

*Needs Assessment Report:
Career-technical Education*

Needs Assessment Report: Career-technical Education

Prepared for:

**Employ Florida Banner Center of Excellence
Career Academies/Secondary**

Prepared by:

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Executive Summary

Career-technical education in Florida has changed markedly in recent years. It is clear that with the passage of SB1232 the pace of change will accelerate even more. Career academies now routinely attract the top students in the districts where they are located. Further, students in career academies may receive industry-designated certificates of achievement and/or articulated credit with colleges and universities worth thousands of dollars while studying in a learning environment that prepares them well both for college and for the workplace. Career-technical education programs are effectively shedding their “dumping ground” reputation by putting rigorous, industry-relevant training into students’ normal social environment. Florida’s career academies come complete with access to football, band and other extra-curricular and social amenities that students and their families value. The industry certificates, college credit hours and scholarships earned by students in career-technical programs represent an investment in training, skills and human capital, the cost of which many families could otherwise not afford.

The incremental funding embodied in the new legislation will allow districts to offer the valuable industry certificate programs that many students otherwise could not obtain. In many counties, depending on local population growth patterns, districts may achieve cost savings via embedding desirable programs in facilities that otherwise would have become redundant. The business - workforce development - education partnerships mandated by the legislation are intended to help secondary schools earn and maintain the relevance that the students, their families and their employers require in a globally competitive marketplace.

This report provides a needs assessment for career-technical education in Florida. Since career-technical programs are designed to provide training for a future workforce, it is vital to know which jobs will be important in the future. The report highlights those industries that create the most jobs statewide and provides estimates of population growth. We consider the effects of globalization, technological progress and other issues on career-technical education, while highlighting current best practices in the field and discussing potential areas for improvement.

Among the key findings of the study are:

- The number of students obtaining industry certifications will increase markedly over the next decade, due both to the growth in availability of programs and the demands from business for specific skills. Key occupations with high growth potential can be found in:
 - Life Sciences (including Biotechnology, Medical Device Manufacturing, pharmaceuticals, and Health Care)

- Information Technology (including IT Products/Services, Software Development, Modeling/Simulation/Training, Photonics/Lasers/Optics, Microelectronics, and Telecommunications)
 - Aviation / Aerospace
 - Homeland Security / Defense
 - Financial / Professional Services
 - Manufacturing
- Florida’s Labor Market Information service forecasts that the occupations expected to experience the most job creation over the 2006 – 2014 period in these targeted industries will include:

○ Registered Nurses	(36,428)
○ Nursing Aides, Orderlies, and Attendants	(20,015)
○ Electrical engineers	(890)
○ Aircraft Mechanics and Service Technicians	(730)
○ Network Systems and Data Communications Analysts	(7,844)
○ Computer Support Specialists	(7,150)
○ Customer Service Representatives	(38,715)
○ Receptionists and Information Clerks	(17,663)
○ Laborers and Material Movers	(22,599)
○ Carpenters	(19,037)
- Technology advances, process automation and offshoring may trigger a previously unanticipated deceleration in job growth rates in attractive information technology fields. The “Blinder Index” (see Sections 3 and 4) suggests that these risks differ systematically by occupation. Among the most at risk for offshoring are computer programmers, telemarketers, computer systems analysts, and billing and posting clerks.
 - The long term impact on Florida population growth rates of windstorm insurance costs and increased property tax payments is not yet known. While Florida tax burdens are not high by national standards, increases in insurance costs due to higher anticipated risks of storm damage may slow migration rates, school enrollments and labor market demand.
 - There is, as of yet, a large and unmet need for secondary school curricula providing specific skill sets and culminating in industry-recognized certifications. Florida’s education system will need to lead the nation in partnering with industry trade associations to meet this need.

- These characteristics of a successful career academy implementation will likely include the following:
 - a comprehensive school within a school focused on providing students early training in an important area of the economy
 - an external review process to ensure the quality of education within the career academy;
 - a curriculum or set of curricula developed with input from local businesses and workforce boards to ensure the relevancy of the program;
 - the existence of programs with coursework that either a) leads directly to industry certification in a particular area b) articulates into college credit under agreements with colleges and universities and/or c) is provided as a dual enrollment course with a college or university.

- Dual enrollment programs that lead to industry certification and/or college credit are likely to be extremely effective in encouraging further worker training and educational attainment. Surmounting the course equivalency barriers currently in place will facilitate this process.

Florida's new career and professional academy legislation provides the platform for career academies to become more closely aligned with business needs for education and skills training. The strategic planning process that focuses on workforce needs will enhance district ability to respond to a rapidly changing modern environment.

Several forward looking districts lead the state in terms of implementation. These are Okaloosa County's CHOICE program; Manatee and Sarasota County's Suncoast Tech Prep Program and the Palm Beach County Career Academies. They already, according to self-reports, meet some or all of the guidelines suggested above. However, with the passage of recent legislation (Senate Bill 1232) career academies will be mandatory in all Florida counties within a few years. School districts and even individual schools must be able to establish academies that train students in methods relevant to the areas that they serve. Indeed, adaptability seems to be a critical factor in establishing successful career academies. Thus we focus in the final section of the report on providing information on the successful elements of career education programs.

Introduction

This report provides a needs assessment for career-technical education in Florida. Since career-technical programs are designed to provide training for a future workforce, it is vital to know which jobs will be important in the future. We dedicate the initial section of this report to providing a description of Florida's competitive industry advantage and to highlighting those industries that create the most jobs statewide. And because job training in the absence of trainees is of little use to a growing economy it is necessary to understand the potential size of the available future workforce. Thus the second section provides an estimation of future population size and demographics, along with a discussion of the risks potentially affecting these growth forecasts. We pay particular attention to the risks inherent in forecasting the particulars of the future population because Florida may well fall prey to complications with property tax and windstorm insurance that will potentially affect the rate of population growth over time. We also note that the Florida economy functions in concert with national and global economic forces and, as such, is potentially affected by such issues as globalization and technological progress. Therefore, in the third section, we offer a look at issues associated with globalization and technological innovation in the context of the future of Florida's economy. Following this, in the fourth section, we assemble the various pieces of the puzzle to provide occupational demand forecasts for Florida's target industries in parallel to estimates of expected demand for students requiring career-technical education. Finally, we discuss the details of career-technical education as it exists currently in Florida highlighting both best practices and potential areas needing improvement.

Career and professional education has long played an important role in providing workers with the skills necessary to meet business needs at the national, state, and local levels in the United States. Historically, the focus of this legislation was on poorer students in blue-collar professions. The direction of these educational programs has shifted, consistent with the changing needs of the US economy, towards preparing all students to be more competitive in a dynamic, technically-challenging, and internationally-based working environment. Particularly since the Carl D. Perkins Vocational Education and Applied Technology Act (1984), vocational education programs that were once tailored primarily towards high dropout-risk students have been redefined to serve students across the academic spectrum. Within the state of Florida, over half of the 67 school districts have developed programs that at least loosely meet the definition of a career academy. Unfortunately, the development and structure of these programs has been somewhat ad-hoc, leading to programs that may or may not meet particular industry standards. However, the lack of a common "cookie-cutter" structure also ensures that the academy programs can be tailored to serve the specific needs of the communities and businesses where they are located.

Today, new challenges posed by globalization, process automation and technology are changing the boundary between those jobs considered “impersonal,” (easily delivered from a distance without reducing the quality of services provided) and those considered “personal” (requiring face-to-face contact). As business’ demand for workers responds to the forces of change, their educational requirements will vary accordingly. This highlights the importance of providing a workforce trained with skills commensurate with business needs. As such, student learning may be evaluated less on how many years of education the student receives, or which general degree the student obtains, and more about the specific job skills the student acquires.

Senate Bill 1232, which was signed into law in June of 2007, provides the platform for career academies to become more closely aligned with business needs for education and skills training. The legislation calls for the establishment of career academies which meet and exceed current national and state general education guidelines, and which are directly keyed to local and state workforce needs. To that end, the legislation has several key components: First, each district is required to develop a five-year plan that establishes likely workforce needs in conjunction with local workforce boards and state-approved postsecondary institutions. The five-year plan will lead to the development and implementation of career academies that provide career and professional training for those careers determined to be in high demand. Second, Senate Bill 1232 mandates collaboration with local businesses to maximize use of private facilities and private personnel, ensuring that students are trained for vocational careers in the latest practices on the most modern equipment. Third, the bill requires career academies to partner with colleges and universities to ensure that the coursework students complete will transfer to approved post-secondary institutions as college-level credit. This is an important component of SB 1232, as all career courses should lead either to industry certification or college credit that can be linked directly to that particular career theme.

The three basic models of career education programs as they have developed within the state of Florida are described later in the report. These are Okaloosa County’s CHOICE program; Manatee and Sarasota County’s Suncoast Tech Prep Program and the Palm Beach County Career Academies. The text discussion highlights the basic defining characteristics of career academies as recognized by national consortia of career education programs. These characteristics include, most critically for the state of Florida, the following: a comprehensive school within a school focused on providing students early training in an important area of the economy; an external review process to ensure the quality of education within the career academy; a curriculum or set of curricula developed with input from local businesses and workforce boards to ensure the relevancy of the program; the existence of programs with coursework that either a) leads directly to industry certification in a particular area b) articulates

into college credit under agreements with colleges and universities and/or c)is provided as a dual enrollment course with a college or university.

Existing programs in the state of Florida, according to self-reports, already meet some or all of these criteria. However, with the passage of recent legislation (Senate Bill 1232) career academies will be mandatory in all Florida counties within a few years. Because of this mandate, it is important to highlight the existing best practices identified around the state. Additionally, each program should include the core elements that ensure success for any career education program. At the same time, flexibility for each program is critical. School districts and even individual schools must be able to establish academies that train students in methods relevant to the areas that they serve. Perhaps no one rigid model can be adopted. Indeed, adaptability seems to be a critical factor in establishing successful career academies. Thus we focus in the final section of the report on providing information on the successful elements of career education programs.

Section 1 – Florida’s Competitive Advantage

To identify the need for career technical education over the coming decade in Florida, we begin by describing those industries in which Florida has a good opportunity to generate high quality jobs that can likely be sustained over time. We provide an employment breakdown of each industry, along with cluster maps illustrating the locations of companies within the specific industries, and employment concentration maps indicating the regions of the state in which each industry plays a dominant role.

Enterprise Florida, Inc. produces and periodically updates a five-year statewide strategic plan for economic development. According to *Roadmap to Florida’s Future, 2007-2012 Strategic Plan for Economic Development*, Florida is one of the fastest-growing U.S. states in terms of population, economic output, personal income, and employment. Adding about a third of a million new residents each year, Florida’s economy and labor markets continue to thrive in population-driven industries such as construction, real estate, healthcare, education, personal services and retail trade. Florida’s tourism and international trade are on the rise and numerical job increases are the highest in the nation. The six key recommendations presented in this report were to build world-class talent, to ensure business climate competitiveness, to promote sustainable development to ensure Florida’s superior quality of life, to invest in Florida’s innovation economy, to establish Florida as a pre-eminent global hub, and to accelerate Florida’s economic diversification.

There is evidence that the quality of economic growth in Florida is starting to reflect economic diversification. Some main indicators of the quality of growth such as labor productivity, average annual wages and per capita personal income reflect Florida’s gains in closing the economic gap between itself, competitor states and the nation as a whole. As Florida’s economy grows, the focal point of economic activity is shifting from individual cities and towns to economic regions that encompass multiple cities and counties. Labor, business and consumer markets in the state increasingly are organized at a regional level, as a result of connections between clusters of interrelated industries and other economic assets, such as universities, research labs and military bases.

Presently in the private sector, large numbers of Floridians remain employed in low wage industries. Table 1 ranks Florida sectors, using the North American Industrial Classification System (NAICS), by sector size, from largest to smallest. The rightmost column provides average earnings per worker per year.

Table 1 - Employment and Earnings, by Sector - Florida

NAICS Code	Description	2007 Jobs	Percent of total	Earnings per Worker
44-45	Retail trade	1,210,594	11.3%	\$29,650
90	Government	1,171,992	10.9%	\$55,491
56	Administrative and waste services	1,123,514	10.5%	\$28,367
62	Health care and social assistance	1,051,026	9.8%	\$44,250
23	Construction	817,283	7.6%	\$46,862
72	Accommodation and food services	788,359	7.4%	\$22,240
54	Professional and technical services	690,833	6.4%	\$56,986
81	Other services, except public administration	674,965	6.3%	\$21,523
53	Real estate and rental and leasing	598,503	5.6%	\$36,372
52	Finance and insurance	487,865	4.6%	\$66,390
31-33	Manufacturing	404,880	3.8%	\$62,420
42	Wholesale trade	389,344	3.6%	\$63,225
48	Transportation and warehousing	350,540	3.3%	\$49,673
71	Arts, entertainment, and recreation	293,949	2.7%	\$31,024
51	Information	194,481	1.8%	\$64,999
11	Agriculture, forestry, fishing and hunting	190,123	1.8%	\$18,911
61	Educational services	162,145	1.5%	\$29,404
55	Management of companies and enterprises	82,113	0.8%	\$96,527
22	Utilities	25,293	0.2%	\$129,764
21	Mining	11,619	0.1%	\$60,784

Source: Economic Modeling Specialists, Inc.

Compared to the entire U.S workforce, Florida has higher concentrations of workers in retail, administrative and waste services, real estate, construction and accommodation and food services (see Table 2). The state has significantly lower concentrations in manufacturing and government. These comparative sector sizes are consistent with an image of a rapidly-growing state that attracts large numbers of tourists and retirees. Perhaps surprisingly, the share of labor force absorbed by health care services is below the national average.

Table 2 - Employment Concentration, by Sector - Florida and the U.S.

NAICS Code	Description	Florida % of total 2007	US % of total 2007
11	Agriculture, forestry, fishing and hunting	1.8%	2.1%
21	Mining	0.1%	0.5%
22	Utilities	0.2%	0.3%
23	Construction	7.6%	6.4%
31-33	Manufacturing	3.8%	8.1%
42	Wholesale trade	3.6%	3.6%
44-45	Retail trade	11.3%	10.8%
48	Transportation and warehousing	3.3%	3.6%
51	Information	1.8%	2.0%
52	Finance and insurance	4.6%	4.4%
53	Real estate and rental and leasing	5.6%	4.0%
54	Professional and technical services	6.4%	6.7%
55	Management of companies and enterprises	0.8%	1.0%
56	Administrative and waste services	10.5%	6.3%
61	Educational services	1.5%	2.1%
62	Health care and social assistance	9.8%	10.3%
71	Arts, entertainment, and recreation	2.7%	2.1%
72	Accommodation and food services	7.4%	6.8%
81	Other services, except public administration	6.3%	5.7%
90	Government	10.9%	13.2%

Source: Economic Modeling Specialists, Inc.

Shift-share Analysis

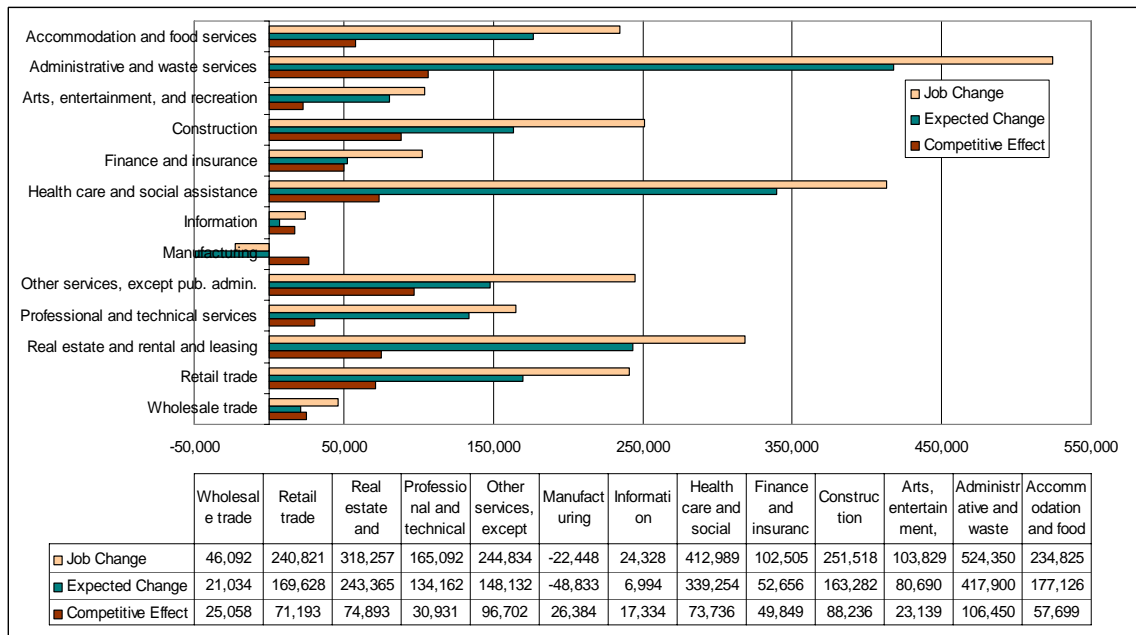
Shift-share analysis highlights the uniqueness of a regional economy in terms of job growth rather than total jobs in an industry. Industries with high regional competitiveness effects highlight the region's competitive advantages or disadvantages. Shift-share does not indicate why these industries are competitive but merely shows the sectors in which the region is out-competing or under-competing the nation.

The basic use of shift-share is to prevent an inaccurate interpretation of raw job growth numbers. An industry may be booming in a region, but shift-share reveals that the industry is actually growing even faster at the national level, showing that regional factors probably have little influence on the regional boom. Or, shift-share may reveal a national decline in that industry, showing a unique regional advantage in that industry that ought to be identified and fostered. An industry may be declining in a region, but shift-share reveals that it is declining even faster at the national level—and thus the regional industry is actually outperforming the nation by stemming

job loss. Or, the industry may be growing nationally, indicating that the region faces some disadvantage that is causing localized job loss in a nationally growing industry.

Traditional shift-share analysis involves the four components: job change, national change effect, industrial mix effect, and regional competitiveness effect. A simplified analysis includes three basic components, all defined in the basic unit of “jobs”. Job change is the actual and/or projected job change in the regional industry over the specified timeframe. The change is actual for historical data and projected for future years’ data. Expected change is the sum of the national growth effect and industrial mix effect. It is basically the job growth one would expect in the regional industry if it followed national trends exactly. The competitiveness effect is the most important and equals job change minus expected change. A positive competitiveness effect for an industry indicates the regional industry is outperforming national trends (both overall national trends and national trends in that specific industry). A negative effect means that the industry is underperforming compared to national trends.

Figure 1 - Job Change, Expected Change, and Competitive Effect, 2002-2017



Source: Economic Modeling Specialists, Inc.

Within the larger industry sectors, much attention has been devoted to selecting a limited number of sectors generating high quality jobs in which Florida may be able to develop or sustain a competitive advantage. Florida can further foster this competitive advantage by considering ways in which to implement career technical training focused on these sectors. Economic development promotion activities, including tax incentives for business location decisions, are largely targeted to the following key sectors:

- Life Sciences (including Biotechnology, Medical Device Manufacturing, pharmaceuticals, and Health Care)
- Information Technology (including IT Products/Services, Software Development, Modeling/Simulation/Training, Photonics/Lasers/Optics, Microelectronics, and Telecommunications)
- Aviation / Aerospace
- Homeland Security / Defense
- Financial / Professional Services
- Manufacturing

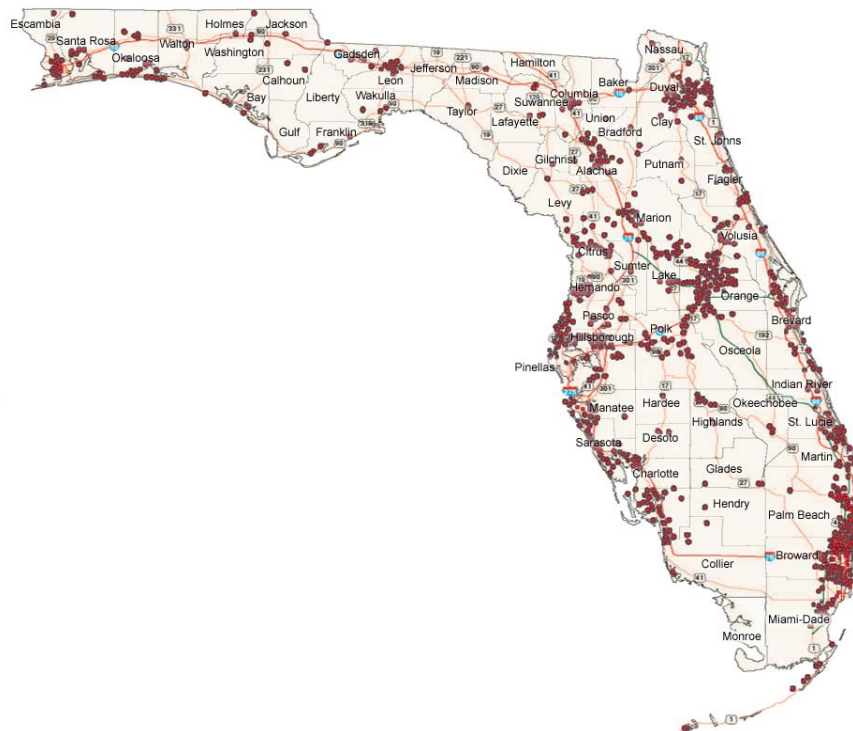
These sectors are heavily promoted as target industries by state government and economic development groups. The cluster maps, based on information from Enterprise Florida, Inc., show where the presence of these industries is strongest in the state. The county maps, generated by the Haas Center, show industry employment as a percentage of overall employment in all of Florida's 67 counties. Counties that are shaded darker have higher levels of employment in that industry sector relative to other counties.

Florida Life Sciences Cluster

Currently, within the broader life sciences industry, Florida has one of the country's largest medical device sectors. According to the Federal Drug Administration, Florida ranks 2nd in the nation in the number of FDA-registered medical device establishments. Over 20,000 Floridians work in this sector, with a majority of companies located along the Florida High Tech Corridor in Central Florida, the Jacksonville area, and in the South Florida region.

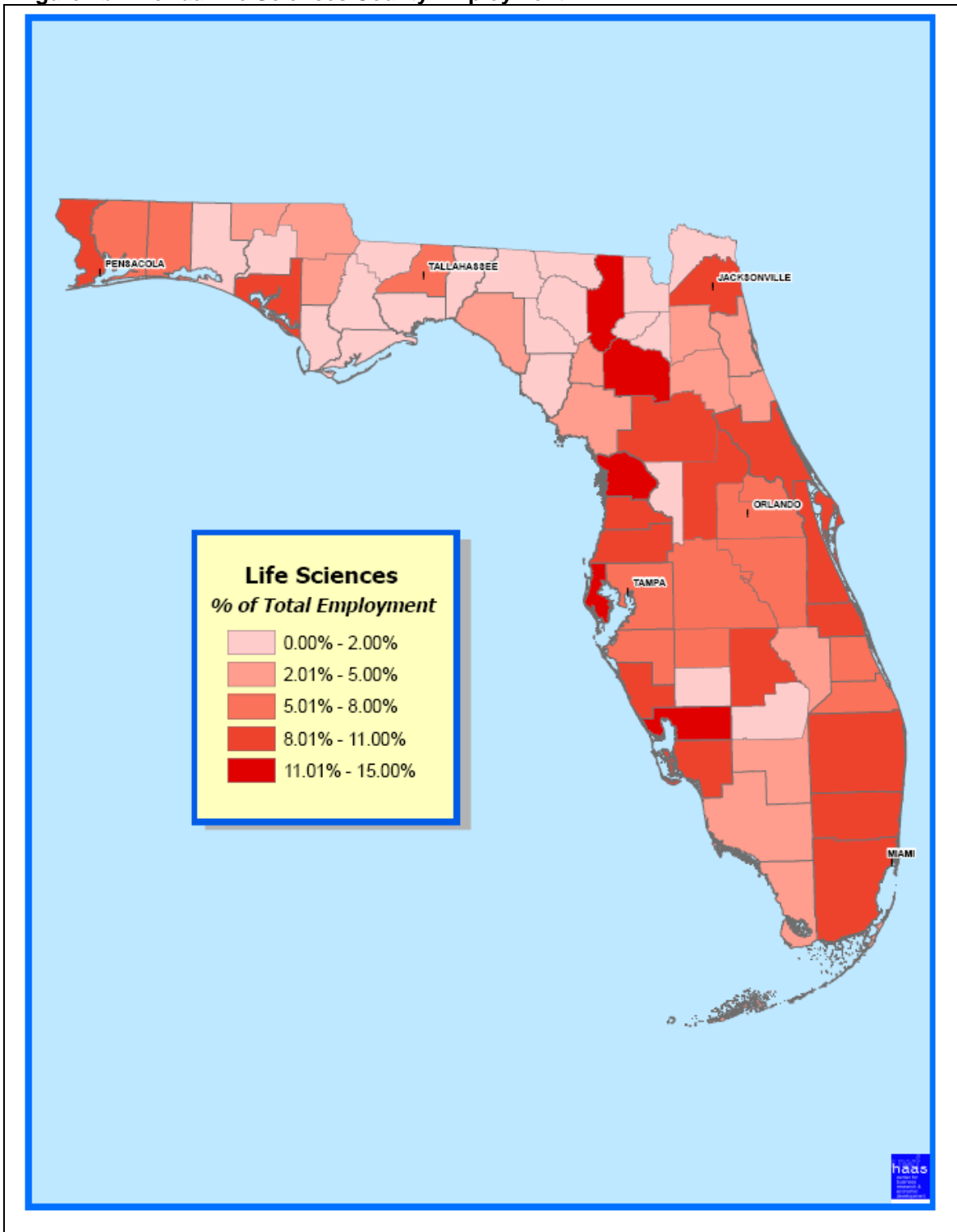
The 90 Florida pharmaceutical and medical manufacturing companies are involved in all aspects of the industry. In addition, Florida is home to a number of contract research organizations and other life sciences companies that help support the pharmaceutical industry. The majority of the companies in this sub-cluster are located in South Florida, Central Florida and Tampa Bay regions.

Figure 2a - Florida Life Sciences Cluster Map



Source: Enterprise Florida, Inc.

Figure 2b - Florida Life Sciences County Employment

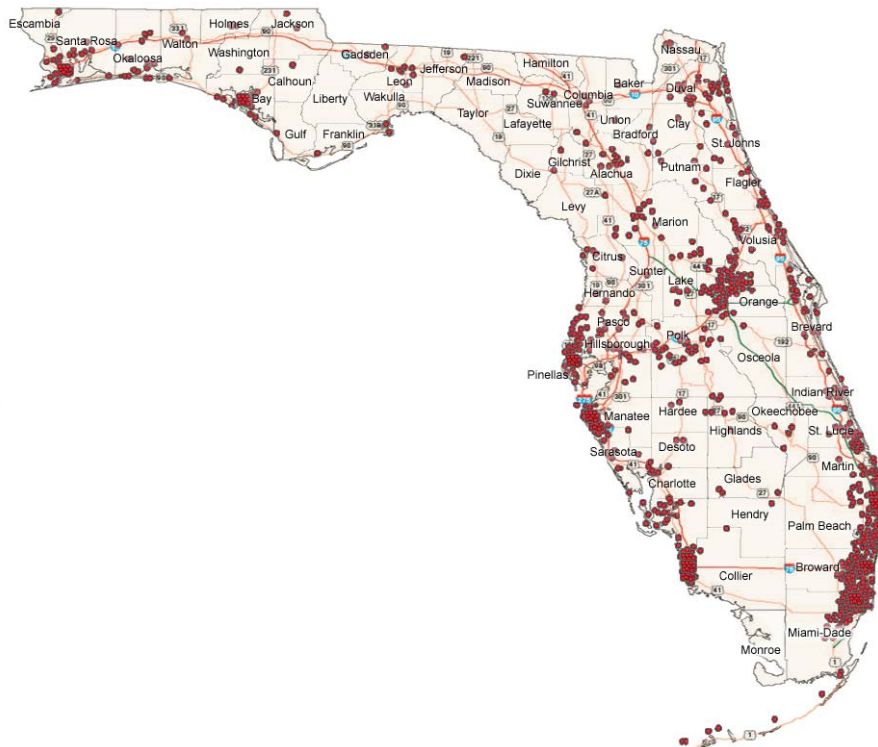


Florida Aviation and Aerospace Cluster

Florida is known as the premier location in the world for space technologies. Today, it continues to provide business opportunities for large and small space technology companies alike. While the majority of space-related businesses are located in the Cape Canaveral area, their network of suppliers extends throughout the state. The increased commercialization of space activities has attracted numerous new private-sector companies to Florida, which is one of the Top 4 U.S. states in manufacturing space vehicles and parts.

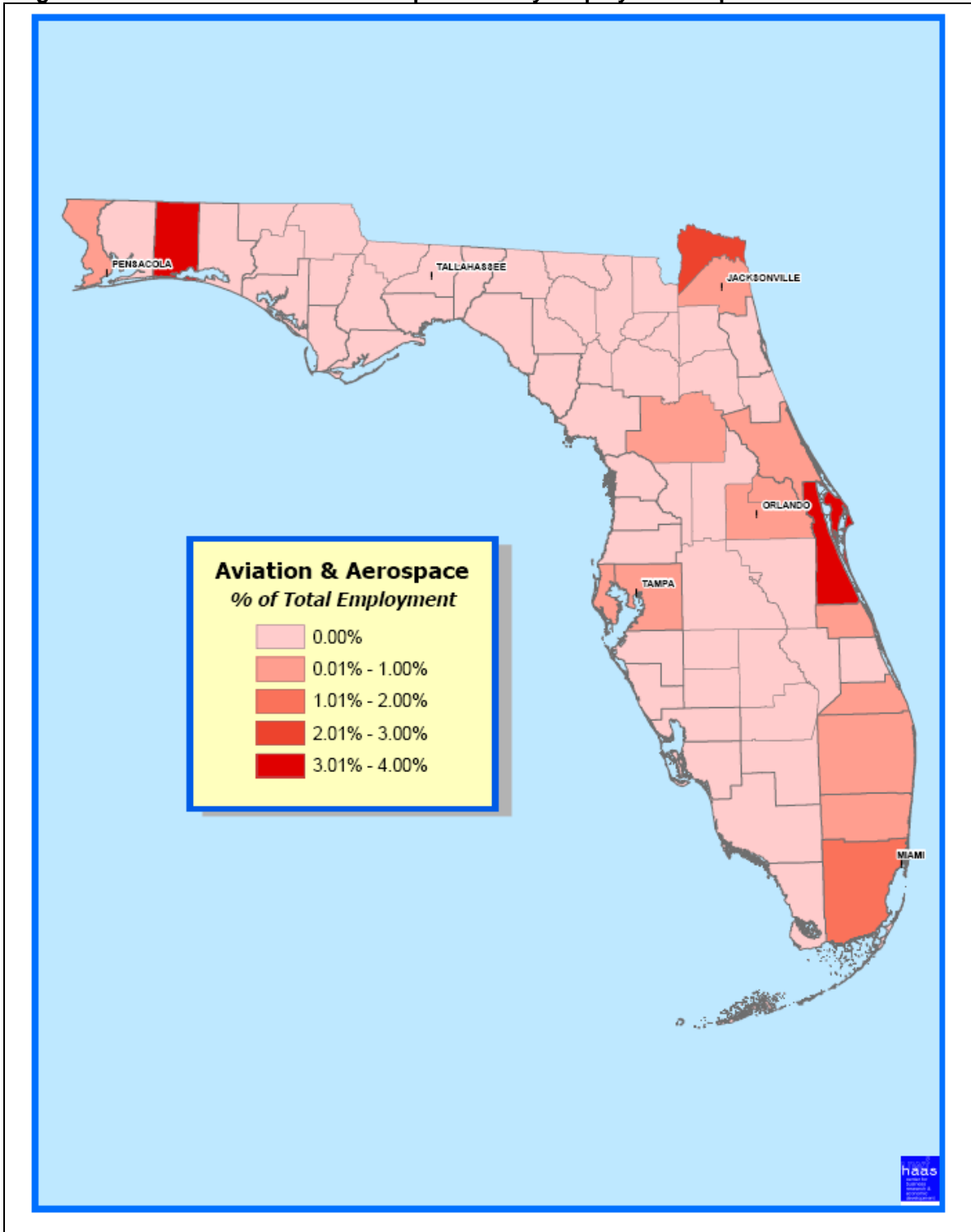
The state's aviation industry employs more than 50,000 people and operates out of 129 public airports, over 600 private airports and 27 military airfields. In addition, one fifth of the world's flight training occurs in Florida.

Figure 3a - Florida Aviation and Aerospace Cluster Map



Source: Enterprise Florida, Inc.

Figure 3b - Florida Aviation and Aerospace County Employment Map



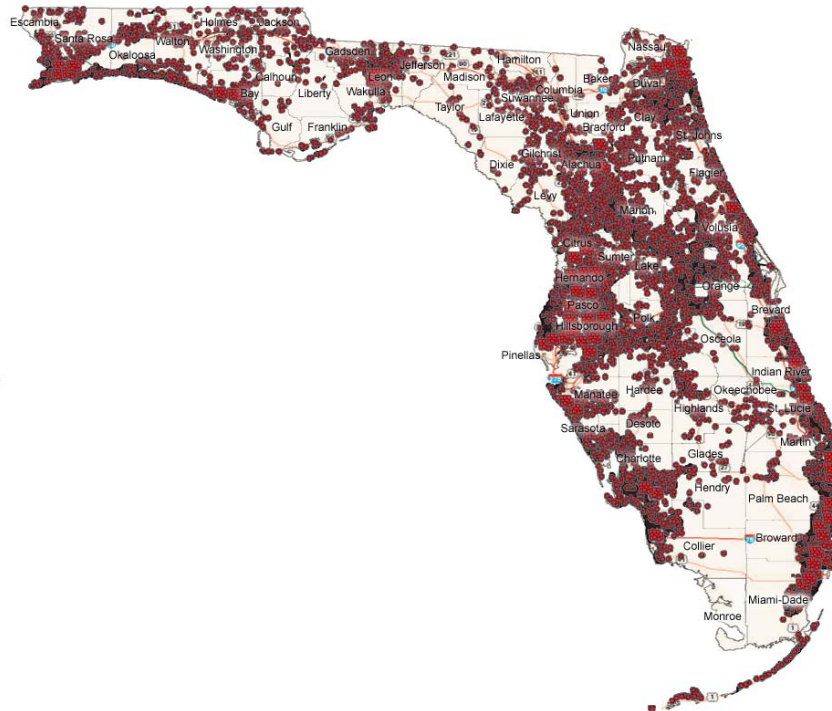
Florida IT Cluster

Florida's computer & microelectronics sector produces a broad spectrum of equipment, from microprocessors and circuit boards to nano-sized devices and other technologies of the future. The production activities of the nearly 600 companies and 33,000 workers in this IT sub-cluster are concentrated around Florida's major metropolitan areas.

Florida has been the geographic focal point for modeling, simulation and training (MST) development since the 1960s. Beginning with the establishment of Army and Navy simulation and training systems commands in Orlando and followed by the development of major theme parks that utilize the technology, the state is now home to one of the world's largest MST clusters, with over 300 companies and 16,000 professionals.

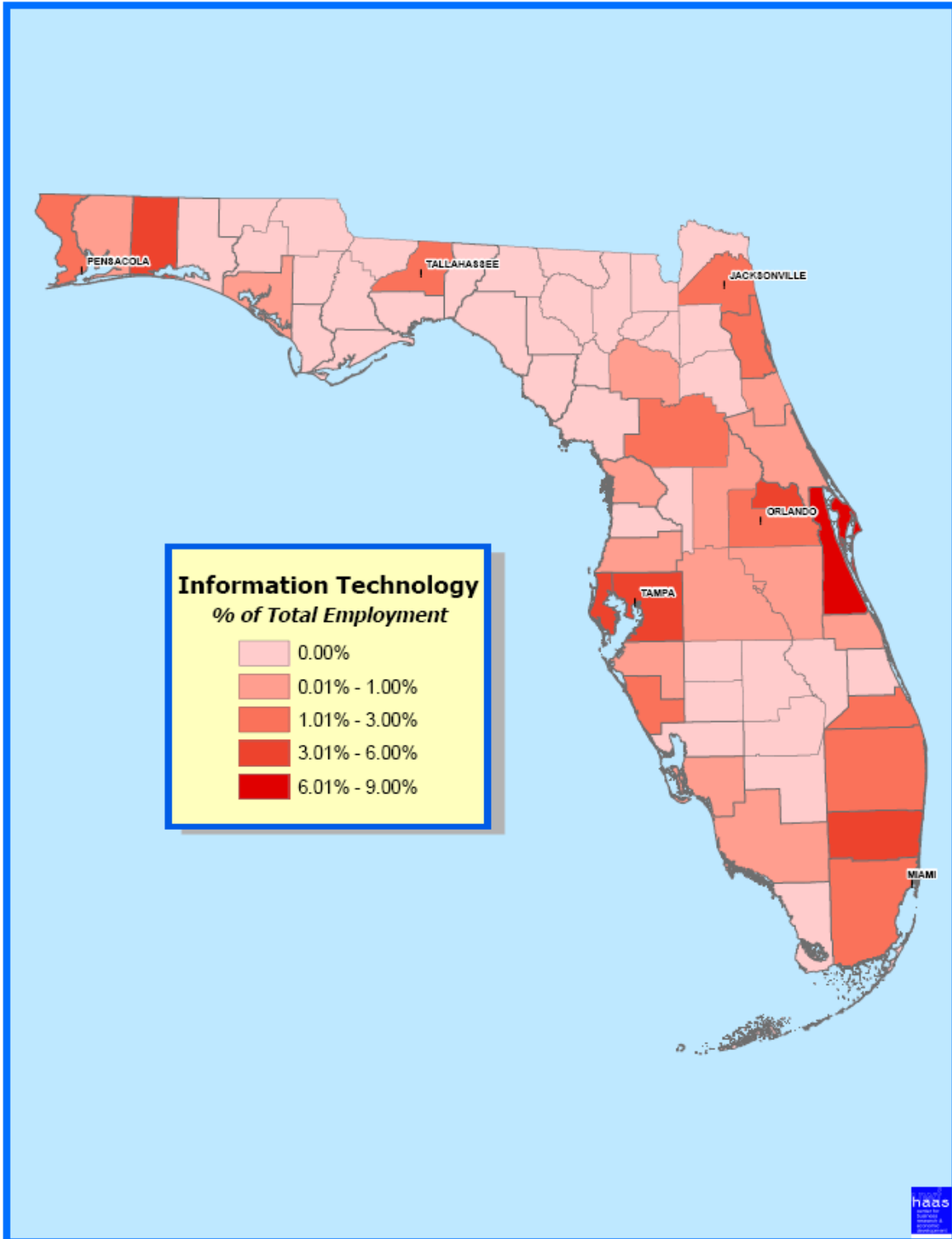
Florida's Software & Computer Systems Design & Integration industry is one of the largest in the U.S, consisting of some 9,000 firms. The cluster has expanded by over 1,000 new companies over the past few years.

Figure 4a - Florida IT Cluster Map



Source: Enterprise Florida, Inc.

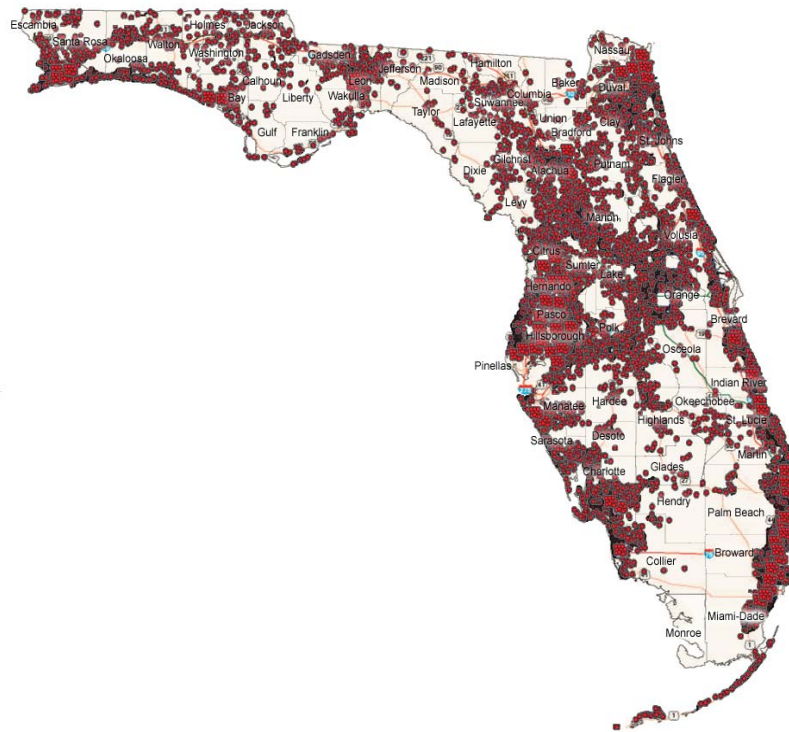
Figure 4b - Florida IT County Employment Map



Florida Finance and Professional Services Cluster

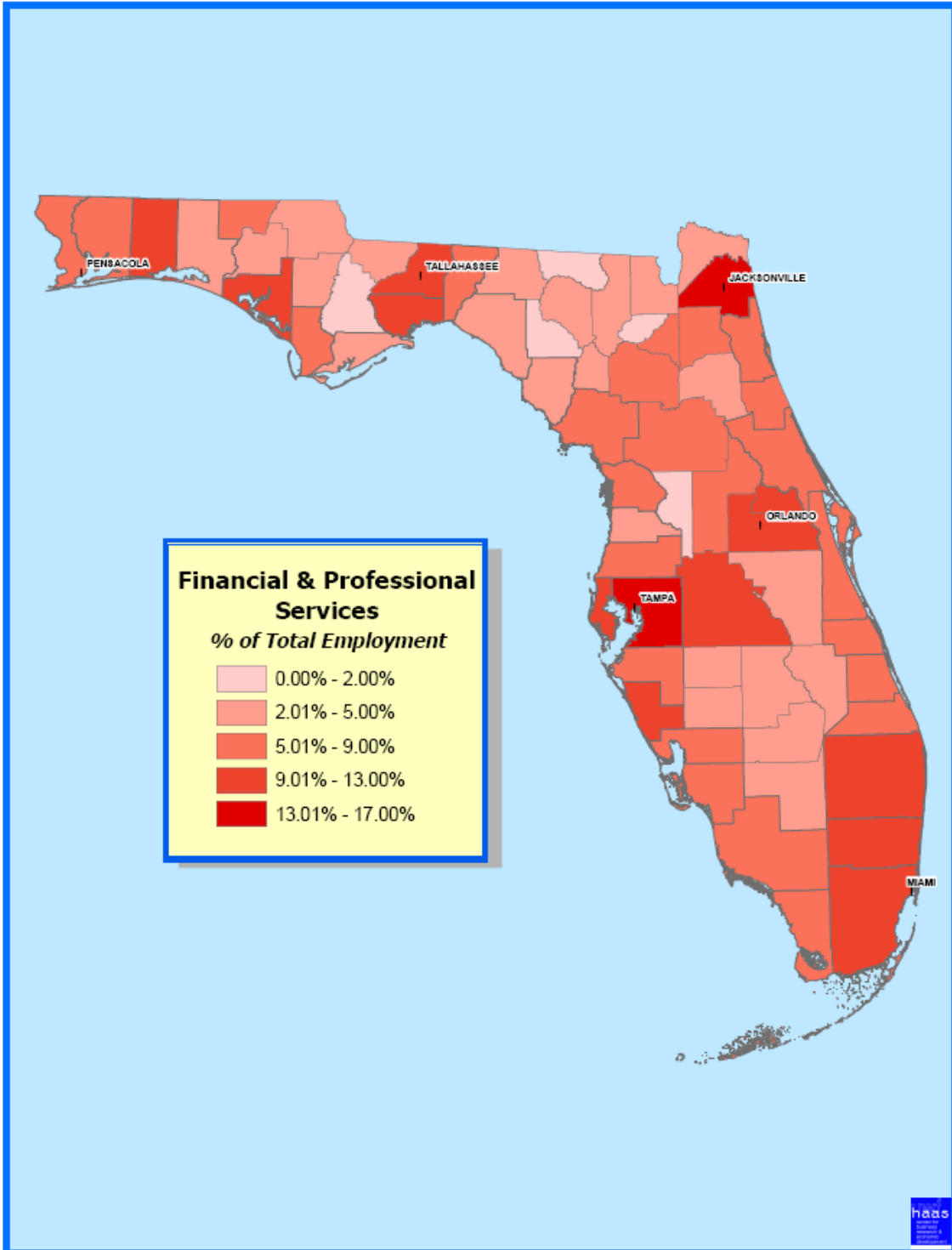
Nearly 90% of Florida's gross economic output is generated in the service sector. The state's diversified economic structure has enabled it to be a global player in the provision of high value-added services, such as Financial Services (banking, insurance) and Professional Services (legal, accounting, consulting, engineering). This industry is present statewide.

Figure 5a - Florida Finance and Professional Services Cluster Map



Source: Enterprise Florida, Inc.

Figure 5b - Florida Financial and Professional Services County Employment Map

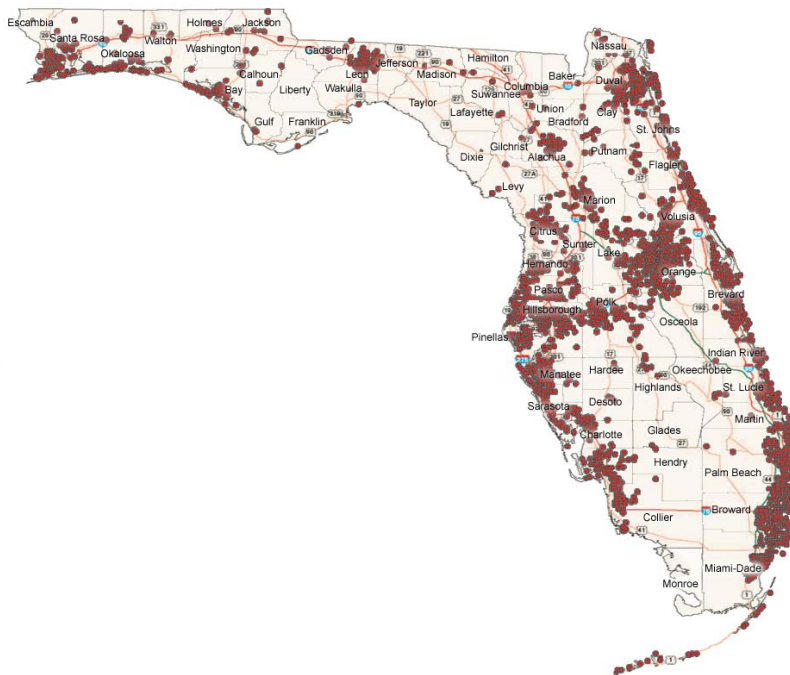


Florida Security/Defense Cluster

Florida is home to one of the nation's largest defense industries. Last year, Florida companies generated more than \$10.3 billion in Department of Defense Prime Contract awards, ranking it 5th in the nation. In total, Florida is home to roughly 50 military installations, including 12 major installations and 3 unified command centers, as well as many of the nation's leading defense companies and a large pool of highly skilled workers and veterans. According to Enterprise Florida, Inc., Florida's top ten contractors alone employ more than 28,000 Floridians.

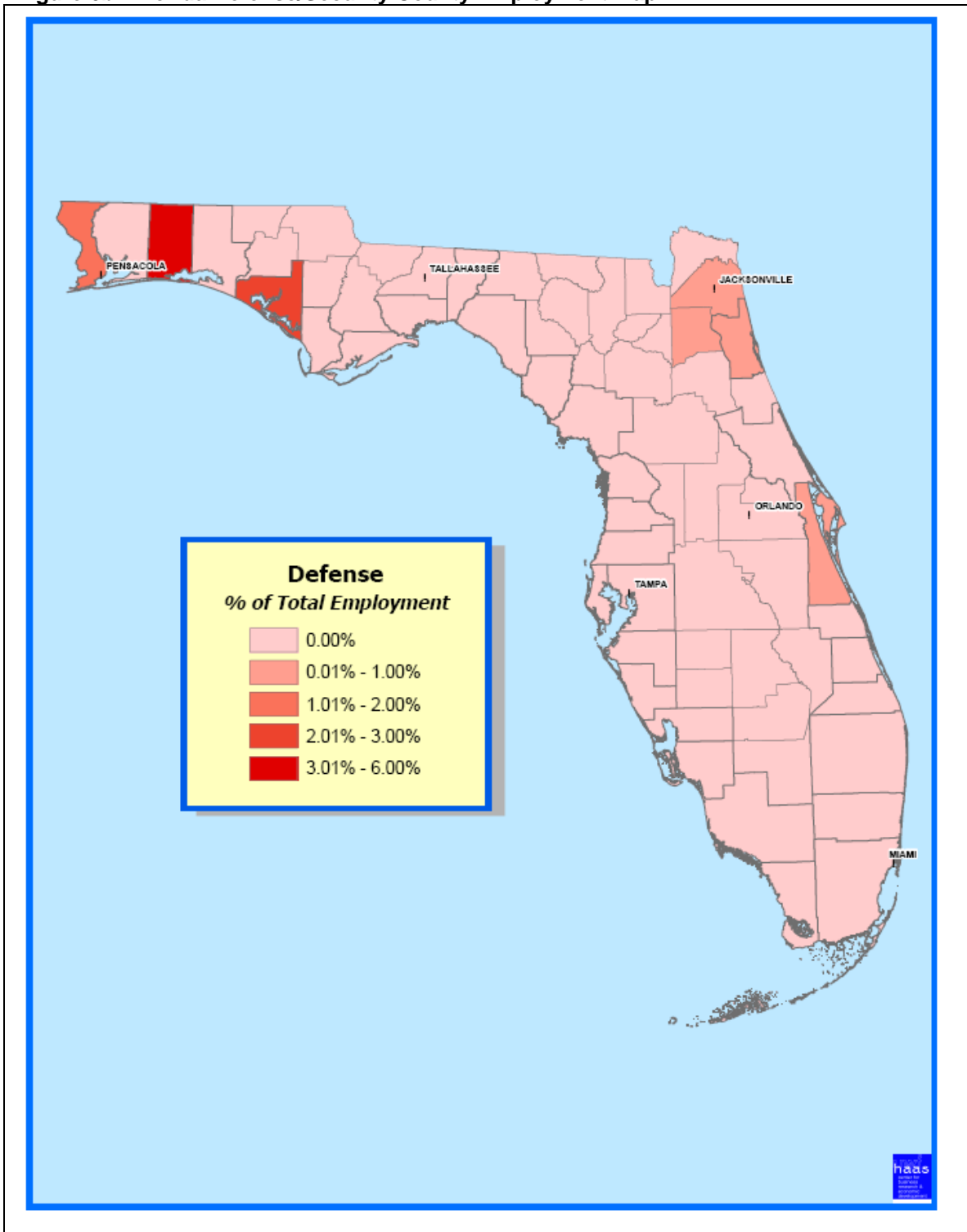
Florida's existing and sizable defense industry and the presence of most of the nation's major defense contractors, as well as the state's growing life sciences cluster, which includes companies developing vaccines and R&D related to pandemics like avian flu, position it as an ideal location for the emerging Homeland Security industry. Each of the state's major research universities has homeland security-related research programs that contribute to the technological innovation that drives the industry.

Figure 6a - Florida Security/Defense Cluster Map



Source: Enterprise Florida, Inc.

Figure 6b - Florida Defense/Security County Employment Map

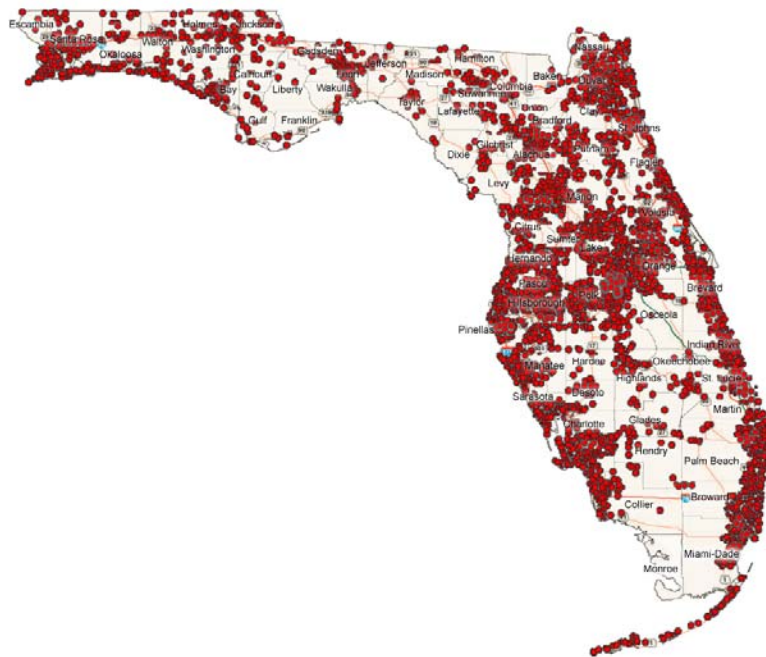


Florida Manufacturing Cluster

Florida's manufacturing industries are diverse and include companies in traditional manufacturing industries, such as plastics, food processing and printing, as well as those that are engaged in breakthrough technologies, like electronics, medical devices and aviation/aerospace. The industry cluster counts over 16,500 manufacturers who employ nearly 390,000 workers across the state. Employment concentrations, shown in Figure 7b, include all goods producing industries, and not just durable and non-durable manufacturers.

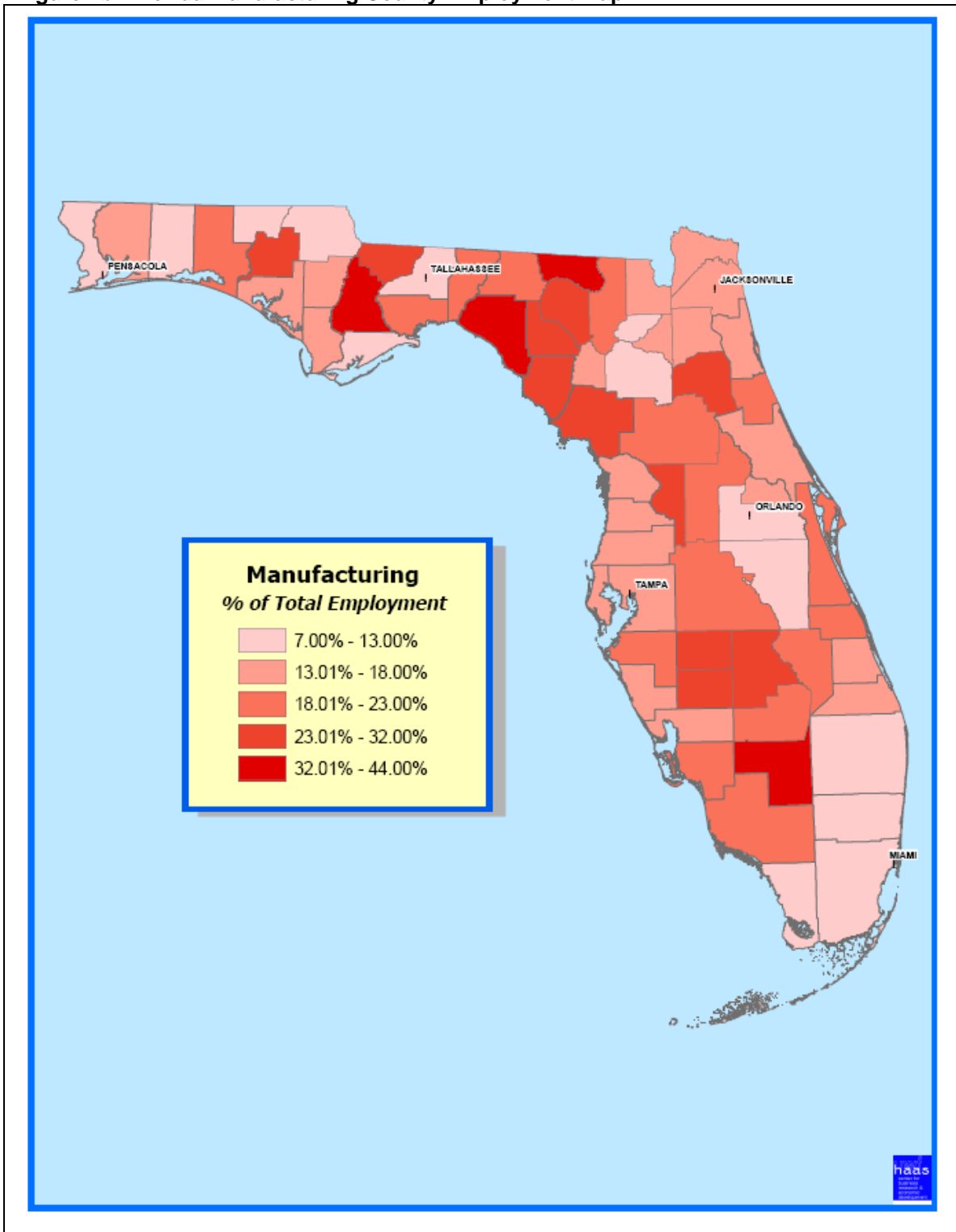
Other emerging industries that are considered in keeping with Florida's competitive advantage include alternative energy, marine science, materials science and nanotechnology.

Figure 7a - Florida Manufacturing Cluster Map



Source: Enterprise Florida, Inc.

Figure 7b - Florida Manufacturing County Employment Map

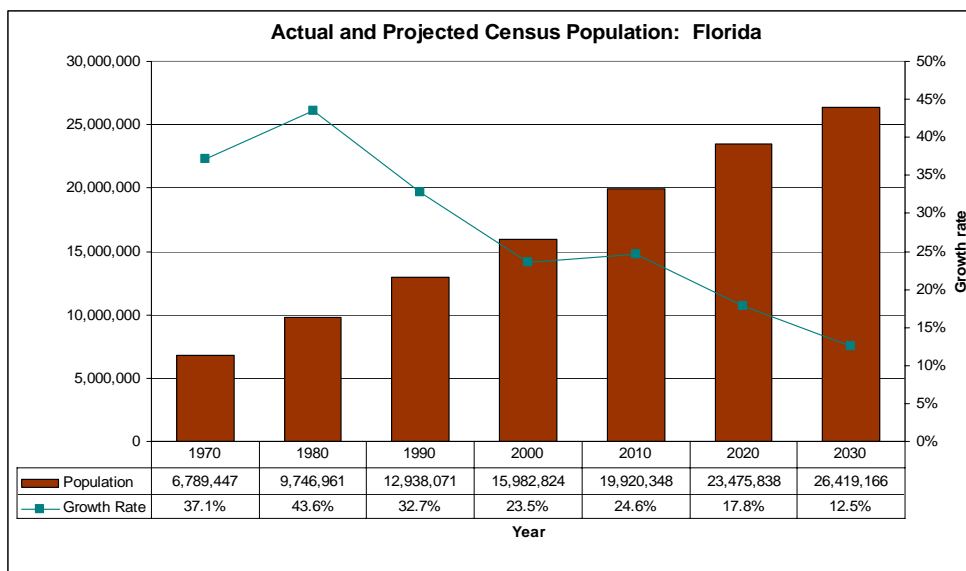


Section 2 – Demographic Trends

In this section we discuss the factors that will potentially influence employment demand in Florida over the coming years. Important long-run demographic trends including movement to the coasts and retirement of the baby-boomers point to continued Florida population growth and to an aging workforce. This is likely to generate employment opportunities in specific industries, including construction and health care, which can be directly serviced through career technical training. However, other factors now prevalent in Florida, particularly housing affordability, may suggest the need for downward modification of existing population forecasts, and therefore, growth in occupational demand. These housing affordability changes are due both to higher purchase prices (the home price increases of the last several years were particularly pronounced in Florida), and to higher carrying costs (higher windstorm insurance rates and property tax payments that increased with home prices). In examining expected occupational demand and the need for career technical education, we also highlight the issues that may impact population growth in the state.

Between 1980 and 2000, Florida's population increased by 6.2 million residents, or 64 percent. Only two states, California and Texas, added more residents than Florida during this period. Between 2000 and 2030, current population projections have Florida adding an additional 10.4 million residents, reaching a total population of 26.4 million. This would represent growth of 65 percent from 2000 levels, well over twice the projected national growth of 29 percent during the same time period.

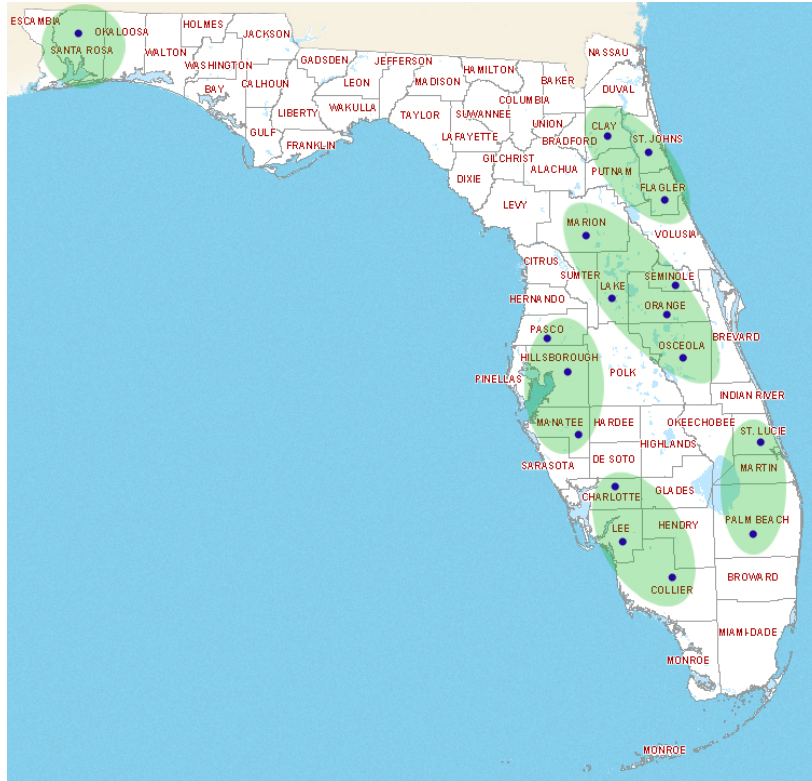
Figure 8 - Actual and Projected Population - Florida



Source: Demographic Estimating Conference Database, updated July 2006

Figure 9 shows those areas in the state which are projected to gain the most residents between 2007 and 2017, while also growing at a rate faster than the overall projected growth rate for the state.

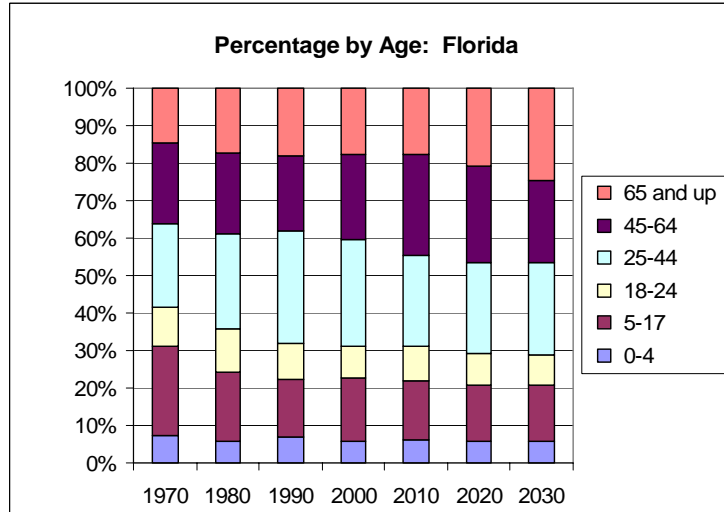
Figure 9 - Regions Gaining the Most Residents - 2007 to 2017



Source: Office of Economic and Demographic Research, Florida Legislature, Demographic Estimating Conference.

The 45 and over age group is estimated to be the fastest growing in the state during this period. For prime working age groups between 25 and 44, Florida's population will stagnate or shrink over the next decade. This will mean a tighter labor market, and will require some businesses to reach out over a broader geographic region to meet their staffing needs. Data also highlight the aging population in Florida with approximately 25 percent of the population expected to be aged 65 and over by 2030.

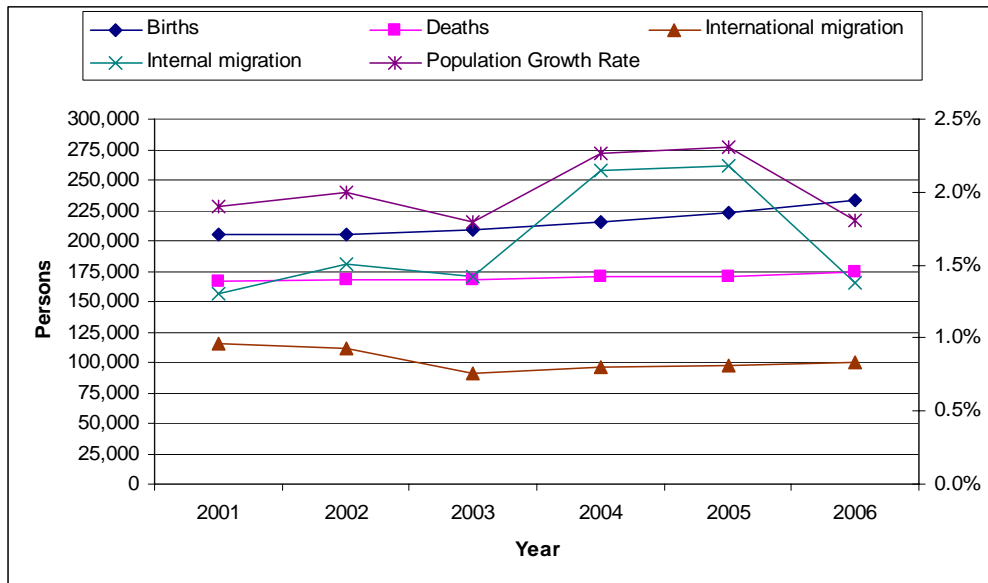
Figure 10 - Population Age Cohorts - Florida



Source: Demographic Estimating Conference Database, updated July 2006

An examination of recent growth trends shows that internal migration plays a significant role in Florida's population growth. Despite highly publicized and destructive hurricane seasons in 2004 and 2005, the state overall growth rate appears to have slowed only slightly.

Figure 11 - Births, Deaths, and Migration Trends - Florida - 2001 to 2006



Source: U.S. Census Bureau

Potential Factors Affecting Projected Population Growth

Estimating population growth is critical to assessing school enrollment and the overall need for career technical education. The potential long-term population growth is subject to many regional and national influences such as economic and income growth, the condition of the stock market, tax treatment of mortgages and second homes, interest rates, real estate cycles, etc. Projections of growth at the state and local levels that do not consider these broader factors are typically less reliable since they only tend to incorporate historical patterns of development.

A recent study from the Center for Urban and Environmental Solutions at Florida Atlantic University looked at the unexpectedly low enrollments in Florida public schools for the 2006-2007 school year. The study found that enrollments were down throughout Florida, particularly in the south Florida region.

Table 3 - Current and Projected Student Enrollment in South Florida Public Schools

		2006-07				
	2005-06 Enrollment	Projected Enrollment	Actual Enrollment	Difference	2007-08 Projections	2010-11 Projections
Monroe	8,328	8,190	8,058	(132)	7,823	7,231
Miami- Dade	358,141	355,300	350,435	(4,865)	343,781	328,845
Broward	267,152	266,664	260,686	(5,978)	254,788	242,609
Palm Beach	173,236	172,762	170,015	(2,747)	166,776	166,056
Martin	17,736	18,109	17,857	(252)	18,009	17,902
St. Lucie	36,043	38,308	38,634	326	41,263	48,852
Indian River	16,942	17,412	17,549	137	18,034	19,197
South Florida	876,939	877,426	863,043	(14,383)	850,474	830,692
Florida	2,641,121	2,689,974	2,641,598	(48,376)	2,645,655	2,714,618

Source: FAU CUES and Florida Department of Education

Across Florida, actual enrollment levels fell short of predicted levels by almost 50,000 students. In South Florida alone, the shortfall was approximately 14,000 students. The regional decline in student population was largely attributed to the growing cost of housing and the consequent affordability decline for middle class residents. Substantial increases in property values, property taxes, and hurricane-related insurance costs have potentially made South Florida unaffordable for middle class families with children, compelling many to move to less expensive areas of Florida or to other states such as Georgia and Tennessee.

According to the CUES study, only time will tell if this is a long term trend; however, demographer Dick Ogburn of the South Florida Regional Planning Council does not expect it to be. "We are already in a period of corrections in terms of housing prices andas in other major metropolitan areas that have gone through similar difficulties long before South Florida, there will be a longer term adjustment process that will lead to more suitable equilibrium between the cost of living and salaries in the region... While growth rates could be somewhat slower than what we previously projected, long term population trends are likely to be maintained."

Housing Prices

Population growth typically results in higher housing values for several reasons. For example, home building tends to lag behind population growth; building inputs tend to increase because demand outpaces construction supplies; labor costs tend to increase with population growth; speculation on future housing values tend to increase land prices; existing home values increase due to demand for immediate housing; and regulatory costs and the necessary infrastructure (roads, schools, etc.) to support new growth tend to increase rapidly.

A 2005 study by the Treasure Coast Regional Planning Council on workforce housing found that housing prices that remain continually above national averages have a negative impact on gross regional product and effect location decisions of economic migrants. Using a REMI model simulation of a five percent increase in housing and land prices relative to the nation, the study concluded that with other variables remaining constant, consistently higher housing prices tended to have a negative impact across all industries and created a declining labor force.

One factor that may tend to mitigate the effects of other shocks on population growth is continued higher home prices in other areas of the country relative to Florida. Additionally, according to Florida Home Loan, Florida has the highest share of international buyers in the country, averaging a 15 percent share.

Property Taxes and Insurance

A May 2007 report from Florida TaxWatch using a REMI model simulation to examine various property tax reduction scenarios, including the replacement of property taxes with increased sales taxes, concluded that a reduction in property tax with no change in sales tax would boost the Florida economy by increasing GRP and disposable personal income without creating a significant number of job losses. The study also found that the magnitude of annual job losses over time will be much higher for property tax/sales tax swap scenarios compared to property tax cut scenarios because a sales tax increase raises prices which will cause business costs to go up and consumers will be more selective in buying, so demand is reduced. Lastly, the report concluded that a property tax cut will attract more people to Florida and increase statewide demand for goods and services, increasing output in the economy, while a sales tax hike will have the mitigating effect of decreasing population growth and result in a corresponding reduction in demand and output.

The National Association of Insurance Commissioners recently issued a report ranking U.S. states in terms of the cost of homeowner's insurance. The average cost to insure a U.S. home in 2003 was \$668 a year, but the range extended from an average of \$433 per year in Idaho to \$1,328 per year in Texas. The top five costliest areas were Texas (\$1,328); Louisiana (\$975); Oklahoma (\$925); Florida (\$810) and Washington D.C. (\$806). In 2006, Florida Home Loan reported that less than 1 percent of buyers are forgoing Florida because of high insurance costs but also reported that economist David Lereah and others¹ warned that the share of those electing to eschew Florida could rise unless the government makes strides in restructuring subsidies for disaster insurance.

Aging workforce

In the United States, approximately 16 percent of the workforce is aged 55 and older. The number of workers 55 and older is growing four times faster than the workforce as a whole. Baby Boomers, aged 43 to 61 in 2007, currently represent nearly one-half of the U.S. workforce and because of the relative size of their group, will continue to have a disproportionate impact on the nation's workforce. Projected annual growth rates show that from 2010, the traditional working-age population of 15 to 64 will grow at only 0.3 percent, while the 65 and older group is projected to grow at 3.1 percent.

Table 4 shows the percent of workers by industry sector in the 55 to 64 age cohort. All but one industry has double-digit employment concentrations of workers approaching retirement.

¹ Speaking at the 2006 International Real Estate Congress and Expo

Table 4 - Percent of Workers Aged 55-64, by Industry Sector

Industry 2005	Workers Aged 55-64	Total Employment	Percent 55-64
561 Administrative and Support Services	92,563	834,713	11.1%
541 Professional, Scientific, and Technical Services	55,319	435,219	12.7%
621 Ambulatory Health Care Services	47,016	341,439	13.8%
622 Hospitals	35,495	241,937	14.7%
722 Food Services and Drinking Places	28,959	554,937	5.2%
423 Merchant Wholesalers, Durable Goods	25,462	187,302	13.6%
238 Specialty Trade Contractors	24,117	244,999	9.8%
623 Nursing and Residential Care Facilities	23,896	154,811	15.4%
452 General Merchandise Stores	22,540	161,391	14.0%
531 Real Estate	20,715	124,689	16.6%
445 Food and Beverage Stores	20,095	196,567	10.2%
721 Accommodation	19,713	154,286	12.8%
522 Credit Intermediation and Related Activities	19,538	179,140	10.9%
524 Insurance Carriers and Related Activities	18,580	132,476	14.0%
441 Motor Vehicle and Parts Dealers	17,683	134,611	13.1%
236 Construction of Buildings	16,703	135,528	12.3%
611 Educational Services	15,140	94,663	16.0%
713 Amusement, Gambling, and Recreation Industries	14,585	122,795	11.9%
424 Merchant Wholesalers, Nondurable Goods	14,560	122,986	11.8%

Source: U.S. Census Bureau Local Employment Dynamics

On the supply-side of the labor market, a number of problems exist. As the U.S. will soon lose a large fraction of its skilled workers as the baby-boom generation reaches retirement age, this will exacerbate the skilled-worker shortage. As the baby-boom generation retires from the U.S. workforce, companies will have to cope with the problem of losing highly experienced personnel and with having an insufficient supply of talent to fill the gap.

Not all older workers are expected to retire. According to the Bureau of Labor Statistics, workforce participation rates among the 55 and older cohort is expected to increase from 34.5 percent in 2002 to 39.7 percent in 2012 with positive change in all age segments, 55-64, 65-74 and 75 and older (Toosi, 2004). While financial necessity is the primary reason older employees continue to stay in the workforce, non-financial benefits of employment such as the wish to work for enjoyment, the desire to stay physically and mentally active, and the need to have something to do are important as well.

Even so, many companies are aware of the problem and are adjusting working practices to accommodate their older employees. For example, IBM, drawing from its 2005 survey of human-resources directors, concluded that: "When the baby-boomer generation retires, many companies will find out too late that a career's worth of experience has walked out the door, leaving insufficient talent to fill the void."² As a result, they are offering more flexible work hours and telecommuting in order to extend the working lives of key employees. Other firms are actively

² "Turning Boomers into Boomerangs" The Economist, February, 2006

recruiting former employees and bringing them back into the workplace to stave off the worker shortage. For example, BMW opened a new factory in Leipzig, Germany, and only hired workers over the age of 45, while Ernst and Young (the accounting firm) rehired approximately 30,000 former workers to increase its skilled workforce.

The structural change in the labor force has significant implications for education generally, and career technical education in particular. As the supply side of the labor market struggles to keep up with demand, regional education planners need to address the expected shortfall and prepare students with the requisite skill sets to meet the growing demand for trained workers.

Overall, there are several factors that have the potential to revise down population growth estimates in Florida. These factors are typically not accounted for in population estimates as they represent future uncertainties that are difficult to accurately quantify. As such, perhaps current population growth estimates can be considered as an upper bound on growth forecasts. The current status of Florida's housing market and property tax reform may have a significant downward bump on future population growth and on the number of students requiring career technical education. At the same time, the aging population provides challenges for regional education planners to increase the supply of students leaving high school with the requisite skill sets to replace the retiring population.

To estimate the impact of current and expected issues on population growth and school enrollment is beyond the scope of this report. As discussed, Haas Center researchers considered the impact of isolated changes in economic conditions on population growth using a general equilibrium framework, but to expand the analysis to simultaneously examine all potential changes is perhaps an area for future research.

Section 3 – The Changing Structure of the U.S. Economy

Sections 3 and 4 of the report present an analysis of the factors and challenges that will potentially impact occupational growth in Florida, and therefore, expected demand for students requiring a career technical education. Section 3 describes how the changing structure of the U.S. economy impacts occupational growth and the need for career technical education to supply labor to a dynamic workforce. Section 4 then quantifies the need for students requiring career technical education.

Over time, the U.S. and other industrialized nations have faced significant structural shifts in their respective economies that have provided both benefits and challenges alike. The latest impact comes in the form of globalization. This section begins with a historical perspective on structural change and its impact on national economies before discussing the current shift toward globalization, the potential threats to occupational growth posed by cheaper foreign labor in the service sector industry, and implications for the future role and development of career technical education in Florida.

This section will discuss how globalization has changed the critical divide in the Florida labor market and its impact on education. The threat posed by globalization means educational programs emphasizing how much children should be educated will be increasingly replaced by how they are educated. Career technical education in Florida will play a significant role in addressing the future needs of companies and providing students with the requisite skill sets commensurate with expected occupational demand.

Background

Historically, industrial revolutions changed employment practices as workers moved from farms to factories, and then from factories to white-collar service sector positions. Education practices had to change in accordance with the changing need for different worker skill sets. The current structural shift should be no different. To gain perspective on the current change in the economy, we provide a background on previous major shifts and their impact on economies .

Friedman (2006)³ addresses the historical nature of changing economies by identifying three eras of globalization; Globalization 1.0, 2.0, and 3.0. Globalization 1.0 concerned the era from the 15th Century to the early 19th Century as explorers searched for and mapped out new lands, reducing the world from a size large to a size medium. Globalization 2.0 continued on through the turn of the 21st Century, as multinational corporations dominated the economic landscape. This era saw the birth and maturation of the global economy as the movement of goods and information between continents improved. Friedman reasons that the world has now entered Globalization 3.0 that flattened the world through the technology boom that empowered individuals and companies to compete globally, from anywhere in the world.

Blinder (2005)⁴ describes the world economy as moving into its third industrial revolution. In the first industrial revolution, workers moved from farms to factories, creating a massive structural shift in economies and a huge net gain to society as a whole. In 1810, 84 percent of U.S. workers were employed in the agricultural sector and only 3 percent in manufacturing. In 1960, agriculture's share of total employment had fallen to 8 percent, while manufacturing's share had increased to 25 percent. Blinder states that societies had to change dramatically to accommodate the structural shift, changing education systems, business organization, and government practices.

The second industrial revolution occurred in the 1960s. This economic shift involved a movement away from manufacturing of goods and toward the service sector. From 1967 to 2003, the service sector's share of total employment increased by approximately 19 percent in the U.S., 21 percent in Japan, and 25 percent in Britain.⁵ Again, education systems needed to adapt. Required worker skill sets moved away from physical labor skills toward more knowledge-based learning and the development of human capital. As such, more education for students in the form of post-high school degrees was seen as a means to meet occupational needs.

Blinder suggests that the world's economy is now in the embryonic stages of the third industrial revolution called the "information age." As Friedman discusses the flattening of the world, Blinder argues that the cheap and easy flow of information around the world has expanded the scope of tradable services. Like the other two industrial revolutions, the latest major economic shift requires a change in government and business practices. Most importantly for this study, the latest economic shift requires a change in education processes as well.

³ "The World is Flat" Thomas L. Friedman, 2006

⁴ Blinder, A.S., "Fear of Offshoring," *Working Paper*, Center for Economic Policy Studies, Princeton University, December, 2005.

⁵ Source: Organization for Economic Cooperation and Development

As the economy enters the third industrial revolution, it faces a significant threat from globalization – namely offshoring outsourcing. Offshoring outsourcing is the migration of jobs, but not the people that perform them, from rich countries to poor. Friedman suggests that December 11, 2001 is a date that provided a large shift in the advanced nations' economic structures. On that day, China formally joined the World Trade Organization. This assured foreign companies that if they shifted factories offshore to China, they would be protected by international law and standard business practices. Cheap Chinese labor makes offshoring jobs from the U.S. an attractive proposition for U.S. companies in certain industries. For example, the average wage of a high-skilled machinist in the U.S. is approximately \$3,000 a month, compared to roughly \$150 a month for an equivalent Chinese worker.

Like any other major structural change, from an economic perspective, free trade and productivity improvements brought about by offshoring should yield substantial net economic gains to society as a whole. Yet, concern is apparent for those specific jobs most at risk to foreign competition. As a relatively new phenomenon, while most economists agree to the overall benefits emanating from free trade, some leading economists differ in their opinions regarding the redistributive effects offshoring will create in advanced industrialized nations. For example, N. Gregory Mankiw, a Harvard professor states that offshoring is a natural consequence of comparative advantage and free trade across international boundaries. As more goods and services become tradable, society as a whole benefits. However, Blinder⁶ disputes that offshore outsourcing is merely an extension of international trade and believes that there could be highly significant consequences from offshoring and that governments should start preparing for the major transformations it will bring. Blinder believes economists holding to the free trade stance underestimate the importance of offshoring and its disruptive impact on wealthier nations. So far, rough estimates suggest that in the U.S., due to offshoring, well under one million service-sector jobs have been lost. He reasons though that sometimes “quantitative change is so large that it brings about qualitative changes, as offshoring likely will.” Blinder further indicates that constant technological change and global communications guarantees more offshoring and the current impact of offshoring on jobs lost in wealthier nations is merely the tip of the iceberg and the total impacts could be immense.

Blinder also provides some historical perspective on the impact that offshoring will have on industrialized nations. Just like previous industrial revolutions, in which declining industries did not disappear, but rather, reduced their share of total employment, globalization will not result in mass unemployment. Rather, like the previous two, productivity gains resulting from globalization

⁶ Professor of economics at Princeton University

can drive significant overall gains in employment but the necessary social and economic adjustments must be made.

Initially, Blinder provided a ballpark figure for the number of jobs under threat by offshoring in the U.S. He assumed that potentially all manufacturing jobs are vulnerable, while construction, retail trade, and government positions are not likely to leave the U.S. The other sectors are more difficult to quantify. Considering each sector and the relative potential for offshoring of jobs, Blinder estimates that between 30 and 40 million U.S. jobs are susceptible to offshoring.

In more recent work, Blinder (2007)⁷ revisits his theory to provide a more sophisticated analysis of the threat to U.S. occupations through offshoring. Extrapolating normal technological progress by assuming the current level of technology improves steadily over time, Blinder creates a two-digit “offshorability” ordinal index number for 817 occupations, ranking each occupation from most-offshorable to least. Blinder uses the O*NET database to analyze each occupation. O*NET provides subjective information useful in the analysis such as the type of tasks and work activities typically required within each occupation. To rank each classification, first, Blinder places each occupation into one of four classifications; highly offshorable, offshorable, non-offshorable, and highly non-offshorable. An offshorability index is then assigned based on the tasks and work activities specific to the occupation. Blinder only assigns an index to those occupations in the first three classifications (i.e. highly non-offshorable jobs are not assigned a number). Table 5 provides an example of some the occupations by classification.

⁷ Blinder, A.S., “How Many U.S. Jobs Might Be Offshorable?” *Working Paper*, Center for Economic Policy Studies, Princeton University, March, 2007.

Table 5 - The Blinder Offshorability Index

Highly Offshorable (total = 8.2 million workers) – Classification I		
Occupation	Index	Number of Workers
Computer programmers	100	389,090
Telemarketers	95	400,860
Computer systems analysts	93	492,120
Billing and posting clerks	90	513,020
Offshorable (total = 20.7 million workers) – Classification II		
Occupation	Index	Number of Workers
Computer software engineers: applications	74	455,980
Computer software engineers: systems software	74	320,720
Accountants	72	591,311
Welders, cutters	70	358,050
Non-offshorable (total = 8.8 million workers) – Classification III		
Occupation	Index	Number of Workers
General and operations managers	55	1,663,810
Sales managers	26	317,970
Highly Non-offshorable (total = 8.8 million workers) – Classification IV		
Occupation	Index	Number of Workers
General and operations managers	25	916,290

Table 5 shows that, according to Blinder’s measurement, almost 30 million U.S. jobs can be classified as offshorable, of which 8.2 million are highly offshorable. Occupations facing the greatest threat from offshoring are computer programmers (receiving a Blinder index of 100), telemarketers, computer systems analysts, and billing and posting clerks. At the other end of the index are general and operations managers and sales managers.

The table highlights the critical divide in today’s workforce and as a result, the need for a restructuring of local education to face the challenges posed by globalization. Table 5 highlights that the essential labor market divide today is between “personal” services that require face-to-face contact between the parties and “impersonal services” that require little face-to-face contact and can be provided electronically through a wire. In table 5, the highly offshorable positions

represent occupations requiring little personal contact while the less offshorable positions cannot (at this moment in time) be easily provided electronically and require some personal contact.

Essentially, the critical labor-market distinction between high skilled workers and less skilled workers is less valid in today's society. In the future, this critical divide may be more about those jobs that are easily deliverable through a wire without reducing the quality of services and those that are not. For example, Blinder states that it is unlikely that a taxi driver or airline pilot occupation will be delivered electronically over distance. The former is a low-skill profession while the latter is typically regarded as a high-skill occupation but they are both "personal services" in which face-to-face contact is required. The divide therefore is not the level of skill but its ability to be provided electronically. Conversely, typing services (typically seen as low-skill) and data systems analysis (high-skill) are occupations that are already being delivered electronically. These are essentially impersonal services that have different attributes to face-to-face services. As such, personal services requiring face-to-face contact are less likely to be offshored, so nursing, child care, wait staff, and psychotherapy positions are less vulnerable to offshoring than the impersonal occupations of call center operators and computer software technicians. Blinder further argues that the dividing line between personal and impersonal services will continue to shift over time as more personal services will become impersonal.

Overall, while globalization may create productivity gains that provide a net benefit to society as a whole, at the micro level, governments must address the complex nature and "multifaceted challenges" that offshoring creates. Blinder notes that one of the primary components that needs to be addressed is the educational system. Essentially, today's critical labor market divide necessitates that local and regional education planners address the challenges in providing today's students with the tools and skills necessary for tomorrow's workforce. Blinder cites transforming education systems as a primary tool to prepare workers for the jobs that will actually exist in their respective societies. He reasons that how children are educated may be more important than how much, and to meet this need, education specialists need to start addressing this problem now.

Overall, Blinder sees the most acute need as estimating how to educate children today to meet the demand for jobs ten to twenty years from now. However, as education no longer centers on the distinction between high-skill and low-skill work, he suggests that simply providing more education is not sufficient. Rather, as discussed in the next section, rapid technological change continues to drive demand for education beyond the high school level; a significant proportion of the fastest-growing occupations require vocational education or industry recognized certifications.

Technical career education provides a platform for students to develop the skills and earn the industry recognized certifications specific to the occupations most in demand. With the provision of SB 1232, career technical education is one step toward addressing current education reform in Florida. As SB 1232 mandates career education programs throughout the state of Florida, education curricula can focus on providing students with the skills and training in specific industry recognized certifications commensurate with expected occupation demand. Section 5 discusses in detail the specific components of SB 1232, but generally, the legislation is designed to establish career academies relevant to local and state workforce needs. Collaboration with local workforce boards ensures that the academies are established in fields that are relevant to workforce needs.

Career technical education can also provide additional benefits to students, and therefore the economy, through the development of soft-skills. Focus groups in an earlier Haas Center study on the value-added of the CHOICE program in Okaloosa County indicated that students graduating from the CHOICE program were better-equipped than typical high school graduates in the types of soft-skills useful in a more dynamic economy. Problem-solving, multi-tasking, and collaboration were all regarded by local businesses as traits instilled in CHOICE students that are important to the companies. Friedman and others suggest that the current education system in the U.S. does not stress enough the importance of creativity and problem-solving within the curricula.

Once more, as the economy shifts, the educational platform supporting the current and future occupational demand changes accordingly. The assembly-line system of industrial production pioneered by Henry Ford and rationalized by Frederick Taylor assigned most quality control and problem solving issues to managers. In recent decades, it has been replaced by a new system that has essentially eliminated layers of management, assigned more supervisory and problem-solving responsibilities to workers, and emphasized the need for teamwork and job rotation rather than task-orientated jobs in which workers were seen as cogs in a machine, repeating the same process. The new system requires more communication and collaboration between workers, and more complex thinking, problem solving and flexibility from workers. As such, Friedman suggests that school children should be steered away from tasks that are routine and toward work that requires imagination.

Overall, this section highlights the importance of career technical education as a component of restructuring the educational curricula in response to the changing economic structure. Supplying industry with an adequately trained workforce will help Florida compete on a global scale. This also has important implications for economic development and quality of life in regional and local

economies. The availability of adequately trained workers in a region encourages the development of industries that utilize their skills. Jobs created by these industries are those that raise the standard of living over time. Conversely, a lack of adequately trained workers can impede regional economic development, causing living standards to lag in those areas that fail to hold on to their well-educated residents.

Section 4 – Occupational Forecasts

With the changing structure of the U.S. economy driving a fundamental restructuring of traditional education programs, forecasting regional occupation growth is critical to shaping the direction of career technical education. As described in Section 3, the growth in service sector employment created by the economy entering into a new era of globalization and technological change provides benefits in the form of additional demand for the increasingly productive and efficient service sector occupations, but also threats in the form of international competition for services that can be more easily shipped abroad. This section provides occupational forecasts in five targeted industries in Florida through 2014, together with average hourly earnings estimates, and education requirements. The basic forecasts are also cross-referenced with both the Blinder Index and the O*NET database to provide more analysis of the occupations most vulnerable to foreign competition and those positions that are more likely to remain in the U.S. Overall, this provides a reasonable estimate of the expected demand for students with specific training/education levels through 2014.

Blinder Index and the O*NET Database

Section 3 described the fundamental reasoning behind the Blinder Index and the components comprising its formulation. Merging occupational growth forecasts with the Blinder Index illustrates the potentially high-growth occupational demand areas that face the greatest threat from offshoring. For example, Table 8 shows significant annual growth of between four and five percent in certain IT occupations over the coming years, yet many of these positions are considered “highly offshorable” in the Blinder classification. For instance, occupational demand for network systems analysts is expected to grow at an annual average rate of over five percent but receive a Blinder Index of 92 out of 100. Based on Blinder’s model, network systems analysts face a severe threat from U.S. companies offshoring jobs abroad, tempering expected growth. While forecasting growth provides important data on the occupations most in demand over the coming years, comparing forecasts with the Blinder Index provides additional information regarding expected growth as the forces of globalization take hold.

Another important component of the analysis is to also examine the skills and tools that correlate most with high-growth occupations. This provides additional details concerning the need for career technical education and the industry recognized certifications that will provide the most value-added with respect to future occupational demand. To achieve this, occupational growth forecasts are cross-referenced with the O*NET database to provide a more comprehensive analysis of the key attributes, such as types of tools, skills, education, and knowledge required to

function in each occupation. O*NET is an online service developed for the U.S. Department of Labor and serves as the primary source of occupational information. Information is gathered for the database through surveys of workers in each occupation and is consistently updated. O*NET developed a Content Model to provide a framework to identify the most important types of information occupational attributes.

O*NET is the successor to the Dictionary of Occupational Titles and contains partial information on approximately 950 U.S. occupations, that, in most instances correspond to the Labor Department's Standard Occupational Classification (SOC) used in this analysis. For most occupations, O*NET provides a description of the occupation and detailed descriptive information regarding the nature of the occupation. The description covers attributes such as tasks typically performed in that occupation (e.g. collect and analyze data), skills required (e.g. time management), abilities needed to perform the job (e.g. oral expression), work context (e.g. face-to-face discussion), and others.

Cross-referencing data augments the analysis by providing descriptive occupational attributes for the occupations forecast to be in highest demand over the next five to eight years or so. To illustrate how the large dataset can be applied, Table 9 establishes that there is expected to be a significant state-wide increase in demand for accountants and auditors. Cross-referencing with O*NET suggests that, as expected, data analytics, report preparation and presentation, and use of accepted accounting procedures are important tasks performed. Under the 'tools and technology' section, the importance of knowledge/training in Microsoft and other financial analysis software is revealed. Therefore, there are "overspill effects" not typically observed when examining occupational growth forecasts in isolation. In this example, analysis of O*NET data reveals that occupational growth in financial services also impacts growth in IT service occupations. The implication for career technical education is that IT industry recognized certification such as Microsoft or Oracle will also be in demand from companies outside the IT industry.

The Agency for Workforce Innovation forecasts employment growth by occupational code from 2006 through 2014. These forecasts present educational codes and average hourly earnings for each occupation from which we can infer the relative nature of the positions in terms of high-skill, high-wage occupations. In examining the recent trend in labor market occupations, we make a distinction between the "fastest-growing occupations" and the "occupations gaining the most jobs." Fastest-growing occupations reflect the jobs anticipated to add the highest percentage increase in demand. A fastest-growing occupation can show a significant percentage increase in jobs and therefore receive a significant amount of attention as they represent emerging

occupations. However, the same occupations may only be adding a relatively small number of jobs to the region as it may be a large percentage increase from a relatively small employment base. As a result, it is also important to consider Florida's largest job gaining occupations as these reflect the sectors adding a significant absolute number of jobs to the region. We present forecasts of growth reflecting occupations expected to add the most new jobs to the statewide economy. Occupations are then ordered based on the number of new jobs created over the nine-year period.

Finally, identifying occupations within each industry sector can be problematic. While many occupations match up directly with higher level industry sectors, such as registered nurses within health care, some occupations are spread across sectors. For example, most computer support specialists are considered part of the IT industry, yet some spillover into other industries is inevitable as they are also required within aviation, health care, manufacturing etc.

Life Sciences - Occupational Demand

Section 1 identifies the statewide competitiveness in life sciences with the Federal Drug Administration ranking Florida 2nd in the U.S. for number of FDA-registered medical device establishments. Table 6 provides demand forecasts for life sciences occupations through 2014, including average hourly earnings, educational requirements, and the Blinder Index where applicable⁸.

Table 6 shows significant expected growth in many life sciences occupations through 2014, driven by expected population increases and an expanding retiree age cohort. For example, demand for registered nurses in Florida is expected to be in excess of 36,000 through 2014, representing an annual average increase of 3.1 percent. Demand for nursing aides, licensed nurses, medical assistants, and home health aides is also expected to be strong over the coming years with approximately 52,000 jobs expected to be added in all four occupations over the same time period. Associated education codes suggest that all occupations require more than a high school diploma (Education Code 2), with most needing at least a vocational certificate (Education Code 3), revealing significant demand for workers with vocational training in life sciences over the coming years.

⁸ The absence of a Blinder Index associated with a particular occupation indicates that, based on the Blinder (2007) model, the occupation is not considered a threat from globalization.

Table 6 - Occupation Growth for Life Sciences (2006 - 2014)

Occ Code	Occupation	2006	2014	New Jobs	Annual % Change	Avg. Hourly Wage (\$2006)	Educ Code	Blinder Index
291111	Registered Nurses	147,050	183,478	36,428	3.1	26.3	4	
311012	Nursing Aides, Orderlies, and Attendants	87,418	107,433	20,015	2.9	10.4	3	
292061	Licensed Practical and Vocational Nurses	50,501	61,436	10,935	2.7	17.8	3	
319092	Medical Assistants	28,667	39,446	10,779	4.7	12.1	3	
311011	Home Health Aides	30,303	40,191	9,888	4.1	9.5	3	
292052	Pharmacy Technicians	19,524	25,074	5,550	3.6	11.6	3	
319091	Dental Assistants	14,678	19,200	4,522	3.9	14.0	3	
291051	Pharmacists	16,065	19,938	3,873	3.0	44.0	6	
211093	Social and Human Service Assistants	15,314	18,587	3,273	2.7	12.9	3	
292021	Dental Hygienists	9,911	13,017	3,106	3.9	24.9	4	
292034	Radiologic Technologists and Technicians	12,917	15,857	2,940	2.9	22.1	4	
291062	Family and General Practitioners	14,051	16,949	2,898	2.6	75.3	6	55
211099	Community and Social Service Specialists	10,002	12,853	2,851	3.6	17.4	5	
291123	Physical Therapists	10,326	13,088	2,762	3.3	32.1	5	
319099	Healthcare Support Workers, All Other	13,043	15,715	2,672	2.6	12.0	3	
211021	Child, Family, and School Social Workers	10,973	13,615	2,642	3.0	16.4	6	
319011	Massage Therapists	10,981	13,334	2,353	2.7	15.7	3	
292071	Medical Records Technicians	9,539	11,813	2,274	3.0	13.9	3	83
291069	Physicians and Surgeons, All Other	8,574	10,535	1,961	2.9	71.6	6	
119111	Medical and Health Services Managers	9,887	11,831	1,944	2.5	39.5	3	
291071	Physician Assistants	4,641	6,511	1,870	5.0	38.8	5	
292011	Medical and Clinical Laboratory Technologists	8,559	10,170	1,611	2.4	23.3	4	
291122	Occupational Therapists	5,491	7,074	1,583	3.6	29.9	5	
292041	Emergency Medical Technicians and Paramedics	7,904	9,431	1,527	2.4	14.1	3	
292012	Medical and Clinical Laboratory Technicians	6,536	8,060	1,524	2.9	16.3	4	
211012	Educational, Vocational, and School Counselors	9,789	11,247	1,458	1.9	24.0	6	
211022	Medical and Public Health Social Workers	5,854	7,308	1,454	3.1	20.2	6	
292056	Veterinary Technologists and Technicians	5,004	6,366	1,362	3.4	12.0	4	
291126	Respiratory Therapists	6,139	7,442	1,303	2.7	20.5	4	
319094	Medical Transcriptionists	4,939	6,210	1,271	3.2	13.8	3	
312021	Physical Therapist Assistants	3,856	5,109	1,253	4.1	20.3	4	
291199	Health Diagnosing and Treating Practitioners	6,933	8,111	1,178	2.1	33.6	6	

Source: Labormarketinfo.com

Also, average hourly earning estimates reveal that areas adding the most jobs are generally considered high-value positions with many occupations earning well above the state and national average.

Cross-referencing with the Blinder Index and the O*NET database reveals that, in general, occupational growth in life sciences is not subject to offshoring threats. As expected, the personal nature of life sciences occupations implies that these jobs cannot be provided electronically. Nurses, aides, dentists, and therapists all have face-to-face relationships with patients so the high-growth in occupational demand for these positions is not threatened by the changing structure of the economy. Further, analyzing the skills and tools required in many of the high-growth occupations suggests that training in basic Microsoft software programs is beneficial to many of the occupations listed.

Overall, life sciences occupations requiring a vocational certificate are expected to add 77,456 jobs through 2014 with little threat from globalization.

Aviation and Aerospace - Occupational Demand

Section 1 describes that the state's aviation industry as a target industry as it employs more than 50,000 people statewide, operates out of 129 public airports, and over 600 private airports and 27 military airfields, with additional employment provided in flight training.

Table 7 provides an occupational forecast for occupations related to aviation and aerospace.

Table 7 - Occupation Growth for Aerospace and Aviation (2006-2014)

Occ Code	Occupation	2006	2014	New Jobs	Annual % Change	Avg. Hourly Wage (\$2006)	Educ Code	Blinder Index
172071	Electrical Engineers	7,445	8,335	890	1.45	35.6	5	
493011	Aircraft Mechanics and Service Technicians	8,277	9,007	730	1.1	22.5	3	
532012	Commercial Pilots	2,489	2,819	330	1.7	37.2	4	
172011	Aerospace Engineers	4,842	5,166	324	0.8	35.3	5	37
532021	Air Traffic Controllers	1,794	2,020	226	1.6	53.4	3	
251051	Earth and Space Sciences Teachers, Postsecondary	812	1,026	214	3.3	27.0	6	
173021	Aerospace Engineering and Operations Technicians	2,270	2,473	203	1.1	26.7	4	
512011	Aircraft Structure, Surfaces, and Systems Assemblers	2,444	2,538	94	0.5	22.0	3	55
492091	Avionics Technicians	1,205	1,299	94	1.0	12.0	3	
532011	Airline Pilots, Copilots, and Flight Engineers	3,518	3,603	85	0.3	64.4	4	
532022	Airfield Operations Specialists	562	630	68	1.5	17.7	4	
396031	Flight Attendants	4,528	4,590	62	0.2	NA	2	
531011	Aircraft Cargo Handling Supervisors	233	254	21	1.1	21.5	4	

Source: Labormarketinfo.com

Table 7 illustrates the top occupations in aviation and aerospace in terms of expected growth through 2014, revealing aviation and aerospace to be a high-value industry with occupations commanding average hourly earnings from \$22 to over \$50 per hour. Examining the educational codes illustrates that the majority of occupations require at least a vocational certification, with many positions necessitating a bachelor's degree or higher. The relatively high educational requirements illustrate the importance of education and training requirements in the aviation and aerospace occupations that continue to drive growth within the industry. One step toward developing the supply of adequately trained workers in the industry was provided by the launch of the Aerospace Resource Center (ARC) in 2006 as a Workforce Florida Inc. initiative. The mission of ARC is to develop a relevant and timely education and training curricula that address industry innovation and technological advances, therefore providing the future workforce with the necessary skills to compete in a high-growth industry. Responses from a survey of almost 1,500 Florida companies⁹ indicate that a significant proportion of companies base their hiring decision on an applicant's skill set rather than academic qualifications, suggesting that career academies

⁹ "Needs Assessment Aerospace Industry Cluster," Florida Workforce, Inc.

can play a significant role in developing the skill sets of students interested in pursuing a career in aviation and aerospace.

Overall, forecasts suggest that 1,144 jobs specifically requiring a vocational certificate will be added in aviation and aerospace through 2014.

Information Technology - Occupational Demand

While the information technology sector remains a strong contributor of statewide employment, occupational growth within the industry poses an interesting tradeoff. As companies continue to invest in new technologies that improve firm efficiency and worker productivity, the IT industry will benefit from continued growth. However, as expected, the impersonal nature of many of the IT occupations implies that many positions are the most threatened by globalization. Table 8 presents occupational growth forecasts in the IT industry.

Table 8 - Occupation Growth for Information Technology (2006-2014)

Occ Code	Occupation	2006	2014	New Jobs	Annual % Change	Avg. Hourly Wage (\$2006)	Educ Code	Blinder Index
151081	Network Systems and Data Communications Analysts	18,878	26,722	7,844	5.2	27.3	3	92
151041	Computer Support Specialists	33,080	40,230	7,150	2.7	18.2	3	92
151051	Computer Systems Analysts	26,400	33,438	7,038	3.3	30.3	4	93
151031	Computer Software Engineers, Applications	17,555	23,809	6,254	4.5	37.4	4	74
151032	Computer Software Engineers, Systems Software	17,229	23,009	5,780	4.2	37.4	5	74
151071	Network and Computer Systems Administrators	13,793	18,384	4,591	4.2	29.8	3	50
113021	Computer and Information Systems Managers	8,680	10,714	2,034	2.9	47.3	4	55
151061	Database Administrators	5,450	7,253	1,803	4.1	28.4	4	75
492098	Security and Fire Alarm Systems Installers	6,268	7,889	1,621	3.2	15.3	3	
499052	Telecommunications Line Installers and Repairers	8,449	9,825	1,376	2.0	17.4	3	
173023	Electrical and Electronic Engineering Technicians	9,458	10,574	1,116	1.5	22.2	4	
274021	Photographers	9,837	10,862	1,025	1.3	13.4	3	25
492011	Computer, ATM, and Office Machine Repairers	9,490	10,388	898	1.2	17.9	3	
172071	Electrical Engineers	7,445	8,335	890	1.5	35.6	5	
439021	Data Entry Keyers	22,291	23,106	815	0.5	11.8	2	100
492022	Telecommunications Equipment Installers and Repairers	10,321	11,087	766	0.9	22.1	3	
492094	Electronics Repairers, Commercial and Industrial Equip.	5,230	5,880	650	1.6	19.1	3	
151021	Computer Programmers	22,198	22,829	631	0.4	31.6	3	100
151099	Computer Specialists, All Other	3,172	3,786	614	2.4	26.5	3	90
274012	Broadcast Technicians	2,584	3,059	475	2.3	18.1	3	36
492097	Home Entertainment Electronics Installers and Repairers	3,655	3,989	334	1.1	14.1	3	
274031	Camera Operators, Television, Video, and Motion Picture	1,615	1,938	323	2.5	18.5	3	
274011	Audio and Video Equipment Technicians	2,183	2,493	310	1.8	17.5	3	36
492093	Electronics Installers & Repairers, Transportation Equip.	1,337	1,627	290	2.7	19.5	3	
172061	Computer Hardware Engineers	3,351	3,622	271	1.0	39.6	5	73
274032	Film and Video Editors	1,057	1,273	216	2.6	19.6	3	
151011	Computer and Information Scientists, Research	1,082	1,294	212	2.5	41.3	6	96

Source: [Labormarketinfo.com](http://labormarketinfo.com)

Network systems analysts, computer support specialists, and computer systems analysts are expected to add a further 22,000 jobs collectively through 2014, with some positions expected to experience over 4 percent annual growth. Examining the associated education codes shows that the most common requirement for the high-growth positions is a vocational certificate. This suggests a need for IT institutes in career technical education to supply today's student body with the requisite industry recognized certifications to meet expected demand. Also, supplying workers with IT certifications creates a value-added in terms of statewide income gains as many of the high-growth occupations generate earnings of \$30 per hour or more.

Cross-referencing with the Blinder Index provides an important caveat to expected growth figures. The top eight growth occupations are all threatened to some degree by globalization. These positions require little face-to-face contact and can be provided in most part electronically. A breakdown of the main work activities in the O*NET database suggests that most positions require the use of a computer to program, write software, enter, manage, or analyze data, and provide managers and colleagues with information via telephone or email. As such, the impersonal nature of the occupations and the ability to perform many of the primary functions electronically places many of the high-growth occupations in the "highly offshorable" classification and face significant foreign competition. With many of these positions already being shipped abroad and facing increasing competition from cheaper foreign labor in the future, expected demand for IT occupations can certainly be considered an upper bound estimate, with many occupations experiencing growth below forecast levels.

In total, 28,360 jobs are anticipated to be added in IT through 2014, yet, as many positions are threatened by globalization, this could be considered an upper bound estimate. However, as discussed specifically within life sciences and financial and professional services occupations, there are spillovers effects from occupational demand in other industries requiring IT certifications such as Microsoft that will continue to drive demand for IT-related occupations.

Financial and Professional Services - Occupational Demand

To identify all financial services-related occupations, all business and financial operations occupations are included, plus other financial services-oriented classifications that support various financial services industries in Florida¹⁰, such as bookkeeping/accounting. It should be noted that across occupations, not all expected growth will be directly attributable solely to the financial services industry. For example, as Table 9 shows, demand for customer services

¹⁰ See "Florida Financial Services, 2004 Cluster Report." The Florida Agency for Workforce Innovation.

representatives is expected to increase by over 38,000 jobs through 2014, a proportion of which will be required in financial services, with more demand coming from other industries.

Table 9 - Occupation Growth for Financial and Professional Services (2006-2014)

Occ Code		Employment			Annual % Change	Avg. Hourly Wage (\$2006)	Educ Code	Blinder Index
		2006	2014	New Jobs				
434051	Customer Service Representatives Receptionists and Information Clerks	155,861	194,576	38,715	3.1	13.3	3	94
434171	Bookkeeping, Accounting, and Auditing Clerks	83,759	101,422	17,663	2.6	10.6	2	75
433031	Business Operations Specialists, All Other	145,679	160,877	15,198	1.3	14.3	4	84
131199		52,337	66,641	14,304	3.4	28.0	4	
132011	Accountants and Auditors	77,770	91,653	13,883	2.2	27.5	4	72
433011	Bill and Account Collectors	28,657	36,235	7,578	3.3	14.5	2	65
131111	Management Analysts	45,355	52,657	7,302	2.0	37.3	5	
433071	Tellers	34,245	40,126	5,881	2.2	11.2	2	
132052	Personal Financial Advisors	15,545	19,419	3,874	3.1	34.7	4	
131051	Cost Estimators	16,872	20,664	3,792	2.8	25.1	4	
132072	Loan Officers	22,641	26,407	3,766	2.1	27.1	4	
131031	Claims Adjusters, Examiners, and Investigators	17,655	21,360	3,705	2.6	22.3	3	
113031	Financial Managers	19,633	23,150	3,517	2.2	45.6	4	75
131071	Employment, Recruitment, and Placement Specialists	13,076	16,524	3,448	3.3	21.0	4	
434111	Interviewers, Except Eligibility and Loan	13,102	15,989	2,887	2.8	11.7	2	48
131079	Human Resources, Training, & Labor Relations Specialists, All Other	11,393	14,187	2,794	3.1	23.3	5	
433051	Payroll and Timekeeping Clerks	11,785	14,439	2,654	2.8	14.7	2	
131073	Training and Development Specialists	12,141	14,748	2,607	2.7	22.7	5	
434161	Human Resources Assistants, Exc. Payroll	10,630	12,851	2,221	2.6	14.7	2	50
434081	Hotel, Motel, and Resort Desk Clerks	16,383	18,545	2,162	1.7	9.5	2	
434131	Loan Interviewers and Clerks	19,229	21,117	1,888	1.2	15.6	3	46
131023	Purchasing Agents, Except Farm Products & Trade	14,296	16,119	1,823	1.6	23.0	4	55
433021	Billing and Posting Clerks and Machine Operators	31,331	33,124	1,793	0.7	13.5	2	90
132051	Financial Analysts	7,216	8,746	1,530	2.7	31.9	4	76

Source: Labormarketinfo.com

Table 9 also shows strong growth in a number of financial services-oriented occupations through 2014. The top four growth occupations are expected to add over 85,000 jobs over this period. Further, business operations specialists, bill and account collectors, personal financial advisors, and customer service representatives are all expected to yield above 3 percent increases in jobs, year-on-year through 2014.

Table 9 also illustrates that of the financial services occupations expected to add the most jobs through 2014, the majority of occupations are considered high-skill, high-wage positions, requiring a level of education beyond a high school diploma (Education Code 2) and offering hourly wages well above the state average. For example, business operations specialists, accountants and auditors, and management analysts all command average hourly rates of \$27 per hour or more, requiring a vocational certificate, college credit certificate, applied technology diploma, associates degree, or more.

Cross-referencing with the Blinder Index indicates that that five of the top six growth occupations are considered vulnerable to offshoring based on the Blinder index, of which some positions are classified as “highly offshorable,” receiving a ranking of 76 or greater. Customer services representatives, receptionists, and bookkeeping/accountants are all occupations considered highly vulnerable to offshoring due to the impersonal nature of the professions. As such, these growth forecasts can again be expected to present an upper bound estimate.

Cross-referencing with O*NET data and examining the largest growth occupations, certain tasks, abilities, and technology skills are common. As expected, the ability to analyze data is a critical component of many of the highest growing financial services occupations, as is the ability to disseminate information to clients and co-workers. Further, working knowledge of computer software programs is also prevalent. Beyond knowledge of software applications specific to the occupation (such as IBM cost estimator for cost estimators), working knowledge of Microsoft packages is emphasized in many of the occupations listed (for example, accountants/auditors, cost estimators, personal financial advisors, bill and account collectors, customer service representatives, and more). This illustrates the spillover effects of increased demand for financial services occupations due to the importance of IT training within the financial services industry as a significant proportion of high-growth occupations require a working knowledge of Microsoft and other software packages.

Examining expected occupational demand specifically requiring a vocational certificate, 47,266 jobs are expected to be added in financial and professional services through 2014. Growth in

some occupations, specifically customer service representatives, can be regarded as an upper bound estimate as the impersonal nature can lead to further offshoring threats.

Manufacturing - Occupational Demand

The manufacturing sector remains a target industry for Florida despite the general movement toward service sector employment nationwide. It differs from the other target industries as employment has declined generally since the second industrial revolution caused a large shift in the labor force away from factories and toward service sector positions. In identifying occupational growth within the industry, construction, technicians, mechanics, repairers, installers, textile workers, machine operators, and material moving operators are all considered.

Table 10 - Occupation Growth for Manufacturing (2006-2014)

Occ Code	Occupation	2006	2014	New Jobs	Annual % Change	Avg. Hourly Wage (\$2006)	Educ Code	Blinder Index
537062	Laborers and Material Movers	146,874	169,473	22,599	1.9	9.8	1	
472031	Carpenters	92,218	111,255	19,037	2.6	15.4	3	
414012	Sales Reps., Manufacturing	113,260	129,968	16,708	1.8	25.8	3	
499042	Maintenance and Repair Workers	86,837	101,792	14,955	2.2	14.1	3	
472061	Construction Laborers	91,186	105,703	14,517	2.0	11.3	1	
471011	First-Line Superv. of Construction and Extraction Workers	78,102	91,107	13,005	2.1	25.4	4	
111021	General and Operations Managers	62,343	74,344	12,001	2.4	48.0	4	55
472141	Painters and Maintenance	41,416	50,612	9,196	2.8	13.6	3	
493023	Automotive Service Technicians	50,423	59,480	9,057	2.3	17.0	3	
472111	Electricians	47,970	56,235	8,265	2.2	16.9	3	
537064	Packers and Packers, Hand	50,480	57,185	6,705	1.7	8.7	1	
119021	Construction Managers	44,086	50,465	6,379	1.8	41.3	4	
472152	Plumbers, Pipefitters	31,354	37,485	6,131	2.4	16.5	3	
474099	Construction and Related Workers	21,582	27,414	5,832	3.4	14.9	1	
499021	Heating, A.C., and Refrigeration Mechanics and Installers	25,296	30,990	5,694	2.8	16.9	3	
512092	Team Assemblers	42,135	47,503	5,368	1.6	11.1	2	65
472073	Operating Engineers/Operators	26,494	31,314	4,820	2.3	15.3	3	
414011	Sales Reps., Wholesale & Mfg, Tech	28,222	32,273	4,051	1.8	32.7	3	
537051	Industrial Truck Operators	27,664	31,598	3,934	1.8	12.8	3	
472051	Cement Masons and Finishers	18,202	21,989	3,787	2.6	14.4	3	
491011	First-Line Superv. of Mechanics, Installers, and Repairers	22,994	26,508	3,514	1.9	25.9	3	
472181	Roofers	19,099	22,512	3,413	2.2	14.1	3	
172051	Civil Engineers	15,730	19,051	3,321	2.6	33.1	5	
472044	Tile and Marble Setters	9,024	11,978	2,954	4.1	16.1	3	
472021	Brickmasons and Blockmasons	15,015	17,689	2,674	2.2	16.4	3	
493031	Bus and Truck Mechanics and Diesel Engine Specialists	14,775	17,240	2,465	2.1	17.6	3	
519198	Helpers - Production Workers	16,345	18,747	2,402	1.8	9.6	1	70
472211	Sheet Metal Workers	13,081	15,479	2,398	2.3	15.6	3	
516011	Laundry and Dry-Cleaning Workers	15,689	18,031	2,342	1.9	8.6	2	
511011	First-Line Superv. of Production and Operating Workers	22,429	24,715	2,286	1.3	24.5	3	68

Source: Labormarketinfo.com

Table 10 shows that many occupations classified under manufacturing are expected to add significant new employment through 2014. Job opportunities for state level laborers, carpenters, and manufacturing sales representatives are collectively forecast to increase by 58,000 jobs over this period – each experiencing about a 2 percent increase, year-on-year. Table 10 also illustrates that occupation growth in this industry is in relatively low-wage positions, often with

lower education requirements compared to occupation growth in IT or aviation for example. However, in terms of the need for career technical education, many high-growth occupations identified require a vocational certificate.

Examining the skills, technology, and tools required for many of the occupations expected to add the most jobs over the coming years, most positions require training in the capital and equipment specific to the job (e.g. forklift trucks or power hoists), although the supervisory positions also require Microsoft training and other job-related software knowledge, such as inventory control or warehouse management software.

Finally, cross-referencing with the Blinder Index suggests that most of the largest growth occupations in the manufacturing industry are not subject to the threat of globalization. Considering the principle job functions outlined in the O*NET database, most occupations require physical labor or a physical presence that mitigates the potential impacts of globalization. While further improvements in technology may impact the growth in manufacturing occupations, the overall outlook for manufacturing positions in Florida looks strong and not expected to face the globalization pressures of some of the other target industries.

Overall, we anticipate that the manufacturing industry will add a significant number of jobs requiring a vocational certificate over the coming years. Using the forecasts provided, 150,619 jobs are expected to be added in manufacturing requiring a certificate and the physical nature of many of the occupations negates much of the threats from globalization.

Given the occupational forecasts and expected demand for students requiring vocational certificates, Senate Bill 1232, mandating career education programs throughout the state of Florida plays a critical role in restructuring education needs within Florida. As such, Florida's future looks bright - a view that is supported in the recent Cornerstone Study (ES-6; 2003).

In 1989, a Florida Chamber of Commerce Foundation Study entitled *Cornerstone: Foundation for Economic Leadership* highlighted changes in the statewide economy and attempted to prepare Floridians, their businesses and their government for a dynamic future. The study held that what was once an economy dependent on an "influx of retirees, tourists and seasonal residents; resource-based industries such as agriculture and mining, and wood and paper; defense spending and military installations..." and small businesses the 1960s and 1970s, quickly centered on year-round tourism and technologically developing industries in the 1980s (New Cornerstone, ES6; 2003). The future, despite the national economic downturn in the early 1990s looked bright. An emerging series of high-tech industries developing along the I-4 corridor and

the I-95 corridor stood Florida in good stead against other economic powerhouses. Although “traditional advantages remained,” Florida found herself increasingly competitive with a “large supply of affordable labor, an emerging technology base and a transportation and communications link to global markets” (New Cornerstone, ES6; 2003).

At the dawn of a new century the sequel to the 1989 Cornerstone report surmised that Florida was once again on the verge of potentially dramatic economic changes (New Cornerstone, 2003). Not only would Florida remain critically dependent on “tourism, trade, agriculture, defense and services to retirees” for its economic base but would also develop even more broadly in areas related to technology (New Cornerstone, ES-6; 2003). The “new areas of leadership” would include “industries such as information technology, optics, biosciences and technical services...characterized by high-value, high-skill jobs; by high-risk yet high-reward opportunities; by global markets and by emerging businesses and entrepreneurs...” (New Cornerstone, ES-6; 2003). Critically, a newly defined interest centering on the 4 Ts (trade, tourism, technology and talent) would require a workforce with a higher level of education in areas not traditionally emphasized by the state. Specifically, New Cornerstone outlines 10 priorities aimed at preventing Florida, at least in part, from lapsing into a potentially “vicious cycle, where the state’s scarcity of high-skilled workers inhibits the creation of high-value jobs, limits income levels and weakens the state’s economy” (New Cornerstone, ES-12; 2003).

Naturally, education plays a tremendous part in furnishing high-skilled workers for an economy supported by technology and talent, and career academies have the potential to fit well into training schemes for developing a technologically savvy workforce. Specifically, career academies have the potential to link well with at least 3 of the 10 cornerstones for Florida’s economic prosperity outlined in New Cornerstone. First, New Cornerstone provides the basis for a partnership between universities, colleges, federal and military installations, businesses and potentially secondary educators in developing a Thomas A. Edison Innovations Program. The program itself would build on the Technology Development Act to provide monies and facilities for the development of technological education in the state of Florida and aid in the development of additional research and development programs. Foreseeing the key components of Florida’s technological future would allow career academies to develop parallel to the main lines of technological progress and give Florida students entering both college and the workforce a leg up in technological savvy.

Further, Cornerstone calls on the state to reduce the high-school dropout rate. One avenue for doing this includes “tailoring education programs to business and community needs” and “developing a seamless preK-20” education system (New Cornerstone, ES-23; 2003). Career

academies in Florida have so far developed (more or less successfully) around exactly these two themes. Particularly, the Palm Beach Career Academy model, since its inception, required the input of business and industry leaders to develop programs for students serving the surrounding communities. Moreover, career academies such as the Laurel Hill pre-academy in Okaloosa County, developed in partnership with Gulf Power, trains students to be, for example, Gulf Power linemen who are certified immediately upon graduation. Thus career academies have the potential to offer students who are not particularly enthusiastic about reading another Charles Dickens' novel, participating in a Chemistry lab or learning a second language, an exciting reason to attend school in no small part because the academies offer relevant and potentially exciting coursework in a career field that students can immediately and directly connect with increased lifetime income. If educators find it impossible to excite students to learn what they do not wish to learn, then perhaps it will be possible to excite them to learn what they do wish to learn insofar as it is connected to potential future careers.

Finally, Cornerstone calls on the state to aggressively "increase the number of college and advanced degree recipients in key fields" such as science, engineering and information technology (New Cornerstone, ES-23; 2003). Career academies have the potential to aid in developing this cornerstone area as well. Career academies nearly universally prepare students by ensuring either industry certification in a particular field or articulated or dual credits with colleges and universities. Students enrolled in academies routinely gain college credit that catapults them to the head of the class in the critical areas of science, engineering and information technology. Additionally, they also gain industry level certification in some areas that allows them to walk directly into high-paying, high-skill jobs. Thus career academies can function as a precursor to college locking students into interesting educational careers with the potential to complete the post-secondary component in reduced time.

New Cornerstone dovetails nicely with the opening chapters of this report in identifying the key elements of the future of a successful Florida economy. Further, New Cornerstone identifies education as a potential link between Florida's current workforce and changing economic needs. Although New Cornerstone does not highlight career academies as a potential link in the education – workforce – economy chain, it is clear that the potential exists for career academies to develop in support of the New Cornerstone plan. Indeed, in many respects, career academies already serve to advance the goals of at least three of the ten cornerstones for economic prosperity in the state. As the academies spread across the state under the auspices of Senate Bill 1232 it is, as we highlight here, critical they develop in a manner consistent with the identified economic needs of the communities, counties and state that they serve.

Section 5 – Models for Vocational Education

Vocational education has played a role in the American classroom experience since the middle of the 19th century. However, as one might imagine, the structure and expectations of vocational education programs across the nation have changed dramatically over the decades. What was once a series of programs designed to educate farmers in the science of agriculture now also routinely prepares students for careers in high-tech industries such as computer programming and aerospace technology. Within the state of Florida, particularly since the early 1990s, vocational education programs that were once tailored primarily towards students most at risk of becoming dropouts have been redefined as career academies and have developed in some districts to serve students across the academic spectrum. These career academies, where they have developed, are primarily structured by local school boards resulting in some diversity across the state in the way that the various programs are run.

The purpose of this portion of the report is to outline the framework that has guided the development of vocational education broadly within the United States with particular emphasis on the state of Florida. Following a historical outline, we will devote particular attention to the development of career academy programs in Florida in three “model” counties: Okaloosa County’s CHOICE program, Manatee and Sarasota County’s Suncoast Tech Prep Program and Palm Beach County’s Career Academies. Further, we will discuss the implications of the Florida Legislature’s recent decision to implement a program designed to establish, within short order, career academies in every Florida school district (with Okaloosa County’s CHOICE program serving as the advisory model). Finally, we will highlight the potential implications and limitations of statewide implementation of career academies consistent with the Okaloosa County CHOICE model.

Vocational Education in the United States

Historically in the United States public secondary schools were designed to serve only a small fraction of the students who successfully completed elementary schools. The curriculum in secondary schools was largely geared towards preparing students for college with little thought given to those who had no postsecondary plans. Indeed, educators tended to assume that students would gain technical knowledge in the more traditional apprentice style programs. When, in 1862 Congress through the Morrill Act established vocational programs in the United States, it was largely understood that “vocation” meant practical experience for farmers, homemakers and blue collar factory laborers. These programs expanded over time; however, the

“practical” direction that most vocational programs took ensured that programs of this type were to remain on the margins of the education system in America (Kincheloe, 1995).

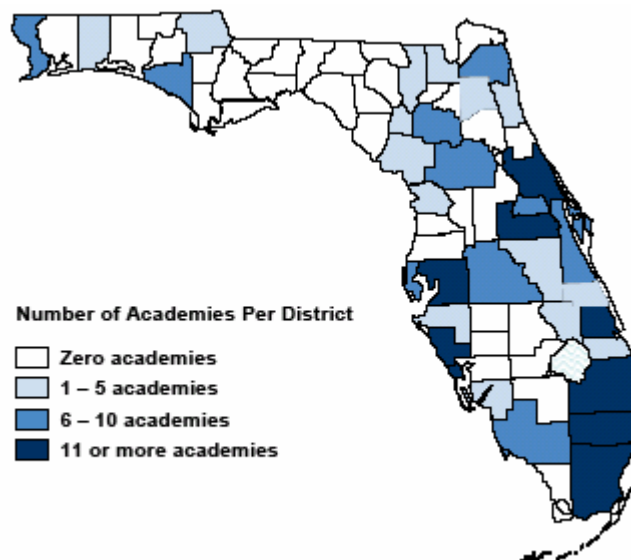
Further, vocational programs were principally aimed at students who were at risk of leaving high school prior to graduation (Thompson 1973). This in turn ensured that these programs would not achieve a “status” level in the minds of parents, students and teachers that comparable secondary and post secondary programs typically did. As Castellano et al. (2003) note, these vital programs prepared generations of young Americans for jobs in offices, factories and fields across the economic landscape. However, as these types of jobs declined (principally as a result of globalization) the usefulness of traditional vocational programs declined as well.

Educators of students whose families were hardest hit by globalization (ie school districts whose families relied most heavily on agriculture and, more particularly, manufacturing) quickly realized the need for a “revolution” in vocational education. This revolution would come in the form of vocational programs that would train students in such high-tech industries as computer programming, aerospace engineering and health technology. This would in turn require educators in the classroom who were skilled in the particular fields most important to the broader community served by the vocational education program. These programs needed to fulfill two basic principals. First, they had to be based around the wider concept of “career clusters” which train students broadly for types of jobs rather than specific occupations. And second, they had to be more closely related to the sort of advanced training a student would receive in a post secondary training environment. This represented a general change in the overall philosophy of vocational education programs; a change that was reflected in the professional vocational education association’s 1998 request that programs use the term career and technical education rather than vocational education (Lynch 2000). Indeed, scholars argued that vocational programs should be viewed as “education through work, education about work, and education for work” (Stone 2000).

The National Center for Education’s latest statistics report reflects a healthy participation in vocational programs by high school students in the United States. Over 11 million people are served by vocational programs in the United States through programs offered in more than 33,000 public and private institutions (Lynch, 2000). Nonetheless, despite a continued emphasis on career education and a renewed federal commitment to vocational education (i.e. the Carl D. Perkins Vocational Education and Applied Technology Act of 1984, followed by Perkins II in 1990 and Perkins III in 1998) students’ participation in vocational education programs has waned slightly in the past two decades. High school graduates in the US earned an average of 4.4 Carnegie units in vocational education programs in 1982 versus an average of 3.5 Carnegie units

in 2004 (Planty et al. 2007). However, the perceived (and observed) decline in vocational education participation among high school students notwithstanding, the recent NAVE (National Assessment of Vocational Education) report to Congress showed that vocational education counts where it matters to Americans most -- in the pocket-book. High school graduates could expect to be earning approximately 2% more per vocational education course than non-vocational education high school graduates fully seven years after having graduated. Thus the benefits of vocational education, particularly with respect to income, are both real and enduring (US Department of Education, 2004). Career and technical education therefore plays an important role in education across the United States. The agility of these programs and their ability to adapt to changing workforce needs ensures that they will play a prominent role in the future of education in the United States.

Figure 12 - Career Academies in the State of Florida (2005-05 School Year)



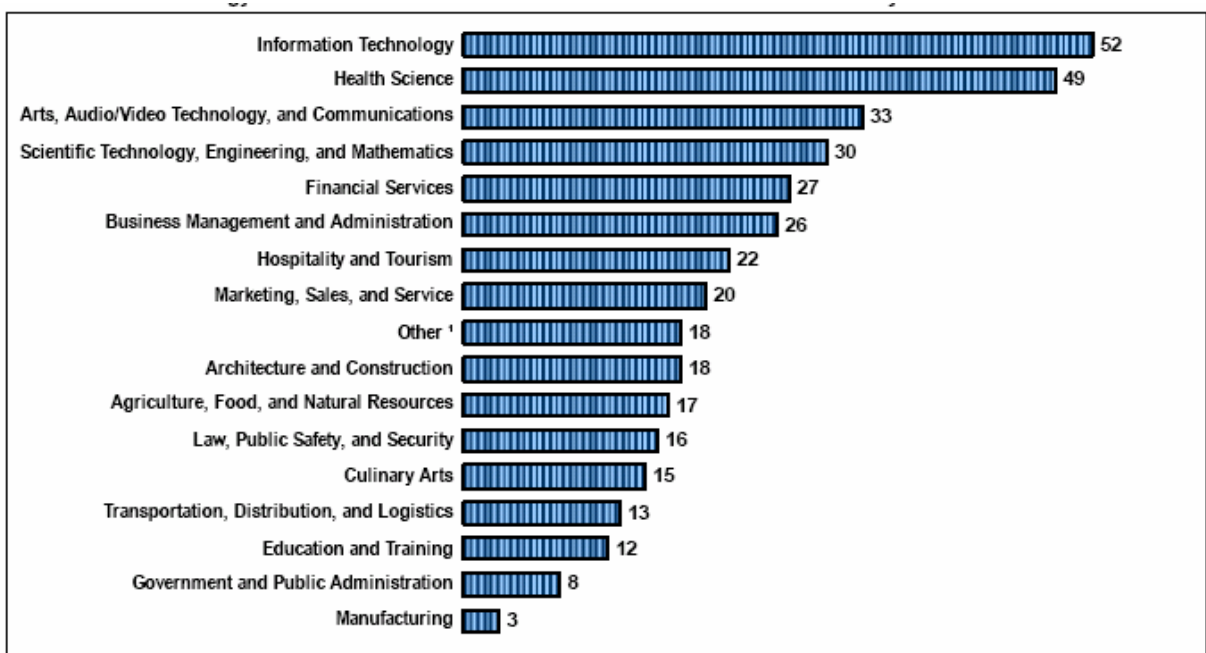
Source: OPPAGA Report No. 06-55; 2007, pp. 3

Vocational Education in Florida

Vocational education programs developed in Florida in a manner largely consistent with programs across the United States. The conceptual advent of career academies in the 1970s gave rise to a new form of vocational education designed to meet the changing demands of workforce needs both in Florida and around the United States. Following the Perkins Act and its subsequent amendments, vocational education in Florida flourished across the academic spectrum. A July 2006 OPPAGA (Office of Program Policy Analysis and Government Accountability) report found that of the 67 total school districts in the state of Florida, fully half had operational (self-reported)

career academies as of the 2004-05 school year. Figure 12 displays the districts who reported operational career academies for the 2004-05 school year as well as their concentration within the districts. These programs existed across a broad spectrum of vocations. As figure 13 shows, schools reported the highest number of career academies in the fields of information technology and health science with academies existing in such varied fields as manufacturing, architecture and construction as well as the culinary arts. Figure 13 also reflects the shift in vocational education, both within Florida and across the United States, towards more high-tech, high skill and high paying vocations.

Figure 13 - Vocational Concentrations of Florida Career Academies in 2005-05



Source: OPPAGA Report No. 06-55; 2007, pp. 4

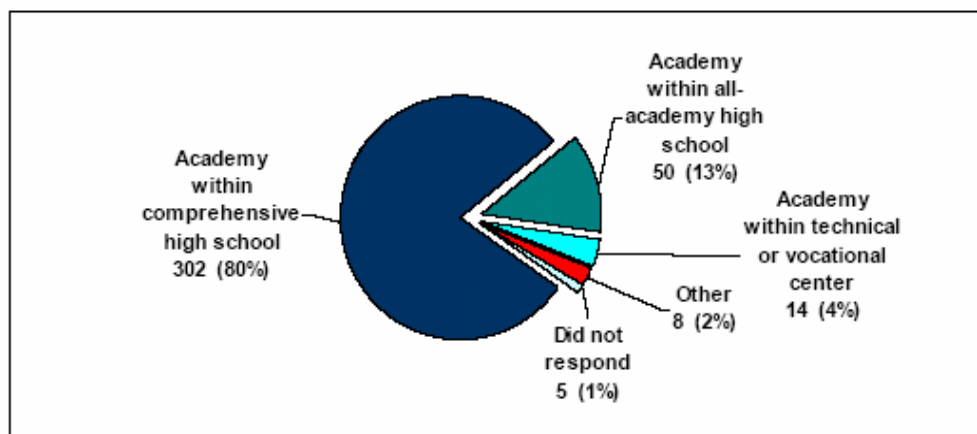
Career academies are defined by national education organizations according to a series of common core elements. The Florida Department of Education, consistent with these national guidelines, characterizes career academies as having three common core elements:

- 1) 'a small learning community comprised of a subset of students within a larger high school;
- 2) 'a college preparatory curriculum with a career theme;
- 3) 'partnerships with the local community employers and higher education institutions (OPPAGA Report No. 06-05 2007, 2).

Of 544 programs in Florida, 462 responded to the portion of the OPPAGA survey gauging compliance with the Florida Department of Education's career academy core elements. Over "one-half of the programs (193 or 51%) reported implementing all three of the nationally recognized career academy core elements" (OPPAGA Report No. 06-55 2007, 5). A further 128 (34%) reported compliance with at least two of the core elements and 52 (14%) implemented only one of the core elements.

Fortunately, the OPPAGA report also affords the opportunity to examine career academies in Florida based on their compliance with specific elements of the common core outlined above. With respect to the first element, as figure 14 demonstrates, approximately 80% of the career academies were academies located within a comprehensive high school. A further

Figure 14 - Career Academies in High Schools in Florida 2005-05



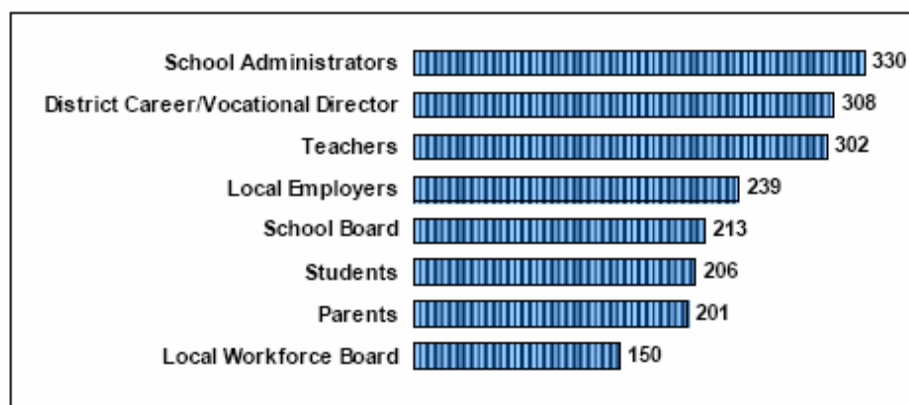
Source: OPPAGA Report No. 06-56, 2007; pp. 5

13% were academies located within an all academy high school and 4% were co-located with a vocational or technical center. Thus the majority of Florida career academies appear to be compliant with the first element of the career academy core. However, the OPPAGA report also notes that 39% (147) of the academy programs allow any student in the high-school to participate in career academy courses. Although this practice allows a wider range of students to participate in academy programs being offered, "it hinders creating close knit student environments" within the confines of the academy itself (OPPAGA Report No. 06-55 2007, 6).

With respect to the second and third elements of the common core, OPPAGA reports that nearly all students enrolled in career academies had the opportunity to take advanced placement courses and dual enrollment courses with 347 total academies reporting availability of both. Additionally, 92% of the career academies reported that vocational faculty were required to

integrate academic themes into the career academy curriculum while only 61% of programs reported that academic faculty were required to integrate vocational themes into pure academic courses. Therefore, as OPPAGA notes, students were more likely to see the connection between auto mechanics and physics in career academy courses than in traditional academic courses. Further, and perhaps more importantly, 77% of the career academy programs responding to the OPPAGA survey reported articulation agreements with postsecondary institutions. Hence a great majority of Florida's career academies provided access to coursework that transferred as credit to educational institutions beyond high-school.

Figure 15 - Selecting the Focus of Career Academies: Schools, Families and Employers



Source: OPPAGA Report No. 06-56, 2007; pp. 17

Career academies across the state also reported a strong relationship with local businesses and employers. Local business and employers provided guest speakers, field trips, job shadowing, mentoring, non-paid internships and equipment and technology for a majority of Florida's career academies. Additionally, businesses and employers provided paid internships and financial support to at least 40% of career academies. However, in this same vein, employers, and particularly the local workforce board, lagged behind school officials and career academy employees in the selection of career academy themes. As figure 15 illustrates, local employers lagged behind school administrators, vocational directors and teachers in the selection of career academy themes. The local workforce boards participated in theme selection in far fewer career academies than did even local employers ranking dead last in participation. Consequently, those who are conceivably most able to forecast future employment in local economies are involved far less frequently in the selection of a career academy's focus than are educators who are most probably positioned to know least. Fortunately 69% of career academies involve industry experts in curriculum input and 64% involve local employers. Therefore once an academy's theme is

selected industry experts and local employers do manage to play some role in curriculum determination in a substantial portion of Florida's career academies.

The most recent picture of the shape of vocational education in the state of Florida provided by OPPAGA remains the primary source of information for educators and planners across Florida school districts. OPPAGA's data gathering process, much like the blind man examining the elephant, gives us only snapshots of a much broader picture. Unfortunately, in this case, the snapshots are the result of the elephant's own self reporting. The OPPAGA study is reliant on the information provided by the districts as to the current status of vocational programs. Neither the Florida State Department of Education nor the state government requires any particular auditing entity to provide outside updates on the state of vocational education, although, as will be outlined shortly, that will soon change.

Fortunately, a number of school districts in the state have, in essence, set the tone for the development of vocational education in the state. Their vocational education programs may be considered "model" programs, and indeed, in at least one case (Okaloosa County's CHOICE program), the model has been replicated across a number of school districts in Florida and recently adopted as the statewide model for vocational education. However, it is useful to examine each of these programs, their strengths and their weaknesses, and their implications for the statewide implementation of CHOICE mandated in recent state legislation.

Models of Vocational Education in Florida's School Districts

The Suncoast Tech Prep Program

The Suncoast Tech Prep Program is a joint venture between Sarasota and Manatee county schools that provides technical preparation for high-school students in a variety of fields. Jointly, the program of study includes coursework in Art and Graphic Design, Automotive Technology, Business Programs, Computer Applications, Computer Networking, Construction, Culinary Arts, Drafting, Early Childhood Education, Electronics, Health Science, Marketing, Materials and Processes, Nursery Operations, Photography, Graphic Design and Technology.

The Tech Prep programs self described aims include a curriculum that:

- 'is designed for students interested in pursuing educational opportunities at Manatee Technical Institute, Sarasota Technical Institute and/or Manatee Community College to complete a structure program of studies over a 6 year period (4 years of high school and 2 years of postsecondary education).
- is comprised of 'a coordinated sequence of academic and career courses beginning gin the ninth grade, although students may enter the program at any time during their high school career.
- encourages students to pursue challenging academic coursework in addition to the sequence of career preparation courses.

As table 11 reflects, Sarasota County currently has 5 high schools housing 15 total academies and Manatee has 11 total academies housed in 4 county high schools:

Although the Suncoast Tech Prep Program's academies do not typically lead directly to industry certification for high-school graduates, fully 90% of the high-school level courses that students participate in earn them college credit at Manatee Technical Institute, Sarasota Technical Institute and/or Manatee Community College. Further, many of the high schools offer students the opportunity to take college-level courses at the local colleges earning credits both in high school and college while enrolled in the tech prep program.

Table 11 - Career Academies in the Suncoast Tech Program

<i>Manatee County</i>	<i>Sarasota County</i>
<p><i>Bayshore High School</i> Academy of Business Technology Academy of Early Childhood Education Academy of Marketing Academy of Fine Arts</p> <p><i>Manatee High School</i> Academy of Medical Arts and Sciences Academy of Communications Technology Center for Design and Construction</p> <p><i>Southeast High School</i> Academy of Agriculture Academy of Culinary Arts Academy of Visual and Performing Arts</p> <p><i>Palmetto High School</i> Academy of Agritechnology</p>	<p><i>Booker High School</i> Environmental Science Academy Law/Public Service Academy Visual and Performing Arts Program</p> <p><i>Sarasota High School</i> MaST Academy (Math, Science and Technology) MaST Research Institute MaST School of Health Sciences and Technology MaST School of Building Construction Technology Academy of Travel and Tourism Career Academy</p> <p><i>Riverview High School</i> 9th Grade Academy</p> <p><i>Venice High School</i> Academy of Graphic Art and Design Academy of Business Careers Honors Academy</p> <p><i>North Port High School</i> Health and Human Services Academy Environmental Science Academy Communication and the Arts Academy Information and Technology Management Academy Leadership and International Studies Academy</p>

Additionally, students participating in a particular program have a fixed series of courses that they must complete in the four year period. For example, a student enrolled in the Agriculture and Environmental Sciences Academy specializing in nursery operations would, in addition to required high school courses, take Agriculture Foundations and Introduction to Horticulture Science in grade 11 and 2 courses in Horticulture Science and one in Nursery Operations in grade 12. All of these courses are articulated courses indicating that they transfer as college credit to the local colleges. This substantially shortens the time that the student would need to complete a specialization in nursery or landscape operations. All other curriculum sets appear to be organized in like fashion.

The Suncoast Tech Prep Program is geared towards providing college-level coursework to high school students in Manatee and Sarasota counties. In addition, there is a strong emphasis within the program on ensuring that these courses transfer as college credit when the student enrolls in one of the three participating colleges or technical schools. This reduces, in some cases rather substantially, the amount of time which the student will have to spend in college before receiving a degree and certification in a particular field. The high school portion of the program is not usually designed to lead directly to industry certification in a particular field, but is designed to give the students advanced preparation for college and college-level technical programs.

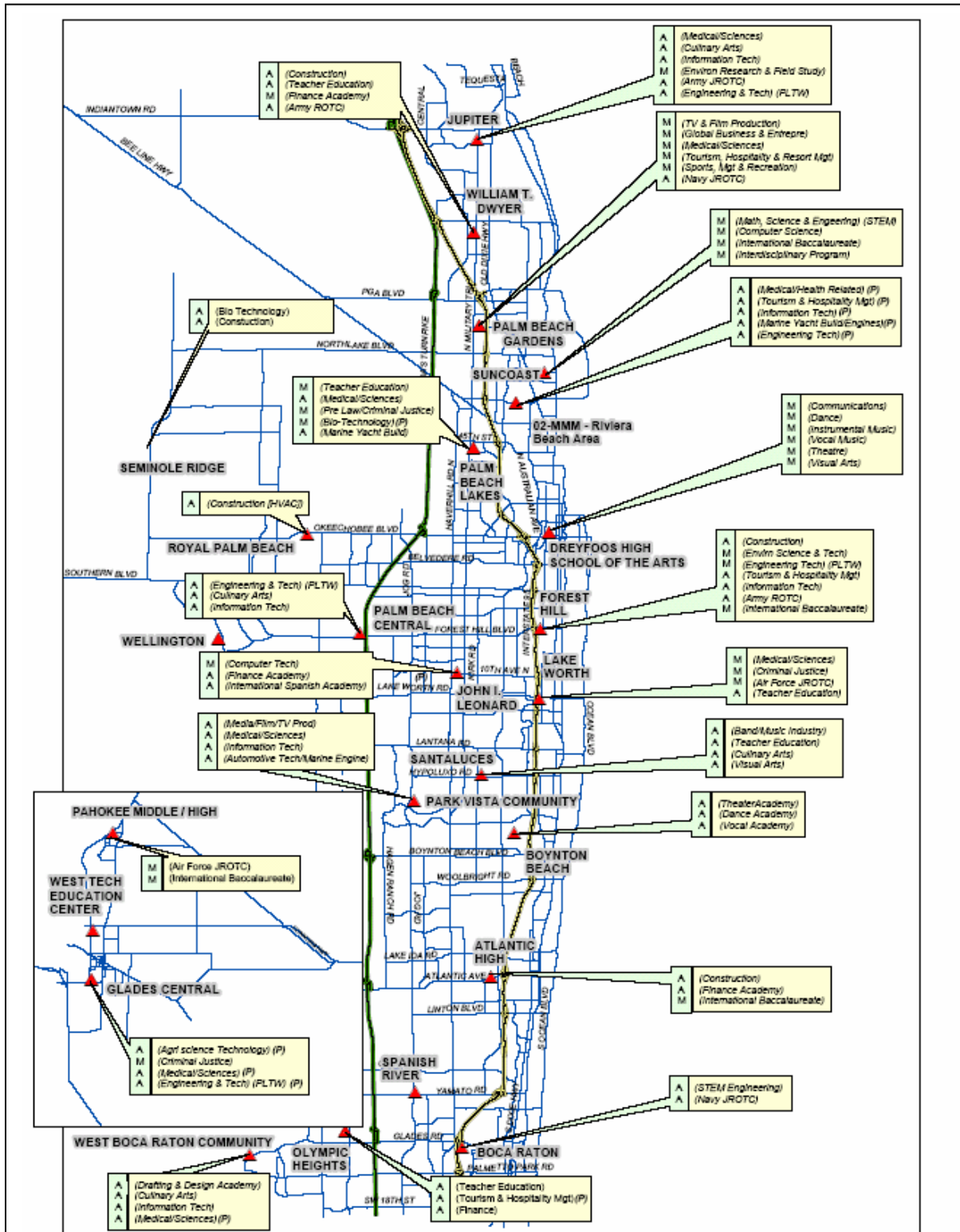
Palm Beach Career Academies

The school district of Palm Beach County is the 11th largest school district in the United States and the 5th largest in the state of Florida. Over 176,000 students attend classes in Palm Beach County's 165 schools. Of these 176,000 students nearly one half are at the poverty level and approximately 20,000 are classified ESOL (English Speakers of other Languages). Despite apparent challenges, Palm Beach received, in 2006, an "A" rating for the 2nd year in a row based on student performance on the FCAT.

Palm Beach County has a diverse set of 96 currently functioning career academies located at approximately 22 of the county high schools. The county provides, through the school choice initiative, access to any career academy for any accepted student. As figure 16 shows, the career academies are widely dispersed throughout Palm Beach County and provide an array of career path choices for Palm Beach students.

Of particular importance to the Palm Beach County career academy program is the existence of advisory councils that parallel each career academy in the county. These advisory councils are composed of business, community and school leaders who inform the creation of academy programs and aid in the structuring of academy curricula. Thus Palm Beach relies on the input of business and community leaders in deciding the future of career education. Additionally, the existence of the advisory councils creates a strong relationship between industry and the career academies aiding the academies in providing job shadowing, mentorships, internships and work based learning for their students.

Figure 16 - Palm Beach Career Academies



Source: Palm Beach County School Career Education Website

The career academies aim to provide their students with a program that spans the high-school experience. As the sample schedule in table 12 shows, career academy students have the opportunity to participate in at least 1 career academy course in the 9th grade, 2 courses in the 10th and 11th grade and up to 4 courses in the 12th grade for a total 9 courses in high school. However, the Palm Beach model is one in which individual schools have a great deal of input in the shape of the academies. For example, none of the county level information on the career academies focuses on articulation agreements with colleges and universities nor does it focus on industry certification, two critical elements defining successful career academy programs. Many of the programs do have articulation agreements, do offer dual enrollment courses, and some have programs that lead to industry certification.

Table 12 - Sample Student Schedule: Palm Beach Career Academy

9th Grade	10th Grade	11th Grade	12th Grade
Physical Education / Elective	Foreign Language I	Foreign Language II	Economics / American Government
English I	English II	English III	English IV
Algebra I or Geometry	Algebra II or Geometry	Algebra II or Pre-Calculus or Integrated Math	Academic Elective
Biology or Integrated Science	Biology or Chemistry	Chemistry or Science Elective	Career Academy Course or Academic Elective
Life Management Skills / Personal Fitness	World History	American History	Career Academy Course or Academic Elective
Career Academy Course	Career Academy Course	Career Academy Course	Dual Enrollment or Internship*
Academic Elective	Career Academy Course or Academic Elective	Career Academy Course	Dual Enrollment or Internship*

*Internship includes Career Academy Course.

The William T. Dwyer High School Academy of Finance, for example, offers summer internship opportunities for students in which they earn course credits for participation. Additionally, they take a number of courses in high school (financial computing, financial operations, financial accounting and financial planning) which are dual-enrollment college preparatory courses. The Lake Worth Community High School Medical Sciences Academy offers students “articulated and direct access programs with colleges and technical schools, pre-medical program with rigorous advanced placement academic courses, free dual enrollment courses with Palm Beach Community College, job shadowing in all areas of medicine, participation in a clinical internship off campus in medical facilities as well as occupational completion certificate programs.” Their

program is designed to approximate a college level program giving students exposure to a wide degree of potential careers from practical nursing to dermatology to veterinary medicine.

The Palm Beach model has several key identifying components. The first, and primary component, appears to be flexibility. Schools are allowed to choose, within the broadest framework, the shape and scope of a career academy program. Moreover, the program itself operates parallel to an advisory board composed of local business members and partners as well as community leaders and educators who determine the curriculum for the school. This allows schools to take their direction from members of the community who are well positioned to know what careers are important now and what careers are most likely to be important in the future. Second, many programs in Palm Beach operate in conjunction with local and state colleges and universities. Either students take courses under an articulation agreement or take courses that allow dual enrollment at a post-secondary institution. Additionally, in some cases, students take courses in high school which leads directly to industry level certification in some fields.

Okaloosa County's CHOICE Program

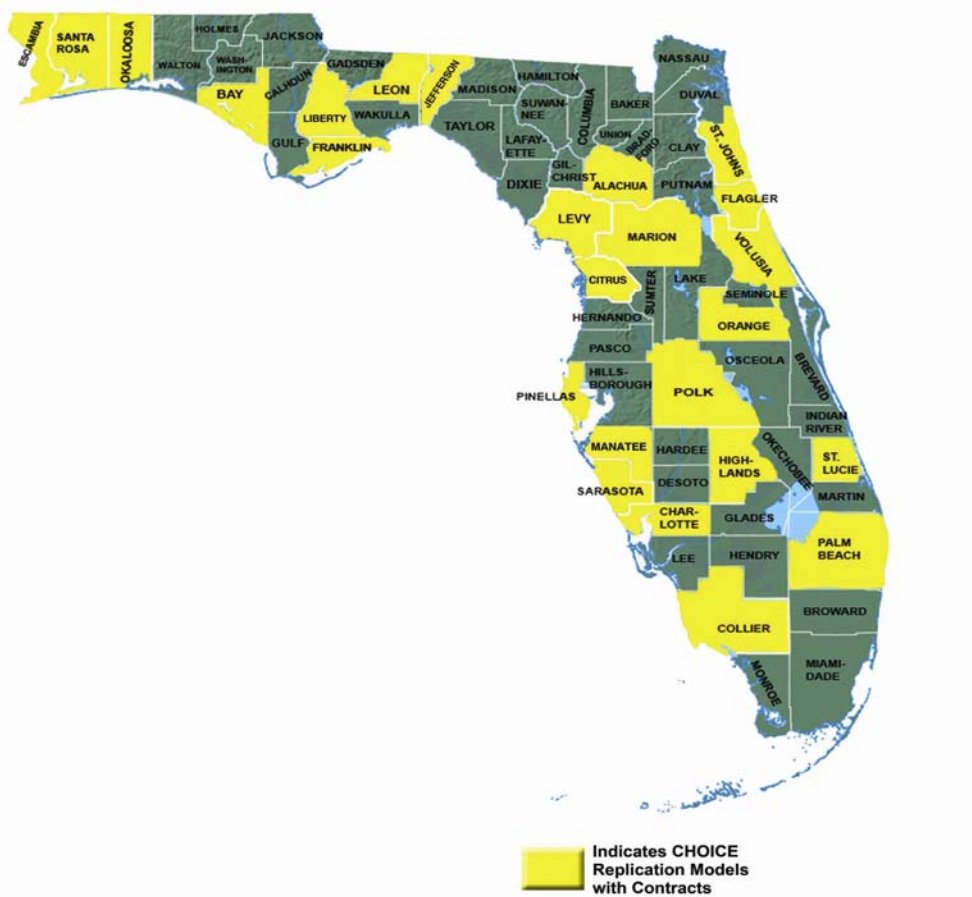
Okaloosa County's CHOICE (Career High-Skill Occupational Initiative for Career Education) program is widely viewed as the premier model of high-school level vocational education in the state of Florida. The CHOICE institutes have been recognized both nationally and statewide as model academies of career education. There are currently 4 choice institutes in operation in Okaloosa County in the fields of aerospace, construction technology, creative arts, and information technology. Additionally, pre-institutes are operating in the fields of allied health, automotive maintenance, hospitality, manufacturing and utilities. Five Okaloosa County Schools house CHOICE institutes including Baker School, Choctawhatchee High School, Crestview Vocational Technical Center (Crestview High School), Niceville High School and Laurel Hill School. A final choice institute is housed on the campus of the Okaloosa Applied Technology Center.

The trademark of the CHOICE institutes is the strong partnership between the institutes, employers and colleges and universities. All CHOICE institute programs lead directly to industry level certification and/or articulated college-level credit. For the aerospace institute, CHOICE partnered with Embry Riddle Aeronautical University, the "world's premier aviation university", to give CHOICE students access to the rigor of university level aeronautical training. Participating students receive weighted high school credit, college credit for the courses and certified FAA (Federal Aviation Administration) training. CHOICE students can train in aeronautical engineering, piloting and navigation, air traffic control, meteorology, aviation maintenance, unmanned aerial vehicles and aviation accident investigation. At the same time they may earn up

to \$48,000 worth of credit in 16 Embry Riddle courses while still in high school at no cost to the student.

CHOICE students enrolled in the Information Technology institute have the opportunity to receive certification in a number of programs while still in high school. The IT institute offers certification in Microsoft, Oracle, Cisco, Adobe and Macromedia. Students also learn the art of website design, database programming and computer networking. Perhaps most importantly, they have the opportunity to gain industry recognized certification that has the potential to lead to jobs directly out of (and sometimes while still in) high school.

Figure 17 - CHOICE Replication Sites in Florida



Source: Okaloosa County School District

The rewards are, however, most prominently felt in the pocketbooks of the CHOICE graduates. The Okaloosa County School District notes that the “2006 CHOICE senior class (304 students) earned \$2.9 million in senior scholarships, industry certifications and university credits”. Additionally, according to a Haas Center report, a CHOICE graduate is expected to earn

approximately \$300,000 more in income across his lifetime relative to the average individual with a high-school education only.

Further, the success of CHOICE is being replicated statewide. As Figure 17 demonstrates, CHOICE type institutes have been replicated in 19 counties across the state of Florida. Additionally, the Okaloosa County School District's CHOICE Institutes were awarded a \$1 million grant by Workforce Florida, Inc. to establish the Employ Florida Banner Center for Career Academies. Their mission under the Banner Center grant is to "provide technical support to districts throughout the state wanting to start new career academies or overhaul existing programs; develop standards and accountability measures for career education programs statewide; and research and highlight best practices in career education that help Florida maintain and improve its globally competitive workforce" (Employ Florida Banner Centers Overview 2007, 4). This mission dovetails with the recent passage of Senate Bill mandating career education programs throughout the state of Florida in the fashion of Okaloosa County's CHOICE program.

Taking CHOICE Statewide: Senate Bill and the Banner Center of Excellence for Career Academies

Senate Bill 1232 gained final passage on 5 May 2007 and, with the governor's signature, will require student access to career academies similar to CHOICE in every Florida county by the 2008-09 school year. The legislation is designed to establish career academies which meet and exceed current national and state guidelines and which are relevant to local and state workforce needs and, to that end, includes several key components. First, the legislation requires each district, at the outset, to develop jointly, in conjunction with local workforce boards and state-approved postsecondary institutions, a five year plan to determine workforce needs for the ensuing five years. The plan shall "develop and implement career academies based on those careers determined to be in high demand" and will also require maximum use of both private facilities and private personnel. Maximum use of industry personnel and industry facilities will ensure that students are trained in the latest practices on the most modern equipment for vocational careers. Partnerships with colleges and universities will ensure that the coursework completed by students will transfer to approved post-secondary institutions as college-level credits. This is critically important because the bill requires that *all* career courses lead either to industry certification or college credit that can be linked directly to that particular career theme.

Further, the bill provides for a review process of all new career academy courses that are proposed as core courses for the purpose of high-school graduation. This will guarantee, on a statewide basis, a rigorous review of the course itself and a prompt decision on its addition to the

core course directory. Thus students will be able to count these courses as core courses for the purpose of graduation as well as using them for industry level certification requirements and potential college-level course credit. Additionally, the bill requires the Department of Education and the local workforce board to develop and implement a program designed to evaluate career academies based on national industry standards like the Career Academy National Standards of Practice as well as outcome measures such as graduation rates, employment success, etc. This establishes an external, state-level evaluation program designed to measure the level of success of career academy programs.

In addition, the bill establishes a mechanism for funding career academy courses. Schools will receive a value of 0.3 full-time equivalent student membership “for each student who completes and industry-certified career and professional academy program...” and the membership will be added to the total full-time equivalent membership for the program with an upper cap of \$30 million annually (statewide) on the total cost (SB1232, 2007). Finally, the bill requires the Okaloosa County CHOICE program to serve as an advisor to the statewide implementation of career academies for a three year period.

In summary, Senate Bill 1232, which implements a CHOICE program statewide, achieves several important objectives. First, it ensures that career academy programs will lead to industry certification or college credit or they will be abandoned. Second, it requires the development of a comprehensive plan to ensure that the academies are established in fields that are relevant to workforce needs. Third, it provides a mechanism of external evaluation for career academy programs statewide, and finally, it provides a source of funding for the individual programs. Naturally, implementation of the particulars of the bill will accomplish more than that, however, those appear to be the universally accepted keys to a successful statewide program.

Conclusion

Vocational and technical education has long played a role in the American education system. For over a century, vocational programs have trained farmers in the art and science of agriculture and later, technicians in the art of auto mechanics. Most recently, these programs, particularly those developing into career academies in states like Florida, have moved into more high tech, high skill and high wage jobs like those existing in the aerospace industry. The advent of the statewide career education program mandated in Senate Bill 1232 and signed by Governor Crist has the potential to take the career education to the next level.

The existing model programs in the state, such as Okaloosa’s CHOICE program, the Suncoast Tech Prep Program and Palm Beach Career Academies all fit, with minor adjustments into the

“CHOICE” model mandated by SB 1232. The core changes in each model program come primarily as a result of the need to ensure that every academy course leads either to industry-level certification or some type of college credit. Although most of the programs meet this requirement, not all do. Additionally, the development of a 5 year plan will perhaps lead to the dissolution of some programs formed before the career academies were required to develop curricula to educate students in careers that are or will be shortly in high demand. Further, all career education programs in the state will benefit from the review processes established in SB 1232, particularly the need to meet industry level accreditation and establish strict state standards.

Most importantly, SB 1232 appears to be flexible enough that any of the three models meet all or most of the requirements. Additionally, the state plan will allow other models to come to the fore as best practices are developed and identified. Certainly, the foundation for success exists in SB 1232 with the base requirements for career academy curricula that lead directly to industry level certification and/or college credit. The requirement to develop a forward looking 5 year plan will encourage every district, whatever the career academy model chosen, to develop programs that are timely and relevant ensuring that students receive in-demand training leading to successful careers.

Section 6 – Recommendations

While we acknowledge the potential threats to occupational growth in Florida faced from globalization, the changing structure of the economy demands a restructuring of the education system. Career technical education provides an ideal platform to meet the specific needs of businesses statewide in specific industry training.

Career academies have the potential to function as the critical link in transitioning secondary students into successful careers in the workforce. Career academies, as they have developed, are designed to provide students advanced pre-college training in areas relevant to the local economy. Additionally, many academies provide industry-level certification for certain positions upon graduation from high school. It is therefore important that we understand two key factors for successful linkage between secondary education and success in the future workforce via career academies. First, as the initial portion of this report outlines, it is critical to identify the industries that will provide secondary students with career success over a lifetime of participation in the workforce. And second, as the final portion of this report outlines, it is important to understand what defines successful career academy programs.

These defining characteristics include the following: a comprehensive school within a school focused on providing students early training in an important area of the economy; an external review process to ensure the quality of education within the career academy; a curriculum or set of curricula developed with input from local businesses and workforce boards to ensure the relevancy of the program; the existence of programs with coursework that either a) leads directly to industry certification in a particular area b) articulates into college credit under agreements with colleges and universities and/or c) is provided as a dual enrollment course with a college or university. With the exception of outside oversight, many of the programs that have developed in the state of Florida, as we note, already include some, if not all, of these critical elements.

Redefining education to adapt to changing times is seldom achieved effortlessly. However, career academies have the potential to provide secondary students with the knowledge and skills that will be important in future high-skill, high-wage jobs. We outline here the skill sets that will be important both presently and in the future for jobs across the state of Florida. Additionally, we outline the steps, both mandated and unmandated, that ensure the success of career academy programs as they arise. The combination of these two critical elements can potentially lead to the creation of a workforce that supports blooming industries in Florida. This ensures good jobs for Florida employees and a workforce for Florida employers that possesses the needed skills.

Section 4 quantified the need for vocational certifications in all target industries. Based on forecasts, manufacturing occupations requiring a vocational certification are expected to experience the largest absolute growth. At this time, occupational demand forecasts in manufacturing are not expected to be significantly affected by threat of globalization. While an unforeseen surge in technological advancement may influence manufacturing processes, with more occupations subject to some structural unemployment as certain skills are made obsolete, overall, occupation forecasts do suggest career technical education in manufacturing will play a vital role in the economic growth of the state. The analysis provided here also indicates that career technical education development providing certificates in life sciences occupations is required. The growing and aging population of the state will continue to drive demand for health care workers with the requisite training. Further, the personal nature of the majority of the positions indicates that forecasts should be realized. Financial and professional services occupations are also expected to experience strong growth in Florida. This also creates some spillover effects on the IT industry as many high-growth occupations also require training in Microsoft packages and other software. Finally, while occupational growth in the IT industry is subject to the most uncertainty due to globalization, continued career technical education in IT certifications will play an important role in student training and overall economic development.

Appendix A – Model Survey Instrument

We include as an appendix to this report a model survey instrument that can be adapted to fit the needs of a particular county or may, as the case requires, be used statewide. We envision that this survey will be administered in its same form at least twice in a particular area. The first will provide a baseline for the purposes of comparing the perceptions of education in the county or state to the perceptions following the implementation of career-education programs in the model of Senate Bill 1232. The survey itself will comprise two forms which will be randomly distributed in equal numbers to the population of interest. A shift in question wording in several places will cue the respondent to think either about education programs in the county as a whole or career-technical education programs as they currently exist. This gets around the rather thorny issue of priming respondents to compare the two in either a favorable or unfavorable light by asking about both sets of programs on the same survey instrument. Further, comparisons of the marginals from the two surveys will provide an estimate of the distinctions respondents make in gauging effectiveness of education in general and career academies in particular.

The survey instrument is divided into several sections which gauge the size of the business, the nature of the workforce employed by the business, the future perceptions of business needs and an assessment of the current product of the county/state school system. Naturally a second round of surveys spaced from the initial round by a number of years will allow systems to gauge the effectiveness of newly implemented career education programs.

What is your title? _____

How long have you been at your current position? _____ years

What is your highest level of formal education?

_____ Some high school

_____ High School Diploma

_____ High School Diploma with
technical certification

_____ Some College

_____ Associates Degree (2 years of college)

_____ Bachelors Degree(4 years of college)

_____ Masters Degree

_____ Doctorate or Professional Degree

A. Companies sometimes employ people from varied educational backgrounds with diverse skill sets from both inside and outside the company's immediate geographical area. We are interested in the basic composition of your workforce.

1. First, what is your total current payroll? _____

2. And how many people are currently employed full time by your company? _____
part time? _____

3. Approximately what percentage of your current workforce is native to xx
county/Florida? _____
and what percentage do you estimate received an education in xx county/Florida? _____

4. What percentage of your company's total current workforce would you say has the following
education/technical skills?

a. high school diploma only _____

b. technical certification with a high school diploma _____

c. associates degree (two years of college or university) _____

d. bachelors degree (four years of college or university) _____

e. masters degree _____

f. doctorate or professional degree _____

5. What percentage of your company's total budget is allocated to new employee
training? _____

6. What percentage of your company's current workforce is required to possess some industry
level certification for job related purposes? _____

7. And what percentage of these industry certifications were obtained...

in high-school vocational technical programs? _____

after the employee joined your company? _____

from a previous employer? _____

B. How about hiring high school graduates entering the work force for the first time?

Please summarize your company's policies towards hiring first time employees by indicating your agreement or disagreement with the following statements:

1. At present, there is a need in my company to hire youth seeking first time employment.

Strongly Agree Agree Disagree Strongly Disagree

2. Youth seeking first time employment in this county/state already possess needed skills for the jobs they seek.

Strongly Agree Agree Disagree Strongly Disagree

3. My company is willing to provide training for youth seeking first time employment.

Strongly Agree Agree Disagree Strongly Disagree

4. My company actively recruits youth seeking first time employment.

Strongly Agree Agree Disagree Strongly Disagree

- C. Business are often called on to forecast their future workforce needs and plan accordingly. Thinking about your company's future workforce needs:

1. Do you think five years from now your company will require a workforce with more skills/education, fewer skills/education or will the skills/education needs of your company remain largely unchanged?

Far More skills/education Somewhat More skills/education Remain Unchanged
Somewhat Fewer skills/education Far Fewer skills/education

2. Do you think five years from now your company's need for certified technicians with a particular set of skills will increase, decrease or remain the same?

Increase dramatically, increase slightly, remain the same, decrease slightly, decrease dramatically

D. Employers in this area are often reliant on local residents educated in xx county schools for their workforce needs. Many employers find that local schools do an adequate job of preparing future employees for the workforce and many employers do not. We are interested in your overall evaluation of the local school system in xx county.

1. Would you say that high school graduates are prepared or unprepared to serve as employees in your company immediately out of high school?

Highly prepared, prepared, neither prepared nor unprepared, unprepared, highly unprepared

2. How about high school graduates of vocational-technical programs? Would they be

Highly prepared, prepared, neither prepared nor unprepared, unprepared, highly unprepared

3. Thinking about your business experience in xx county, would you say that the local school system is doing a better or worse job than 5 years ago in preparing high school graduates for work in your company?

much better job, better job, about the same, worse job, much worse job

E. We would now like you to evaluate the current work skills of employees in your company who were graduates of vocational/technical (or high school) programs. Please read each description carefully and indicate how well the following statements characterize vocational/technical (or high school) graduates in your company by placing a letter in the left hand column next to each statement where A indicates strong agreement and E indicates strong disagreement:

A= strongly agree; B=agree; C=neither agree nor disagree; D= disagree;
E=Strongly Disagree

In general, vocational-technical graduates in my company can:

- _____ 1. Identify, organize, plan and allocate resources.
- _____ 2. Work with others.
- _____ 3. Acquire and use information.
- _____ 4. Follow policies and procedures effectively.
- _____ 5. Work within the system in which your company operates.
- _____ 6. Work with a variety of tools or equipment, including computers.
- _____ 7. Locate, understand and interpret written information.
- _____ 8. Communicate thoughts, ideas, information and messages in writing.
- _____ 9. Perform basic mathematical computations.
- _____ 10. Interpret and respond to verbal messages or directions.
- _____ 11. Organize ideas and communicate orally.
- _____ 12. Generate new ideas.
- _____ 13. Solve problems.