure hinges on the timely availability of essential research facilities. Streamlining and easing existing restrictions will improve timelines and enable the Institute to develop world-class facilities that can support the innovative research and high-tech expansion that the Atlanta region needs to be competitive in the science- and engineering-oriented industries that it desires.

a. Facilities and Leases

High caliber research and educational facilities are essential for institutions that are competing for students, faculty, investment, and extramural research and development funding. The current lease procurement process hinders Georgia Tech's ability to secure its space needs in a timely manner. With turnaround times as long as nine months (or longer), this presents a challenge for Georgia Tech to provide adequate space for research and educational pursuits. Multiple approval layers create challenges since, depending on the dollar value of a lease, there may be more input needed from University System and state authorities to consummate a lease.

Constitutionally, Georgia Tech may only enter into one-year leases. Georgia Tech may renew the lease at the conclusion of the year (subject to regulatory constraints). However, this creates risk that the vendor may not be willing to take. This limits Georgia Tech's bargaining position.

As it pertains to specific economic development initiatives, Economic Development and Technology Ventures (EDTV) has extension offices around the state, and GTRI also leases a number of facilities outside of Atlanta. Frequently, EDTV subleases from another state agency (e.g., DITT, DCA), and the process is restrictive, time consuming, and difficult. This has hampered some efforts to establish field offices in the State while approvals are under review.

A past analysis performed of three major University System research universities lease approval/processing life cycles showed that of forty-five leases that were executed, the average processing time for the lease was 5.6 months, including the time awaiting BOR meeting approvals. However, sixteen of these leases took more than six months (average 9.75 months). At that same point in time, there were ten leases not yet completed, with the average to-date "age" being more than thirteen months.

The consequences from delays of this magnitude are significant. Because BOR/state leases are so onerous and the process so lengthy, some building owners are reluctant, or refuse, to lease to the BOR. The duration of time required to complete the process results in lost revenue opportunities for the private building owners.

In the case of ground leases and lease back arrangements (public/private projects), the extended time to obtain approvals and final documents lengthen the project planning and development effort and often results in significant cost impacts and delays in the completion of the project for the benefit of the user groups. (See below for examples of the cost impact for delays in completing facilities.)

b. Construction

Facilities are a key requirement for success in this competitive research environment. Faculty and students in new and evolving fields need state-of-the-art facilities, laboratories, and equipment. Institutions must be able to provide modern facilities in order to attract and retain the best faculty and students.

The physical expansion of Georgia Tech through research facilities, research parks, office space, incubation facilities, and other economic development infrastructure is essential for the Institute to achieve its goals. State and University System policies have a detrimental effect on construction and renovation timelines at Georgia Tech, slowing the pace of key projects and leaving the Institute at a competitive disadvantage in attracting grants and contracts, faculty, and students. Regulations that define the rules for cost control, indemnification, length of contracts, procurement, building specifications, and other necessary approvals negatively affect the ability of the Institute to pursue an expansion agenda that will allow it to have world-class facilities and attract leading educators and researchers. As recently as September 2003, the four major public research universities in Georgia published a document that called for significant changes to the regulations that guide capital projects at the four campuses. It is not clear that the project gained traction or resulted in meaningful change.

There are several examples of limitations on universities due to restrictive policies. For example, because Georgia Tech is a part of the state procurement code, any contractor must comply with established expectations on the levels of insurance that a contractor will have. The Board of Regents requires contractors to have $2 million of general liability Insurance, $1 million of Vehicle Insurance, $2 million of umbrella insurance, and statutory unemployment compensation insurance. This requirement most commonly affects Georgia Tech's ability to hire contractors for minor construction, rehab, or replacement services. Specifically, the Institute sometimes needs replacement glass, doors, or mechanical items for certain facilities. A large number of companies perform these services, and it benefits Georgia Tech to work with contractors who can provide good service at a reasonable price. Often, these are small businesses that may offer desirable prices for their services, but do not carry insurance or liability protection at a level that the state requires. This effectively limits whom Georgia Tech can do business with, adds time while procurement personnel research a company's indemnification, and increases costs. Companies with more insurance coverage are more expensive and pass along their higher insurance costs to their customers in the form of higher rates for goods and services.

Increased Construction Costs

Construction or renovation costs will increase approximately 3 percent to 5 percent per year, even in times of relative economic stability. Events (hurricanes), specific market conditions (steel shortages), or raw materials (cost of fuel) can generate greater fluctuations in costs of projects.

As an example, assuming an annual increase of 4 percent over a twelve-month period, the delay of a construction project would either increase the project budget or reduce the project scope by that amount. This means that a $40 million project delayed for one year would increase in cost $1.6 million, or $133,000 each month, requiring either additional funds be identified or an equal amount of cost cutting or program reduction to stay within the budget.

Lost Opportunity Cost

Delays in occupying a facility result in lost economic opportunities. Two examples:

- A research laboratory may have an opportunity cost of $300 per square foot per year (the annual revenue generated by researchers housed in a new building divided by the gross square footage of a building). A one-year delay in occupancy of a 100,000-gross-square-foot facility could result in a loss of as much as $30 million of research activity.
- If a laboratory was being built or renovated for a top researcher from a competing institution or industry, the lost opportunity could be much greater. Failing to deliver a facility in a timely manner could equate to the loss of immediate revenue as well as the

cost of the recruitment and years of potential lost revenue while a replacement recruit is identified and secured.

Increased Operational Cost

Failure to occupy a building in a timely manner often requires ad hoc accommodations of space and equipment to bridge the period until a new facility is completed. This accommodation requires investment that may or may not have lasting value. For example, the recruited faculty member who is unable to occupy the delayed project will require temporary space, resulting in the need for possible investment in rental space, renovations, temporary equipment, etc. This can easily equate to hundreds of thousands of dollars for a research lab or program.

Increased Financing Cost

When a construction project is financed through bond sales, there is considerable effort made to put the financing in place when the financial markets are favorable. This may mean that the financing that is delayed beyond a favorable market circumstance could have a significant impact on overall cost. For instance, a shift of a few basis points on a $25 million, thirty-year bond could increase the overall financing cost by more than $2 million.

5. Create a "Scorecard" that Requires Specific Levels of Managerial Responsibility and Accountability

Georgia Tech, and other research universities granted degrees of independence from state regulations, should be subject to objective measures of success. This will ensure that the Institute is leveraging its operational flexibility while still fulfilling its responsibility to the state and region's educational, service, and economic expectations. A scorecard should cover a diverse set of metrics including the number of companies that are created or spun off, license disclosures, patents, R&D growth, job creation, resident and non-resident enrollment targets, capital expenditures, bond rating, budget variances, and other economic improvement measures. A scorecard or a set of measurable targets that must be achieved to enjoy certain levels of operational autonomy will provide the state with a valuable tool for assessing institutional accountability.

6. Reduce Restrictions on the Pursuit of Operational and Financial Partnerships with Private Organizations/Universities

Georgia Tech has ambitious plans to expand the Institute in a way that fulfills its economic development mission. Some of its goals and initiatives include alliances with corporations, investments in companies, and partnerships with leading research universities (such as Emory University) that have complementary innovation-based assets. Emory is a natural partner for Georgia Tech given its location and robust research enterprise. Emory's academic research hospital makes it increasingly attractive as a site to further develop Georgia Tech's biotech initiatives. The state and the Board of Regents should encourage these collaborations and lift restrictions that encumber Georgia Tech's pursuit of value-added relationships. Leading regions and research universities are characterized by collaborations, partnerships, and alliances that bring together the best organizations in the pursuit of common economic development objectives.

7. Consider a Governance Structure More Closely Aligned to Private Peers

Private universities consistently outrank their public peers in national studies (e.g. *U.S. News, Business Week*, NSF, etc.) and, consequently, many universities are looking at the advantages that private institutions have vis-à-vis public universities. As a result, public universities that seek the ability to achieve greater administrative flexibility are becoming increasingly vocal. Some public research universities have successfully achieved quasi-private status and are operationally

able to pursue opportunities with greater flexibility and autonomy from state governance (e.g. Virginia, Michigan). Overall, greater operational flexibility enables a university with a strong economic enterprise to be more efficient, improve accessibility, stabilize revenue streams, capitalize on commercialization opportunities, and develop a stronger institution for service, education, and research, all of which will help to strengthen its reputation and lift it to the next level.

Of little surprise, not one public university appears among the top twenty institutions, according to *U.S. News and World Report*'s study of "America's Best Colleges 2005." Only ten public universities are in the top forty. An explanation of why such a disparity exists between public and private research universities typically focuses on the significant differences in the financial and governance models of the two types of institutions. Although a full reconciliation of the differences is far more complex, governance and administrative restrictions contribute to this gap in success by making it more difficult for public universities to compete.

Exhibits 22 and 23 illustrate the success of both public and private universities with single institutional governing boards (as opposed to a system-wide board). Georgia Tech is the only university currently operating under a system-wide governance board within the *U.S. News and World Report*'s top forty undergraduate programs. All other similarly ranked public and private universities are currently operating under a single institutional governing board or are currently pursuing increased flexibility and autonomy with upcoming state legislation.

Exhibit 22: Governance Structure of Georgia Tech's Peer Institutions

Georgia Tech Peer Group Rankings* (U.S News & World Report)			
Rank*	**University**	**Type**	**Governance**
1 (5)	Stanford University	Private	Institutional Governing Board
3 (7)	California Institute of Technology	Private	Institutional Governing Board
3 (7)	Massachusetts Institute of Technology	Private	Institutional Governing Board
4 (12)	Northwestern University	Private	Institutional Governing Board
6 (13)	Cornell University	Private	Institutional Governing Board
6 (13)	Johns Hopkins University	Private	Institutional Governing Board
7 (20)	University of California - Berkeley	Public	UC-System Governing Board
8 (22)	Carnegie Mellon University	Private	Institutional Governing Board
10 (25)	University of California - Los Angeles	Public	UC-System Governing Board
10 (25)	University of Michigan - Ann Arbor	Public	Institutional Governing Board
11 (37)	**Georgia Institute of Technology**	**Public**	**System-wide Governing Board**
12 (42)	University of Illinois – Urbana-Champaign	Public	System-wide Governing Board
13 (45)	University of Washington - Seattle	Public	Institutional Governing Board
14 (48)	Pennsylvania State University	Public	System-wide Governing Board
15 (50)	University of Florida	Public	System-wide Governing Board
16 (52)	University of Texas - Austin	Public	System-wide Governing Board
18 (60)	Purdue University	Public	Institutional Governing Board
18 (60)	Texas A & M University	Public	System-wide Governing Board
19 (74)	University of Minnesota	Public	Institutional Governing Board
21 (78)	North Carolina State University	Public	System-wide Governing Board
21 (78)	Virginia Tech	Public	Institutional Governing Board

Huron
CONSULTING GROUP

Exhibit 23: Top 40 Undergraduate Universities and their Governance Structure

Top 40 National Undergraduate Universities (U.S News & World Report)			
Rank	**University**	**Type**	**Governance**
1	Harvard University	Private	Institutional Governing Board
1	Princeton University	Private	Institutional Governing Board
3	Yale University	Private	Institutional Governing Board
4	University of Pennsylvania	Private	Institutional Governing Board
5	Duke University	Private	Institutional Governing Board
5	Stanford University	Private	Institutional Governing Board
7	California Institute of Technology	Private	Institutional Governing Board
7	Massachusetts Institute of Technology	Private	Institutional Governing Board
9	Columbia University	Private	Institutional Governing Board
9	Dartmouth College	Private	Institutional Governing Board
11	Washington University in St. Louis	Private	Institutional Governing Board
11	Northwestern University	Private	Institutional Governing Board
13	Cornell University	Private	Institutional Governing Board
13	Johns Hopkins University	Private	Institutional Governing Board
15	Brown University	Private	Institutional Governing Board
15	University of Chicago	Private	Institutional Governing Board
17	Rice University	Private	Institutional Governing Board
18	University of Notre Dame	Private	Institutional Governing Board
18	Vanderbilt University	Private	Institutional Governing Board
20	Emory University	Private	Institutional Governing Board
20	University of California - Berkeley	Public	UC-System Governing Board
22	Carnegie Mellon University	Private	Institutional Governing Board
23	Georgetown University	Private	Institutional Governing Board
23	University of Virginia	Public	Institutional Governing Board
25	University of California - Los Angeles	Public	UC-System Governing Board
25	University of Michigan - Ann Arbor*	Public	Institutional Governing Board
27	Tufts University	Private	Institutional Governing Board
27	University of North Carolina - Chapel Hill	Public	System-wide Governing Board
27	Wake Forest University	Private	Institutional Governing Board
30	University of Southern California	Private	Institutional Governing Board
31	College of William and Mary	Public	Institutional Governing Board
32	Lehigh University	Private	Institutional Governing Board
32	University of California - San Diego	Public	UC-System Governing Board
34	Brandeis University	Private	Institutional Governing Board
34	University of Rochester	Private	Institutional Governing Board
34	**University of Wisconsin - Madison**	**Public**	**System-wide Governing Board**
37	Case Western Reserve University	Private	Institutional Governing Board
37	**Georgia Institute of Technology**	**Public**	**System-wide Governing Board**
37	New York University	Private	Institutional Governing Board
40	Boston College	Private	Institutional Governing Board
40	University of California - Irvine	Public	UC-System Governing Board

8. Other Issues Affecting Georgia Tech's Operational Efficiency

Other issues that constrain flexibility and impact the Institute's ability to effectively manage operations include the following:

a. Motor Pool

The state requires that if an automobile is driven fewer than 6,000 miles during a given year, the organization must get rid of the car. Georgia Tech depends on cars for many of its important auxiliary and research functions and its vehicle fleet is currently an average of 13.2 years old with limited budget available to replace them. Georgia Tech is frequently required to purchase supplemental vehicles or service aging cars since a high number of cars do not meet the state's requirement.

b. Appropriations

Poor procurement decisions are often a result of a "use it or lose it" culture with regard to state appropriations. If budgets are not fully spent, there is concern that they will be lowered in subsequent years, leading to unnecessary or wasteful spending. Proactive financial management is not rewarded, and surpluses may not be retained and invested by Georgia Tech.

c. Inventory

The state requires that anything with a value that is deemed to be $5,000 or higher must be documented, inventoried, and depreciated. At $3,000 and above, items must be tagged. This increases the financial burden by increasing depreciation expense and adds to the administrative burden. Items that have surpassed their useful life and that are expensive cannot be sold so that the Institute can retain the proceeds. The state keeps at least a 5 percent service fee on all sales of assets.

C. Outcomes

In the absence of the suggested changes, the Institute will continue to be competitively disadvantaged in the pursuit of its economic development agenda. However, if the recommendations contained in this report are accepted, the enhanced competitiveness of Georgia Tech will be instrumental in enabling Georgia Tech to expand its role as one of the primary drivers of economic development in the region and the state.

Among the more visible benefits will be:

1. ***Expansion of a vibrant research enterprise***: Combined, the research enterprise at Emory and Georgia Tech bring more than $450 million *annually* into Atlanta and Georgia that otherwise would never enter the region's economy. A vibrant research enterprise also attracts the most qualified faculty, researchers, and students. Construction of facilities, procurement of goods and services to support research, and an influx of employees to support this growth means more jobs and start-up ventures. Expanding the research facilities will continue to require significant public investment, as it has in the past, but the direct and indirect effects of this investment will have immediate favorable economic impact.
2. ***Improved access to intellectual capital***: As leading researchers are attracted to Georgia Tech, the state benefits from having internationally known scientists as residents. Increasing emphasis on science and engineering will create more jobs and trigger growth that will help expand the diversity of the state and regional economy.
3. ***Creation of new private-public partnerships***: Universities with flexibility to form relationships and attract (and spend) investments from private companies and other investors will provide a vital funding mechanism that may ease the fiscal burden on the state. These partnerships are increasingly common in other states and provide the impetus for research collaboration and other innovative partnerships. Nils Hasselmo, president of the Association of American Universities, has said that "[Universities] are looking for greater freedom to take their own fate in their own hands by, for example, …entering into strategic relationships with other institutions and businesses and industry."
4. ***Expansion of infrastructure primed to increased economic growth***: Georgia Tech is already the home to world-class facilities in research and economic development. Growing and developing the Institute's infrastructure, including the possibility of a new cross-functional research park, may provide the foundation for Atlanta (and Georgia Tech) to be the focal point of the innovation-based economy in the state of Georgia. Additionally, investing in infrastructure where there is already a solid foundation of intellectual capital and economic development expertise ensures the likelihood of a greater return than if financial support is distributed to places where there is limited or no existing infrastructure.
5. ***More jobs***: Investment in Georgia Tech will result in new facilities that will require people to build, populate, and manage. Expanding into new industries and new sciences will keep more of the state's intellectual capital in Georgia rather than in other states or regions. Research is a labor-intensive enterprise, and the outcomes of research (i.e. spin-offs and supporting industries) are organizations that can employ the region and state's workforce.
6. ***Joint ventures***: Georgia Tech's institutional assets in engineering are complementary to the efforts at many of the state's leading research universities, both public and private. Georgia Tech can help foster collaboration and the expansion of scientific development efforts with organizations. Other major research universities, particularly Emory, may provide a good candidate for a joint venture that may trigger growth in Atlanta in the important areas of nano-science and biotechnology.

D. Summary

The Atlanta metropolitan area possesses many of the attributes necessary for building a thriving innovation-based economy. Investment in the state of Georgia has a greater chance of returning value-added high-tech output if it is directed toward regions with existing infrastructure and the presence of top talent. Atlanta is the natural choice in the state of Georgia. The region has a number of strategic assets that, as discussed, may be able to drive a thriving economy. However, to become a truly global economy that showcases high-tech, innovation-based industries that are competing in international markets, the Atlanta region and the state of Georgia need to pursue a strategy that, like others, leverages and prioritizes the continued development and growth of its research universities.

The collaboration between Georgia Tech, the Atlanta region, and the state of Georgia has not achieved a level of effectiveness that maximizes economic development. Although there have been some notable successes, and all three have increased their stature during the past decade, Georgia Tech has been constrained in playing a more meaningful role in enabling Atlanta and the state to become more economically strong and diverse. A key limiting factor that affects the Institute is its status as an agency of the state and an institution of the University System that is subject to the same processes, rules, and regulations as all other state agencies and institutions that operate while maintaining a mission that relies on being competitive with private enterprise. This impacts responsiveness, competitiveness, and resource allocation, all of which affect Georgia Tech's ability to be a catalyst for economic growth in the region.

The region's research universities, and Georgia Tech and Emory in particular, possess unique intellectual resources in essential disciplines, including medicine, science, and engineering. The fulfillment of the Atlanta region's potential as an international city fortified with innovation-based industries and markets may hinge on its two major research universities taking a leadership role in economic development. But the ability to play this leadership role depends on an acknowledgement of Georgia Tech's potential and the subsequent willingness of regional and state stakeholders to make changes in its operating structure that will allow the Institute to achieve its economic development potential.

Granting operational flexibility will provide institutions such as Georgia Tech with the ability to more responsively educate, perform research, and contribute to economic growth and prosperity by being more competitive in the pursuit of faculty, students, external research funding, and commercialization. Flexibility in decision making for Georgia Tech and the ability to pursue targeted investments in facilities, partnerships, personnel, and other elements of the economic development infrastructure lead to greater economic impact by the Institute on the state's economy. By placing Georgia Tech in a leadership role within the state's economic development program, the likelihood of increased economic returns for both Atlanta and the state of Georgia will be even greater. In return for this desired flexibility, Georgia Tech should develop performance measures consistent with its private enterprise peers that would allow the state to assess its financial performance and the success of its economic development initiatives.

Appendices

1. Sample List of Studies That Document Georgia Tech's Economic Impact (sorted by date)

Focus of the Study	Title	Author	Date
Atlanta / Georgia Tech	Working Together to Shape Atlanta's Future	Georgia Tech	Mar. 2005
Georgia	Georgia Innovation Initiative	Georgia Tech Economic Development & Technology Ventures	Mar. 2005
Georgia	What Does Georgia Gain by Investing in its Colleges and Universities?	Atlanta Regional Consortium for Higher Education	Feb. 2005
Georgia	The Economic Impact of University System of Georgia Institutions on Their Regional Economies in FY 2004	Selig Center for Economic Growth at Univ. of Georgia	Feb. 2005
National	Correcting Course: How We Can Restore the Ideals of Public Higher Education in a Market-Driven Era	The Futures Project	Feb. 2005
Georgia Tech Case Study	Accelerating Economic Development Through University Technology Transfer	Innovation Associates	Feb. 2005
National	Innovate America – National Innovation Initiative Report	Council on Competitiveness	Dec. 2004
Atlanta	Atlanta-Columbus: Clusters of Innovation Initiative	Council on Competitiveness	Dec. 2004
Atlanta	New Century Economic Development Plan for the City of Atlanta	City of Atlanta	Dec. 2004
Atlanta	Strategic Plan for Promoting Technology Development	Metro Atlanta Chamber of Commerce	Nov. 2004
Georgia	A Roadmap for Georgia in Communications, Computers, and Content Technologies	Technology Partnership Practice - Battelle	Nov. 2004
Georgia Tech	The Economic Impact on Georgia of Georgia Tech's Packaging Research Center	Georgia Research Alliance	Oct. 2004
National Higher Education	The Economic Benefits from Investments in University-based Research, Development, and Education	Arizona State University Office of the President	2004
Atlanta / Georgia Tech	Higher Education in America's Metropolitan Areas	Atlanta Regional Consortium for Higher Education	2003
Georgia Tech	Benchmarking Policy Report	Georgia Tech	Oct. 2002
Georgia Tech Case Study	Innovation U. – New University Roles in a Knowledge Economy	Southern Growth Policies Board	2002
National	Signs of Life: The Growth of Biotechnology Centers in the U.S.	Brookings Institution	2002
National Higher Education	Shaping the Future – The Economic Impact of Public Universities	National Association of State Universities and Land-Grant Colleges	Aug. 2001

2. Facilities and Organizations that Support Economic Development

Atlanta	Georgia	Georgia Tech
Atlanta Logistics Innovation Council	Georgia Research Alliance	Advanced Technology Development Center
Metro Atlanta Chamber of Commerce	Intellectual Capital Partnership Program	Georgia Tech Research Corporation
Atlanta Development Authority	Selig Center for Economic Growth	Venture Lab
Atlanta Regional Commission	Business InSight Partnership	Economic Development & Technology Ventures
Council on Logistics Management	Georgia Regional Transportation Authority	Center for Quality Growth and Regional Development
Atlanta Regional Consortium for Higher Education	Georgia Department of Economic Development	Global Learning and Conference Center
Central Atlanta Progress	Georgia Nanotechnology Alliance	Busbee Center
Economic Development Committee of the Atlanta Metro Chamber of Commerce	Governor's New Georgia Commission	Technology Square
	Georgia's Centers for Innovation	Office of Technology Licensing
	Georgia Electronic Design Center	
	Technology Leadership Coalition	
	Technology Association of Georgia	
	Georgia Department of Technical & Adult Education	
	Georgia Biomedical Partnership	
	Georgia Economic Developers Association	
	Georgia Center for Advanced Telecommunications Technology	
	Savannah Economic Development Authority	
	Georgia Cancer Coalition	

3. *Interconnected Partnerships and Alliances*

In Atlanta, there are several public and private organizations dedicated to the goal of economic development. A significant challenge for Atlanta, and regions like it, is to harness well-intentioned objectives to form a collaborative strategy that can leverage the unique qualities of each organization. Leading regions have been successful at getting all of the "players" in the room where ideas, innovation, and potential can be cultivated and developed. Often it has been universities, with their infrastructure, intellectual capital, and funding streams, that help coordinate the strategic vision.

Universities with successful economic development initiatives develop alliances with industry. University executives serve on corporate boards and community action groups. Faculty work as consultants for industry and help establish cooperative linkages, and students will graduate and serve as the essential raw materials for scientific growth and regional economic expansion. Linking universities with collaborative alliances, partnerships, and industry extension activities has resulted in the creation of jobs, new companies, and participation in emerging industries.

In Atlanta, there are a number of regional and state-based organizations that are engaged in economic development strategies. These organizations each play a valuable role in helping to guide the region toward leadership in key high-tech industries.

a. Georgia Research Alliance

In 1990, a group of Georgia's business leaders founded the Georgia Research Alliance (GRA) to help convert university research into economic growth for the state. Today, GRA is a well-known model for bringing together business, research universities, and state government to develop and nurture a vibrant, technology-rich economy for the state.[45]

The GRA is leading the implementation of a Biosciences Strategic Framework for the state that emphasizes both the strengths of Georgia's research universities and the growth objectives of the state's bioscience industry. This strategic framework is guiding state investment in research infrastructure and has led to several policy initiatives, including a Biosciences Seed Fund and a Bioscience Facility Fund.

Since its creation in 1990, the GRA has invested approximately $400 million of state funding into its affiliated research universities to endow chairs for GRA Eminent Scholars and for research laboratories and equipment, national centers for research and innovation, and technology transfer programs. The state's investment in the GRA has averaged almost $27 million a year. Although not a significant sum, these funds have helped leverage an additional $2 billion in federal and private funding, creating more than 4,000 new technology jobs and generating 120 new technology companies. They also have helped Georgia companies to expand into new markets.

There are presently fifty-two GRA Eminent Scholars at the state's six research universities in fields aligned with the state's strategic high-tech industries. Twenty of these chairs are at Georgia Tech, which has received approximately 30 percent of GRA's state funds. Over the past five years, Georgia Tech has received $36.4 million from GRA, an average of $7.3 million a year.

b. Georgia Cancer Coalition

The Georgia Cancer Coalition (GCC), which was incubated through the GRA, is an independent, not-for-profit organization created to coordinate cancer-dedicated expenditures from the state's share of the National Tobacco Settlement Trust Fund. The GCC is focused on fostering fundamental and

[45] www.gra.org

translational cancer research. More than $178 million in state tobacco settlement funds have been allocated to the GCC through FY 2004.[46]

c. Georgia Seed Capital Fund

This organization is a key component of the state's direct company financing program related to the development of innovation and science-oriented business. This is an $8 million fund managed by the ATDC (located at Georgia Tech) and provides seed funding to early-stage technology firms. Qualified firms can get as much as $1 million per venture.[47]

d. Intellectual Capital Partnership Program (ICAPP)

This program is designed to help businesses partner with University System of Georgia institutions. ICAPP helps develop curriculum, programs, and other customized educational extensions that help meet the needs of Georgia businesses. The program has begun making inroads into specialized high-tech fields and may represent an opportunity for the state to expand opportunities for students seeking futures in global innovation-based industries.

e. Commission for a New Georgia

This program, established by Governor Perdue, has developed a number of strategic documents and plans. Though work plans are in development, traction has not yet occurred. There is potential for positive change in Georgia if the governor can invest the political capital necessary to achieve the following goals outlined in some of the Commission's white papers: 1) create a concerted initiative to attract and retain venture and other sources of financial capital as well as intellectual capital to the state; 2) develop a centralized state commercialization center that proactively seeks licensable technologies for Georgia industries; and 3) establish university-affiliated research parks that leverage research capabilities, economic development infrastructure, and private businesses to stimulate growth.

f. Business InSight Partnership

The state established this collaboration among Georgia Tech's Economic Development and Technology Ventures, the Georgia Department of Economic Development, and the Georgia Department of Technical and Adult Education. This group will look across the state and identify opportunities to address challenges faced by companies in a number of industries. This outreach program is designed to support existing industries and consider opportunities to grow new ones.

g. Technology Association of Georgia

This organization's mission is to help Georgia's technology companies go to market collaboratively. They are dedicated to promoting the economic advancement of the state's technology industry and providing leadership in driving initiative in the areas of policy, capital, education, and giving.

Each of these organizations plays an important role in the state of Georgia and in the Atlanta region. Appendix 2 summarizes the organizations among the state, region, and Georgia Tech that are devoted to economic development objectives.

[46] www.GeorgiaCancer.org

[47] "Laboratories of Innovation: State Bioscience Initiatives 2004." Prepared for BIO and Battelle Technology Partnership Practice and SSTI. June 2004.

4. Benefits Scorecard

Benchmarking Analysis of Peer Institutions' HR/Benefits Policies FY2003

Independence from the State HR System	Rank		Total	Full tuition waiver for dependents of all employees	Partial tuition waiver after minimum years of service for dependents of employees	Employees able to get a tuition waiver for their owncontinuing education	University contributes to Dependent Health Insurance Costs	Vision Insurance Paid by University	Dental Insurance Paid by University	Employees vested for retirement benefits in less than 5 years	University Covers Entire Health Insurance Premium (no employee contribution)
Yes	T-1	University of Michigan	5 yeses	No	No	Yes	Yes	Yes	Yes	Yes	No
Yes	T-1	University of California - Berkeley	5 yeses	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	T-1	University of Illinois	5 yeses	No	Yes	Yes	Yes	Yes	Yes	No	No
Yes	T-1	University of Minnesota	5 yeses	No	No	Yes	Yes	Yes	Yes	Yes	No
Yes	5	University of Texas - Austin	3 yeses	No	No	Yes	No	No	Yes	Yes	Yes
Yes	T-6	Georgia Tech	2 yeses	No	No	Yes	Yes	No	No	No	No
No	T-6	UNC-Chapel Hill	2 yeses	No	No	Yes	No	No	No	No	Yes
Yes	T-6	University of Maryland	2 yeses	No	Yes	Yes	No	No	No	No	No
No	9	University of Virginia	1 yes	No	No	Yes	No	No	No	No	No
(8)	Totals		Yes	0	2	(9)	(5)	4	5	3	3
2			No	(9)	(9)	0	4	(5)	(4)	(6)	(6)

- The Yes/No scorecard suggests that the Georgia Tech (with only 2 yeses) ranks behind many of its peers in selected areas that comprise institutional benefit plans.

Huron CONSULTING GROUP

Benefits Scorecard (continued)

Number of Health Plans Offered to Employees – FY2003

University	Number of Health Plans
U. of California - Berkeley	9
U. of Wisconsin	8
U. of Illinois	7
U. of Washington	7
U. of Michigan	6
Georgia Tech	**4**
Ohio State	4
U. of Chicago	4
Vanderbilt	4
Duke	3
Emory	3
Johns Hopkins	3
U. of Texas	3
U. of Florida	2
U. of North Carolina at Chapel Hill	1

Includes: HMOs, PPOs, and Hybrids

Percentage of Health Care Cost Paid by the Employee – FY2003

University	Employee Contribution Percentage
U. of Wisconsin	0.0%
U. of California	0.9%
U. of Chicago	5.6%
U. of Illinois	14.1%
Ohio State	15.0%
Vanderbilt	16.7%
U. of Texas	19.8%
U. of Washington	20.1%
U. of Michigan	22.4%
U. of Florida	22.9%
Georgia Tech	**25.0%**
Emory	31.8%
Duke	35.9%
U. of North Carolina at Chapel Hill	59.9%

Family coverage on a monthly basis