The Logistics of Education and Education of Logistics

Exploring the Supply and Demand of the Logistics Workforce

Presented by:
The Georgia Center of Innovation for Logistics

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THE LOGISTICS OF EDUCATION & EDUCATION OF LOGISTICS:
EXPLORING THE SUPPLY AND DEMAND OF THE LOGISTICS WORKFORCE

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EXECUTIVE SUMMARY

Logistics plays an increasingly complex and critical role in corporate operations and competitiveness, and companies must hire an educated and properly trained workforce in order to grow. What workforce supply is coming from our educational systems, and what overall demand will there be for them?

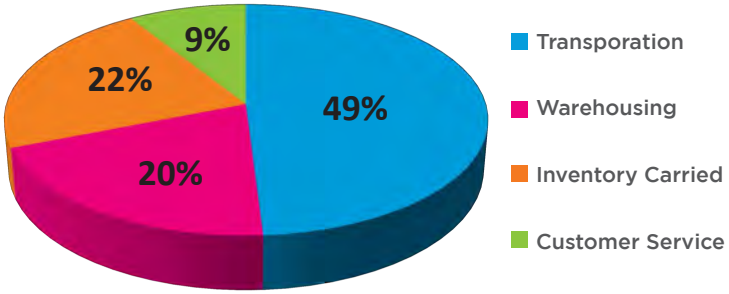
The Georgia Center of Innovation for Logistics, a division of the Georgia Department of Economic Development, has released new research showing that based on U.S. Department of Labor data, **the United States will have approximately 270,200 logistics-related job openings that will need to be filled every year from now until 2018 to keep up with projected industry growth.** The State of Georgia has put extensive resources into increasing the number of trained workers available for the state and the country, including logistics programs from the high school level to Ph.D. programs. **This *"Logistics of Education & Education of Logistics"* report explores the supply and demand of the logistics workforce, how they are trained and the potential gaps the industry may see in the future.**

What is logistics? A fairly simple question, but one with a complex and seemingly ever-changing answer. Perhaps a better question is… What *isn't* logistics?

No matter where we go, how we get there, where we shop, or what we buy, logistics plays a vital role in making it all happen. The truth is that logistics is one of the world's largest, most complex, but sometimes one of the best kept secrets of industries. It is a foundation that impacts companies of all types and sizes, as well as everyday consumers, whether we see it in action or not. In fact, logistics is really not just an industry, it is an ecosystem in which all sectors and participants rely on one another to move freight from Point A to Point B. This includes companies that provide logistics services as well as those that are enabled by the use of logistics to move products to their customers, or raw materials to a manufacturing plant, and in 2011, U.S. businesses spent $1.3 trillion on logistics-related costs to make all this commerce flow.

The better connected this logistics ecosystem, the more efficient, cost-effective, secure and reliable the movement of their products can be. This can equate to improved margins for the shipper and potentially translate to lower prices for consumers.

GENERAL LOGISTICS COST BREAKDOWN



These logistics costs can represent upwards of 10% of a company's total revenue. Every supply chain is unique in its requirements to move products to customers and with this individuality comes added complexity and logistics cost. For example, the logistics of moving pharmaceuticals or biomass fuel pellets is markedly different than traditional consumer product goods and can see logistics spends that consume 40-50% of total sales and revenue.

One area of current and future need across any company or logistics operation is the demand for a well trained and skilled workforce. This report will focus on this element and begin to explore the supply and demand of the logistics workforce, how they are trained, and the potential gaps the industry may see in the future. Against this backdrop, the report will further drill down into the workforce supply and demand for Georgia and compare its standing in the Southeast (defined for this report as Georgia, Tennessee, Alabama, North Carolina, South Carolina, and Florida) and the United States.

KEY REPORT FINDINGS:

- **The sample of U.S. logistics employment referenced in the analysis totaled 2.25 million (in 2008) across six custom sub-categories: Logistics Operations, Industrial Engineering, Warehouse & Distribution Labor, Trucking, Freight Rail, and Air Cargo Supervisors.**
- **The logistics industry is expected to create 270,200 job openings per year that will need to be filled to keep up with the demand and growth of the overall industry. This means over one million job openings total nationwide over the next four years (2013-2016).**
- **The nation's 7,642 educational institutions currently generate 75,277 formally trained, degreed or certified workers each year. This will fill about 28% of the related job openings that are expected to be made available every year.**
- **Every year, Georgia issues over 51% of all the truck driving certificates in the southeast; this equates to 1 out of every 8 for the entire Nation. Georgia also graduates 46% of the industrial engineers in the Southeast every year.**
- **Georgia's logistics industry alone will generate 9,500 job openings per year, each year that will need to be filled.**
- **Logistics employment in Georgia is projected to grow five percent more than the U.S average 18% vs. 13%) and nearly triple the Southeast average, far exceeding the growth of other leading seaport states of New York, Washington State, California, and Texas.**
- **Every year, Georgia issues more than 51% of all the truck driving certificates in the Southeast; this equates to one out of every eight certificates for the entire nation. Georgia also graduates 46% of the industrial engineers in the Southeast every year.**

POTENTIAL SOLUTIONS FOR INCREASING SUPPLY INCLUDE:

- Documentation of logistics as an independent industry sector on the federal and state level.
- Earlier visibility of logistics in the education process, both in technical/career high schools and colleges.
- Enhanced opportunity for internships specifically aimed at providing real-world logistics experiences.
- Better coordination and support for technical colleges, via existing collaboration and through increased funding and scholarship availability for students.
- Reduced or eliminated hurdles for military personnel transitioning into civilian life, including leveraging existing relevant training and certificates.
- Enhanced marketing and promotion of the entire spectrum of logistics education.

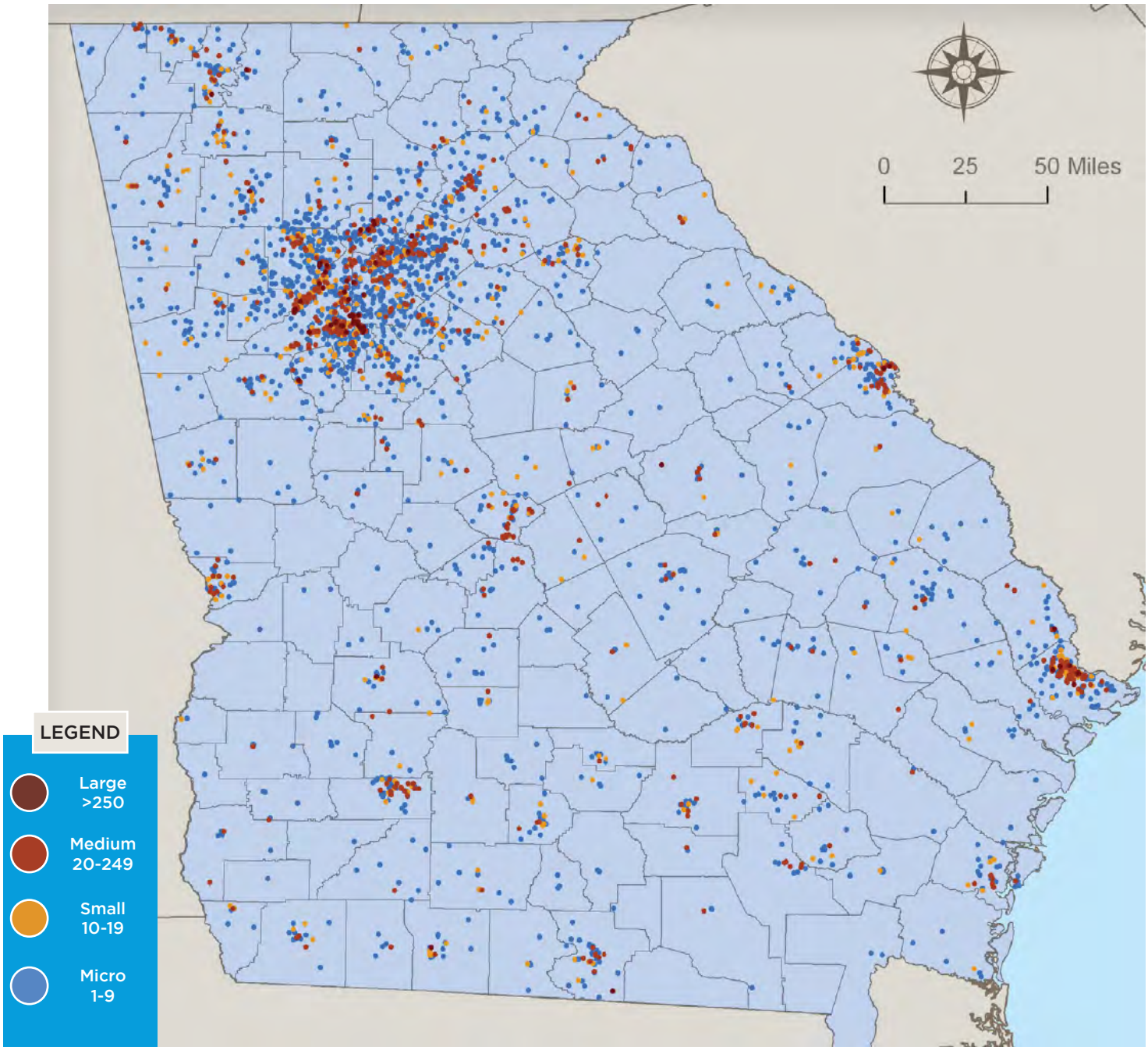
WHY GEORGIA?

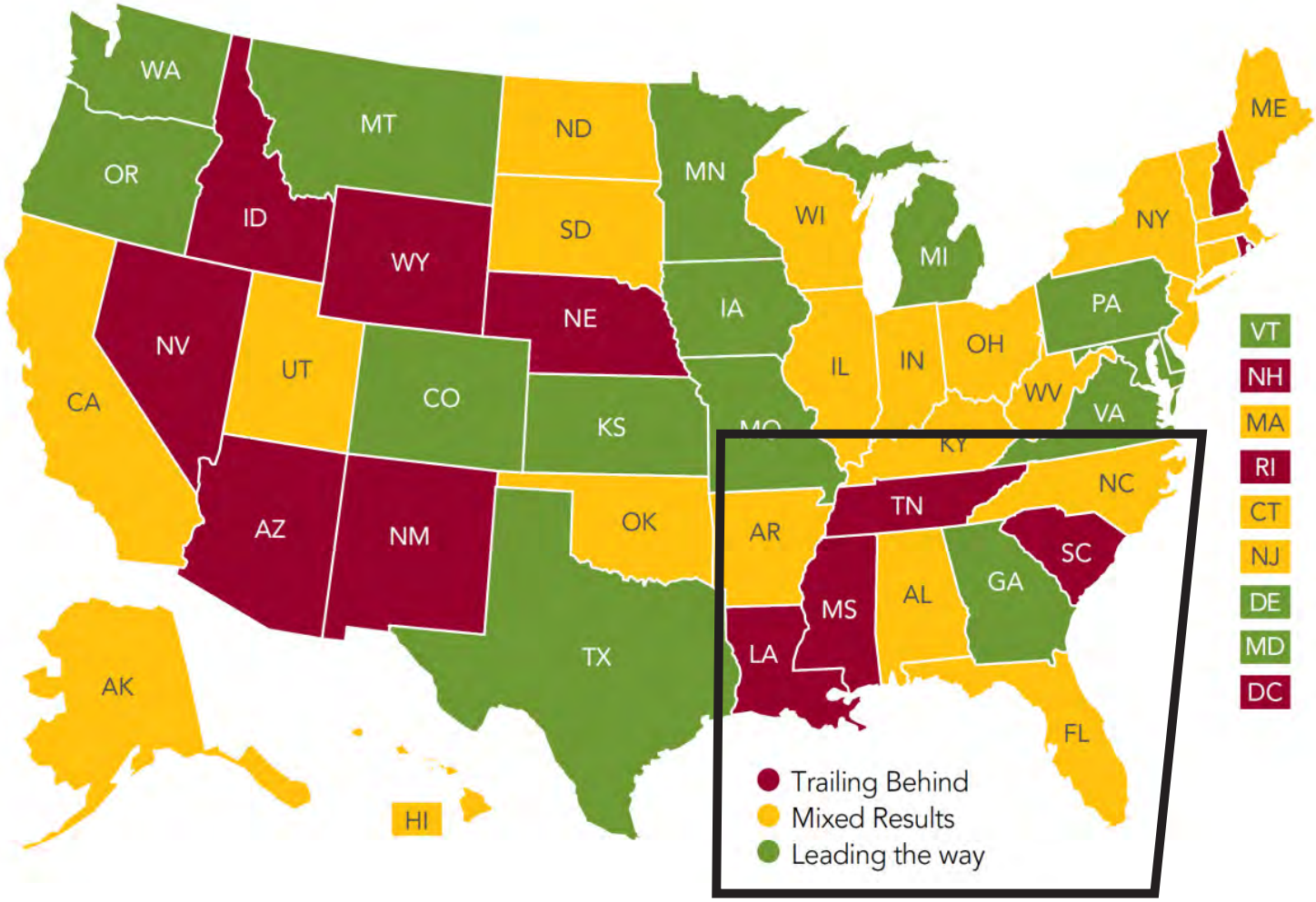
Georgia is home to 11,000 providers of logistics services, from core transportation and facilities, to third-party logistics and software providers, and ranks as the fifth largest overall logistics employer in the nation (see map below). Companies like Delta Air Lines, UPS, SAIA, RedPrairie and Manhattan Associates are headquartered here, along with major consumers of logistics such as Home Depot, Coca-Cola and Gulfstream. In total, close to 33,000 companies critically rely on the efficient flow of freight to operate their business. Additionally, every sector of logistics is supported by active trade associations, and Atlanta is a popular location for many major logistics industry events.

It is due to this industry cluster and enviable list of logistics infrastructure assets that Georgia named logistics and transportation a strategic industry and made it a focus for job creation and growth. As such, examining Georgia's position within the broader national demand provides key insights into areas of need and opportunity both for Georgia and the Southeast. In light of the fact that logistics employment growth in Georgia is expected to outpace the U.S. average, the state must prepare a workforce to meet the high demand.

80 PERCENT OF THE U.S. POPULATION IS WITHIN TWO TRUCKING DAYS

CORE, RELATED AND SUPPORT INDUSTRIES BY EMPLOYMENT SIZE





SOURCE: Pew Center on the States and the Rockefeller Foundation, 2011.

2011 PEW CENTER REPORT: WHERE STATES STAND

In a 2011 report released by the Pew Center on the States and the Rockefeller Foundation, all 50 states were graded across a range of categories including safety and infrastructure preservation, mobility and access, environmental stewardship, and jobs and commerce. In the category of jobs and commerce, which analyzed the impact of a state's logistics strength and its relation to economic development, **Georgia was the only state in the nine southeastern states to be graded as "Leading the Way." Georgia was also one of only 13 states categorized as "Leading the Way" on average across all categories combined.**

GEORGIA IS NUMBER ONE 1 IN WORKFORCE DEVELOPMENT

THE LOGISTICS EDUCATION SPECTRUM

The broad reach of the logistics industry is accompanied by the need for a wide spectrum of trained workforce to fill the range of job functions. This spectrum includes technical high schools and colleges, post-secondary and graduate-level programs, as well as professional industry certifications. Logistics has always been a part of any successful business model, but logistics-related classes or even degrees are often incorporated into different departments such as marketing. As the economy and global marketplace has evolved, so has the field of logistics. Today's logistics professionals are facing unprecedented challenges including (1, 2):

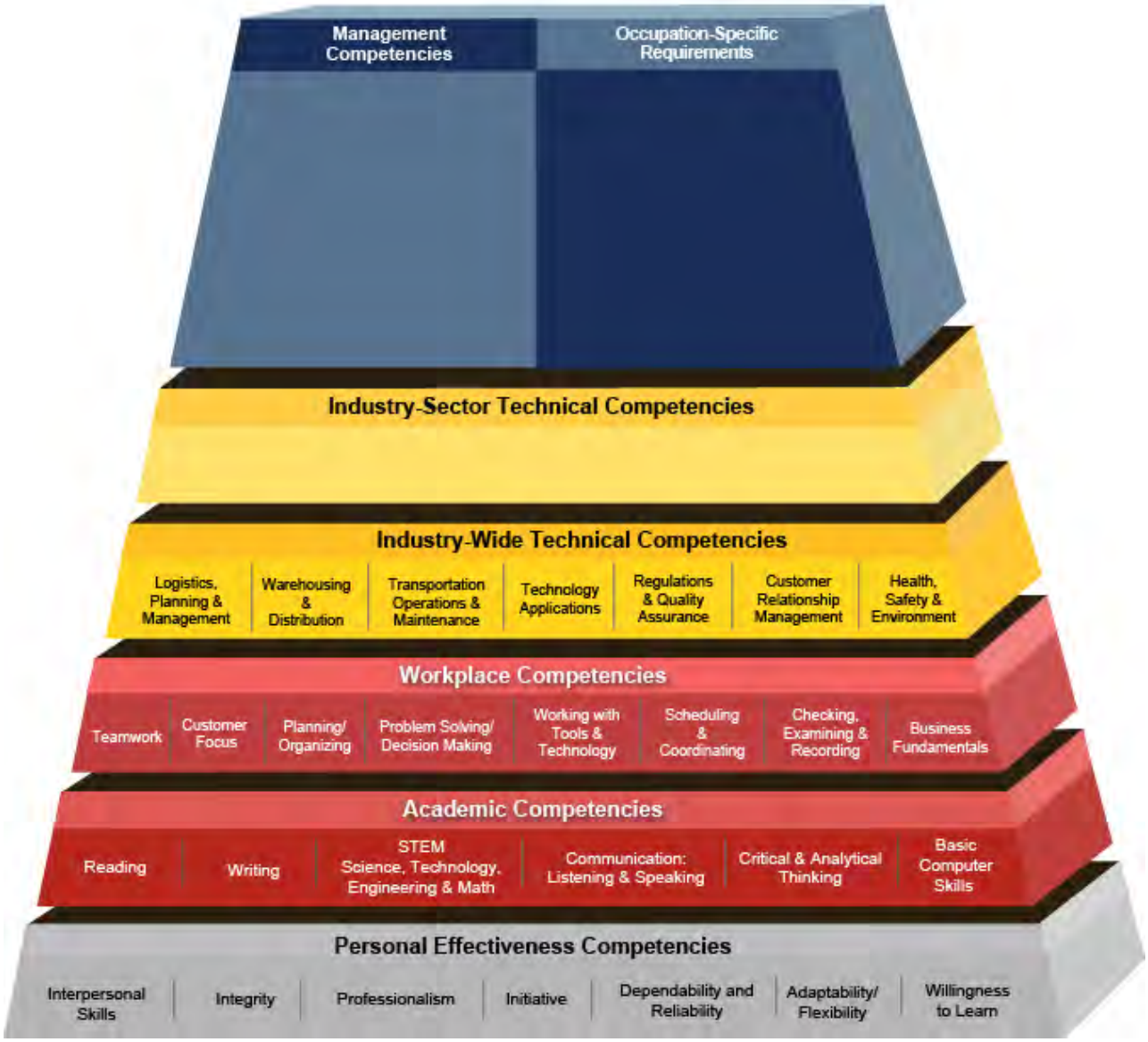
- Both domestic and global competition.
- Heightened security and safety requirements.
- Management of overwhelming amounts of information.
- Deteriorating transportation infrastructure.
- Focus on environmental impact and sustainable operations.
- Uncertain fuel prices.

Students preparing for a career in logistics today need an increased skill set:

- Cultural awareness and understanding of the global marketplace.
- Understanding of government regulation and compliance.
- Increased technological skills including software use and data management.
- Ability to adapt and adjust supply chain to accommodate unexpected economic and environmental changes.

The United States Department of Labor (USDOL) has established multiple "Competency Models" to graphically organize the skills – or competencies – a worker should possess in order to be successful in a chosen profession. "Transportation, Distribution & Logistics" is one of these models and is shown below. The competencies include personal ones such as flexibility and integrity; basic academic skill in math and writing; workplace competency in teamwork, problem solving, and organization; and industry-wide competency in the application of technology and customer service.

USDOL TRANSPORTATION, DISTRIBUTION & LOGISTICS COMPETENCY MODEL



Many of these competencies are found in all reliable workforce program expectations; logistics is no different. However, the logistics industry does have many unique training and skill requirements, and the USDOL expresses these inside the "Advanced Manufacturing Competency Model" where a specific module for "Supply Chain Logistics" can be found.

This specific module includes a very detailed list of skills and industry specific traits (shown below) that go far beyond just advanced manufacturing and arguably should also be included in the Transportation and Logistics Competency Model, if not a model of its own. This is yet another illustration of the broad reach and varied interpretation of logistics.

USDOL SKILLS LISTING FOR SUPPLY CHAIN & LOGISTICS

Entry-Level Technical Content Areas

- Basics of Supply-Chain Management
  - **Elements of the Supply Chain**
  - **Just-in-Time/Lean Manufacturing**

- Managing Inventory
  - **Inventory Forecasting**
  - **Ordering Materials and Supplies**
  - **Inventory Monitoring and Audits**
  - **Stock Rotation Requirements**
  - **Expediting**

- Work Flow
  - **Material Handling**
  - **Plant Facility and Capacity**
  - **Production Scheduling**

- Production Systems
  - **Lead and Cycle Time**
  - **Change Orders, Bills of Material, Work Orders, etc.**

- Packaging and Distributing Product
  - **Packaging Product**
  - **Labeling Product- Inventory Tags and Bar Codes**
  - **Warehouse Management Systems**
  - **Transportation Methods**
  - **Customs and Export Control (Basic Paperwork)**

Technician-Level Critical Work Functions

- **Manage purchasing and just-in-time materials flow, shipping and receiving, packaging, and transportation**
- **Control inventory of materials and products**
- **Develop and maintain production/delivery schedules and supplier networks**

Technician-Level Technical Content Areas

- Supply-Chain Management
  - **Manufacturing Resources Planning**
  - **Collaborative, Planning, Forecasting, and Replenishment**
  - **Vendor Managed Inventory Systems**
  - **Centralized versus Decentralized Control**
  - **E-Business and Direct Shipment**

- Automated Material Handling
  - **Automated Material Handling and Distribution Systems**
  - **Integrated Supply Chain Information Technology**

- Resources Planning
  - **Demand Management**
  - **Sales and Operations Planning**
  - **Master Scheduling**
  - **Measuring Business Performance**

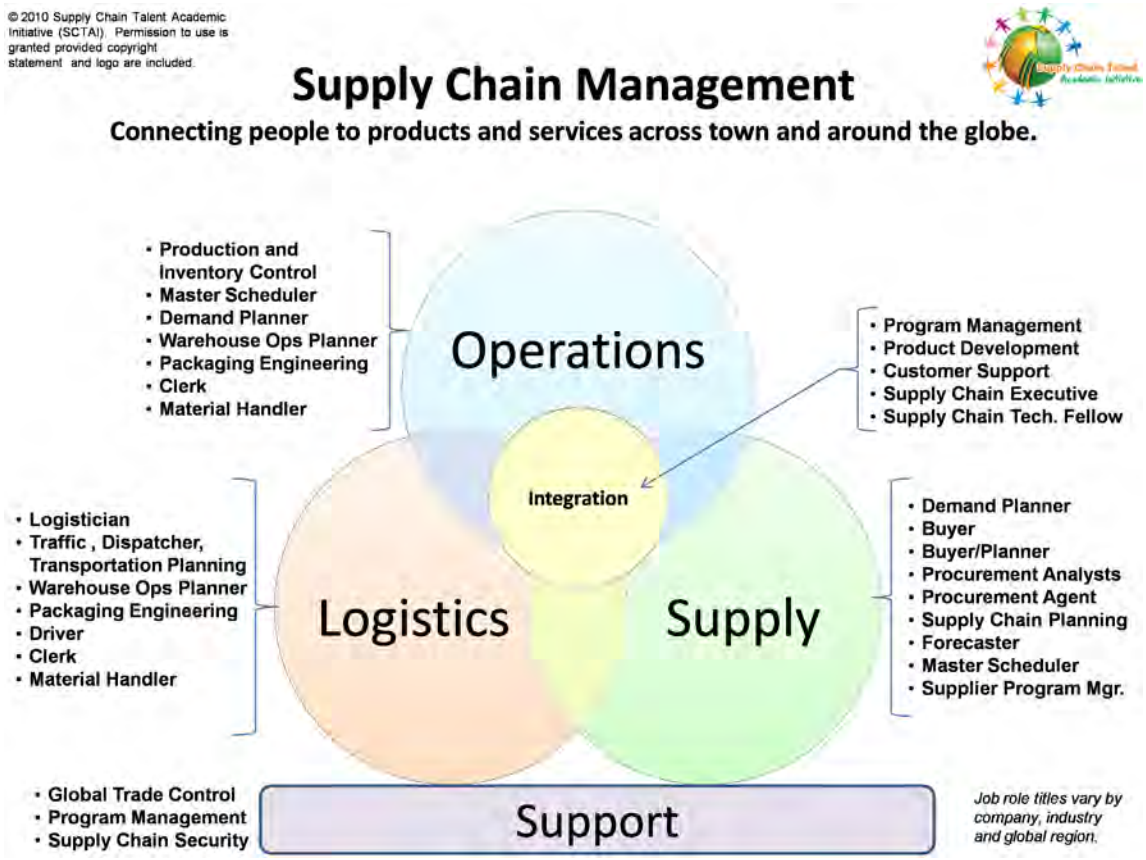
- Detailed Scheduling and Planning
  - **Techniques of Inventory Management**
  - **Detailed Material Planning**

- Executing Operations
  - **Procurement and External Source of Supply**
  - **Prioritizing and Sequencing Work**
  - **Executing Plans and Implementing Controls**
  - **Evaluating Performance**
  - **Ergonomics**
  - **Sharing and Collaboration across the Supply Chain**

- Awareness of Global Impacts
  - **Global Supply Chain Logistics Life Cycle**
  - **Intellectual Property**
  - **Taxes and Duties**
  - **Shipping, Receiving, and Freight**
  - **Customs and Export Control (Legal Aspects)**

www.careeronestop.org/competencymodel/blockModel.aspx?tier_id=4&block_id=646&hg=Y

SOURCE: USDOL



Another group that looks at this spectrum of logistics education is the Supply Chain Talent Academic Initiative (SCTAI), a sub-group of the Supply Chain Council (www.supply-chain.org). The Supply Chain Council (SCC) is an independent, nonprofit, global corporation with membership open to all companies and organizations interested in applying and advancing the state-of-the-art in supply chain management systems and practices.

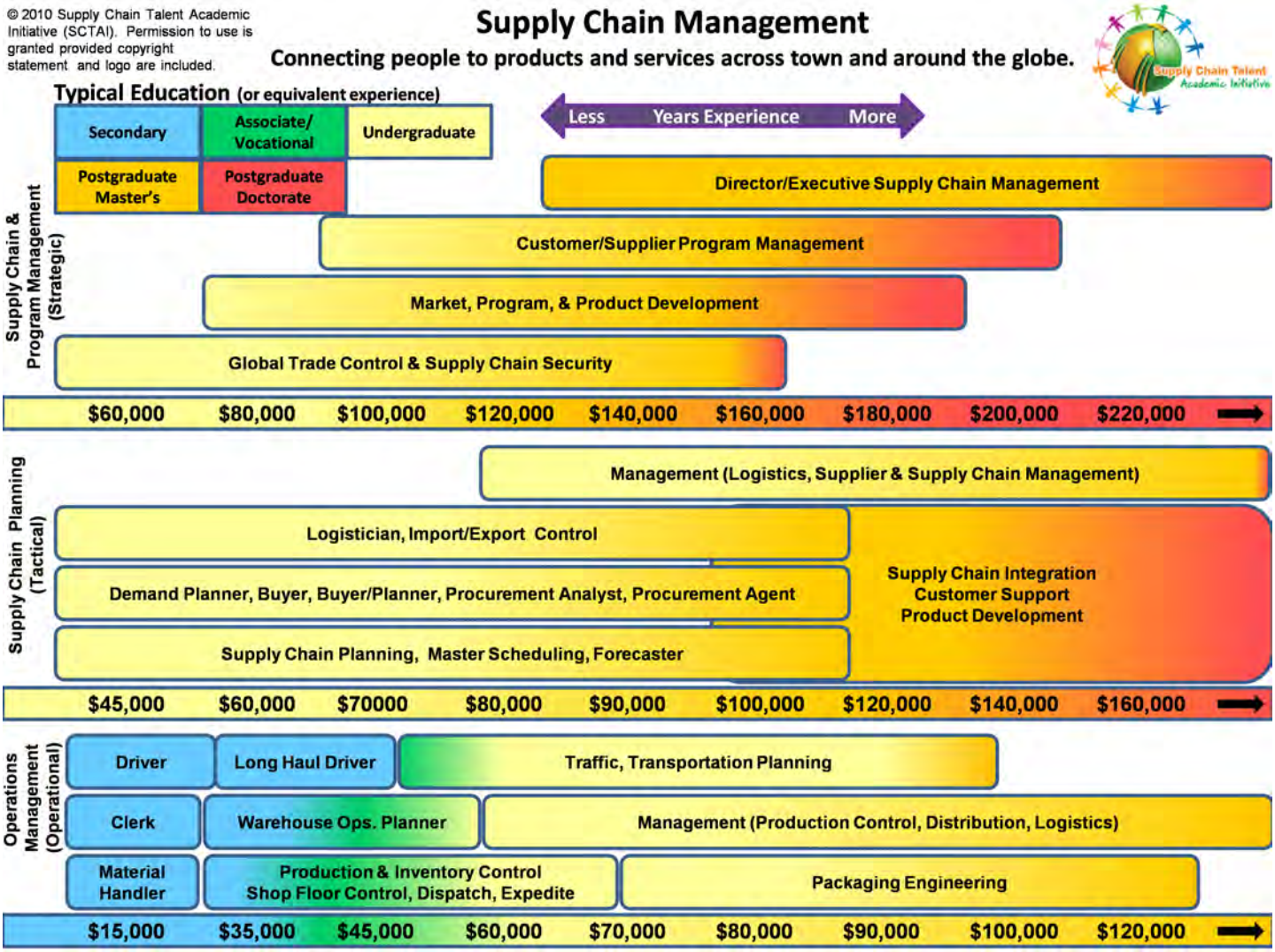
The SCTAI has put together the following graphics that provide yet another view of the range of skills and job titles held by the workforce we call logistics. Their use of the title "Supply Chain Management" is also an accurate and is a commonly exchanged name for logistics or logistics management.

The debate over "Logistics vs. Supply Chain" naming and description is ongoing and at the end of the day all refers to the movement of products to customers. Some experts believe that supply chain is the broader, more global framework, inside which logistics operates, but it is unclear where the dividing line exists, if there is one, and whether it really even matters.

The SCTAI takes this a step further and maps these job titles against ranges of salary, years of experience, and education level. Many other currently available studies support this wide range of job opportunities in logistics coupled with an equally broad span of educational requirements.

The work of the US DOL, SCTAI and others makes clear that not only is there a wide range of job opportunities, but the level of competency and expertise required within those jobs is increasing. As illustrated below, secondary and vocational training supply is a critical component of operational workforce, but only a small sector within the broader range of degree requirements needed to operate and manage today's complex supply chains.

SCTAI MODEL OF SUPPLY-CHAIN EMPLOYMENT FLOW



DEMAND SIDE OF THE EQUATION

The U.S. Department of Labor maintains multiple detailed databases of information spanning all aspects of just about every profession. This data includes Standard Occupational Codes (SOC) grouped into a broad category entitled "Transportation and Warehousing." However, the diversity and broad multi-industry reach of logistics is not lost on the federal government here either. This group includes occupations such as travel agents, limo and taxi drivers, bellhops, flight attendants, and ambulance drivers, which, though important, aren't really logistics jobs. This group also does not include jobs such as logisticians or industrial engineers, which really are relevant and necessary to include in a category that will represent logistics more precisely.

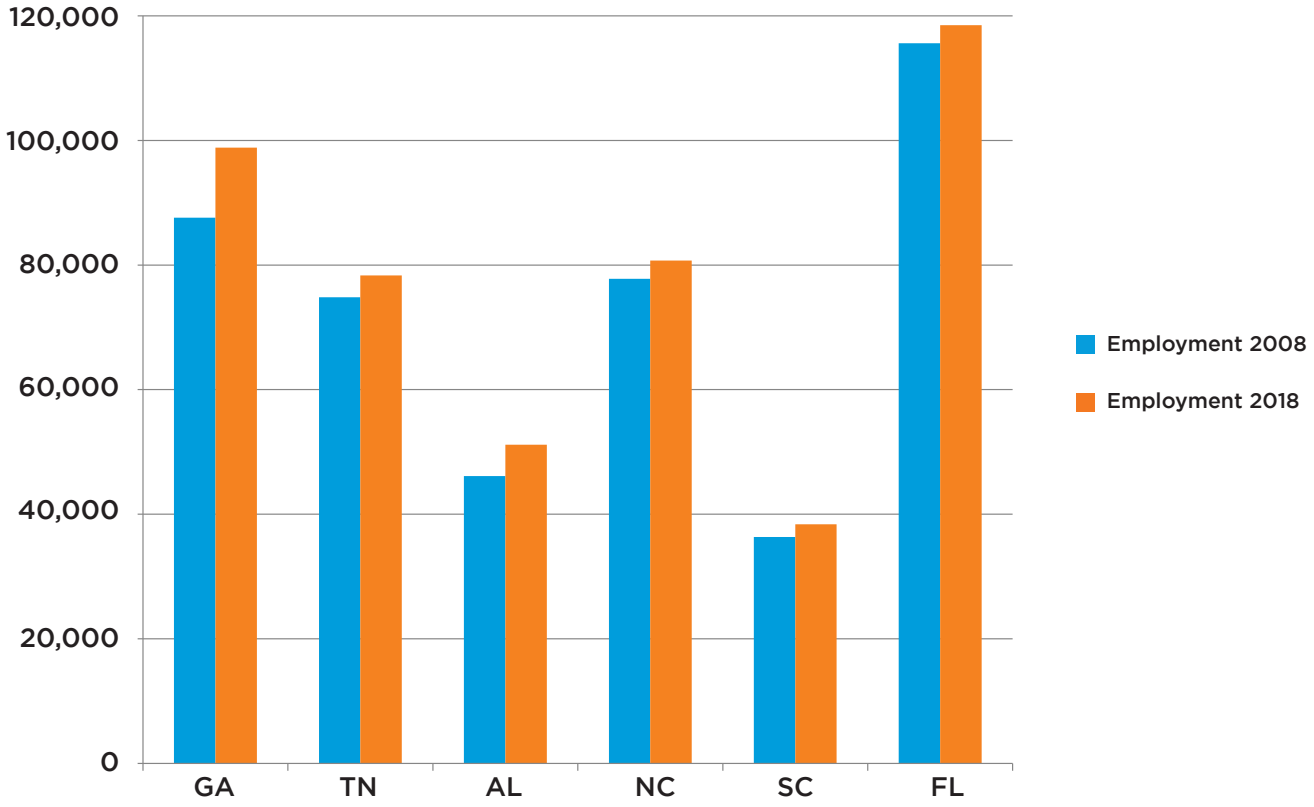
In light of this, for the purposes of this report the Georgia Center of Innovation for Logistics grouped together selected SOC codes into six new custom sub-categories especially created to more specifically represent the freight-related logistics industry. Most of the codes were already included within USDOL's larger "Transportation & Warehousing" category, but a few, like "Logisticians," had to be found and added from other industry groups. This complexity of the industry and how employment data is organized at the federal level is an area of opportunity and will be discussed again at the conclusion of this report. **These six custom sub-categories include Logistics Operations, Industrial Engineering, Warehouse & Distribution Labor, Trucking, Freight Rail, and**

Sub-Category	SOC #	SOC Title
Logistics Operations & Management	13-1081	Logisticians
	11-3071	Transportation, Storage, and Distribution Mangers
	43-5011	Cargo/Freight Agent
Industrial Engineering	17-2112	Industrial Engineers
	11-3051	Industrial Production Managers
	17-3026	Industrial Engineering Technicians
Warehouse & Distribution Labor	43-5071	Shipping and Traffic Clerks
	53-1021	First-Line Supervisors of Helpers, Laborers, and material Movers, Hand
	53-7062	Laborers and freight, Stock and material Movers, Hand
	53-6051	Freight and Cargo Inspectors
	53-7121	Tank car, Truck and Ship Loaders
Trucking	53-7051	Industrial Truck and Tractor Operators
	53-3032	Heavy and Tractor-Trailer Truck Drivers
	53-3033	Light Truck or Deliver Services Drivers
Freight Rail	53-4011	Locomotive Engineers
	53-4013	Rail Yard Engineers, Operators and Hostlers
	53-4031	Railroad Conductors and Yardmasters
Air Cargo Supervisors	53-1011	Air Cargo Handling Supervisors

Air Cargo Supervisors, and while representative of the freight-related logistics industry, are still just a sample of a larger overall occupation and employment set involved in logistics. For example, one key sector that is not represented here is logistics technology companies and their employees. Since software technology is its own SOC grouping, it is difficult, if not impossible to delineate only logistics-related software and hardware within the broader classification, since applications can support multiple enterprise functions. The Center has separately gone through this exercise for Georgia and found that logistics technology companies and this technology sub-sector contains 400 companies, including headquarters of two of the world's largest supply chain technology providers, Manhattan Associates and RedPrairie. However, these six sub-categories still serve as a comparable baseline illustrating projected future activity in the logistics industry across states, regions and sectors over time. As will be discussed in the supply side later in this report, these sub-categories also create an important linkage to the U.S. Department of Education's database of existing educational programs and their relationship to demand from industry.

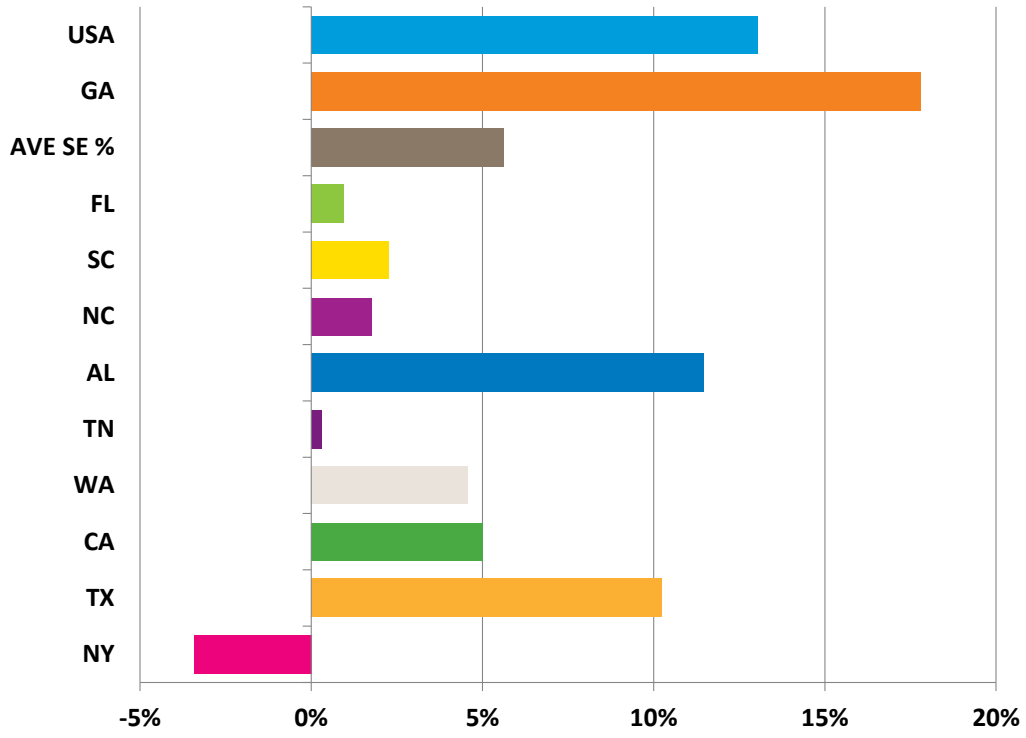
With the sub-categories established, the total employment projections across all six sub-categories were totaled for both 2008 and 2018 for the states in the Southeast (defined for this report as Georgia, Tennessee, Alabama, North Carolina, South Carolina, and Florida). This shows a range of total sub-category employment of about 38,000 to 118,000 across these states. The total sample of U.S. logistics employment referenced in the analysis totaled 2.25 million (in 2008). By comparison, previous research completed by the Georgia Center of Innovation for Logistics identified logistics employment of both logistics service providers and logistics-enabled companies to be more than 1,000,000 in Georgia alone, widening the gap even further between these sub-categories and real world practice.

PROJECTED TOTAL SOUTHEAST LOGISTICS EMPLOYMENT GROWTH: 2008-2018

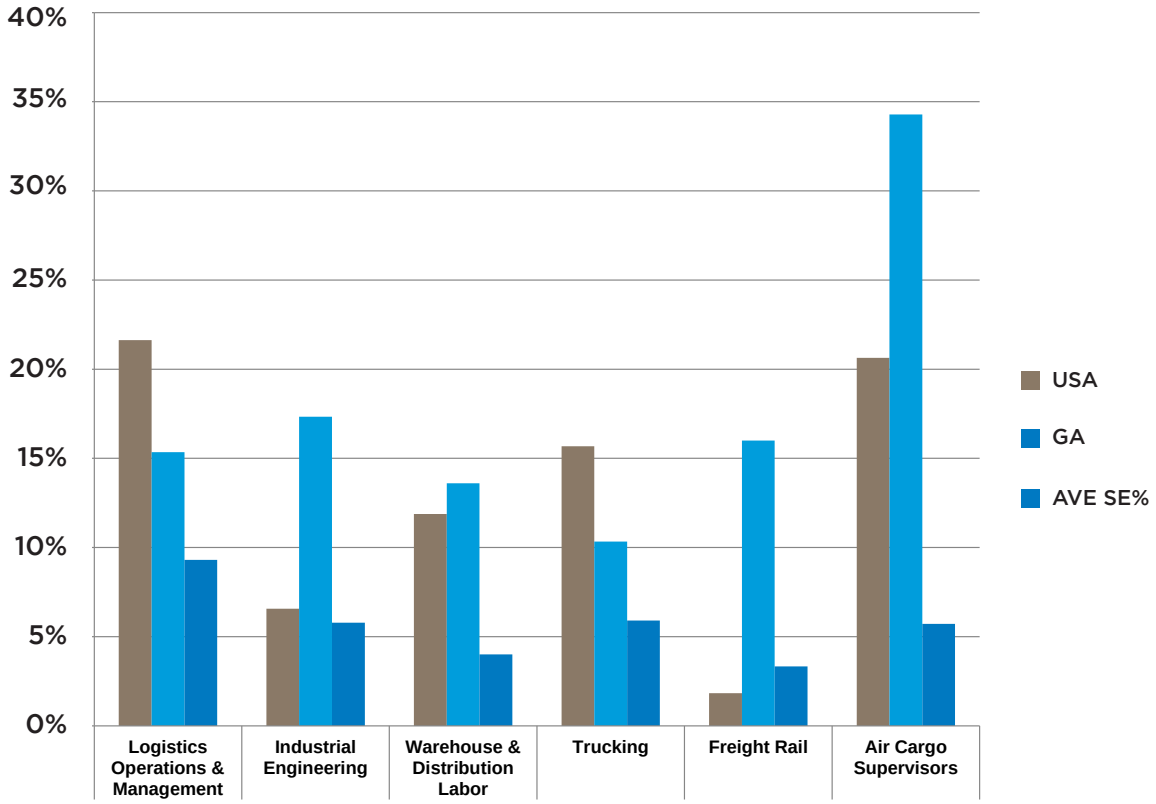


From a percentage perspective, Georgia's logistics employment is projected to grow 5% more than the US average (18% vs. 13%) and is projected to be nearly triple the Southeast average and far exceeds the growth of other leading seaport states of New York, Washington State, California and Texas.

PROJECTED AVERAGE EMPLOYMENT PERCENTAGE GROWTH BY STATE: 2008-2018

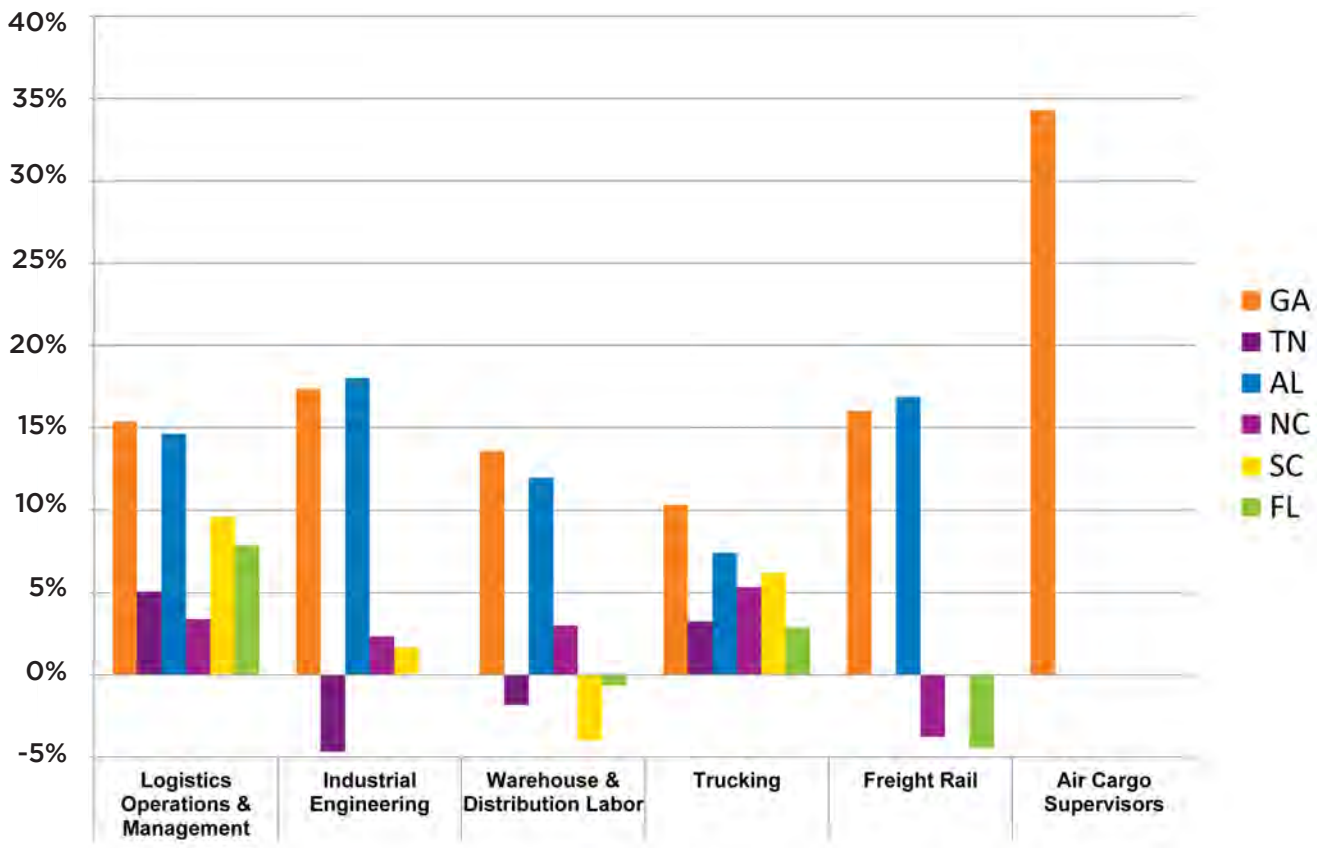


PROJECTED AVERAGE LOGISTICS EMPLOYMENT PERCENTAGE GROWTH BY CATEGORY: 2008-2018

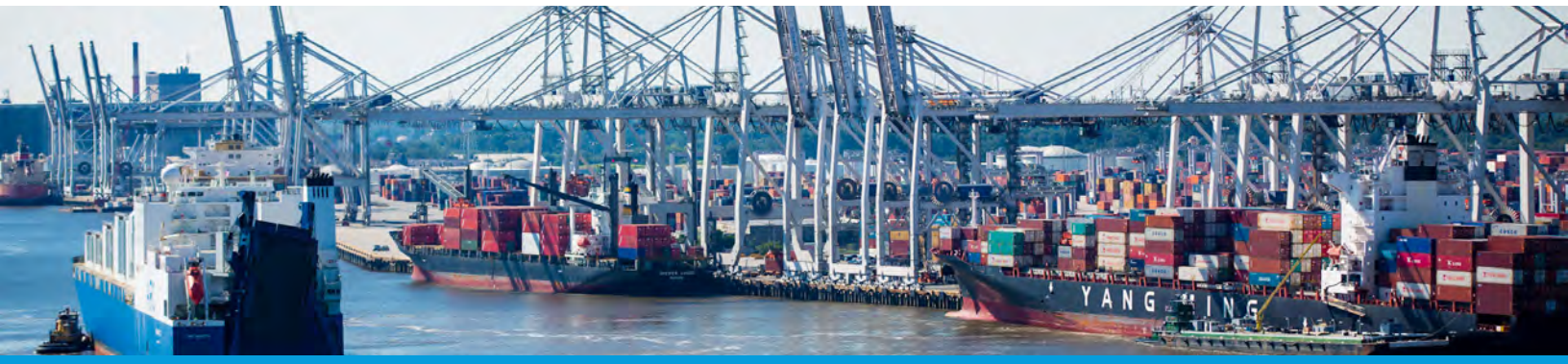


Not surprisingly, states have unique characteristics that set them apart from others; this data above illustrates this fact as well. For example, the data showed that Georgia far exceeds the U.S. and Southeast averages for projected employment growth in "Air Cargo Supervisors" and "Freight Rail," due to its Hartsfield-Jackson Atlanta International Airport and the largest rail hub in the Southeast. When compared state-to-state (below) Georgia lags slightly in the category of "Industrial Engineering" and also "Freight Rail" where Alabama leads the pack.

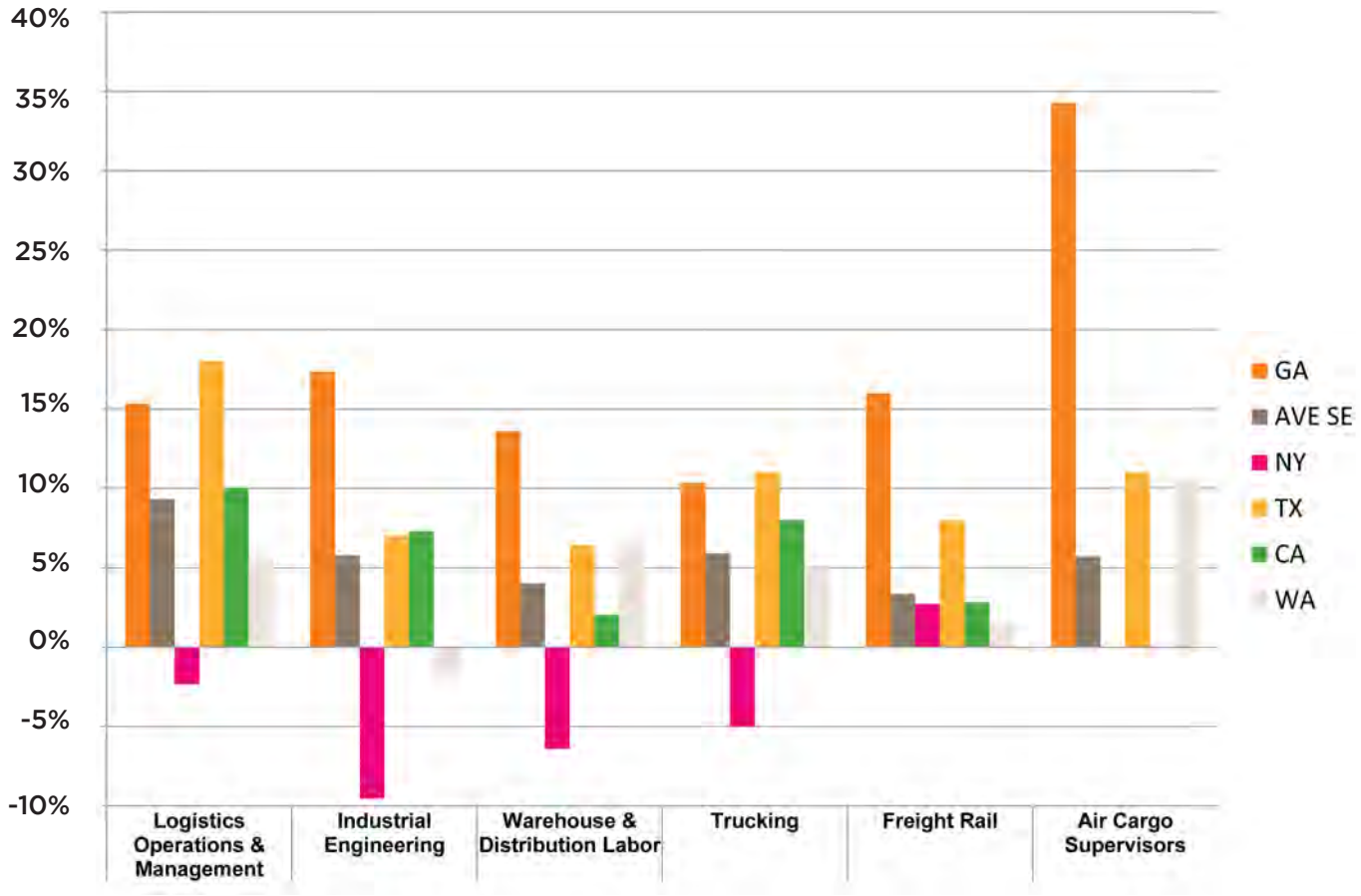
SOUTHEAST STATES PROJECTED EMPLOYMENT GROWTH: 2008-2018



For further comparison, if major seaport states like Georgia, New York, Texas, California and Washington are compared, it shows Texas is the leader in "Logistics Operations" growth and "Trucking." It is also interesting to note a trend of negative growth in four of the six categories for New York. Further research is required to explain this trend in more detail, as it likely has multiple explanations.



MAJOR PORT STATES PROJECTED EMPLOYMENT GROWTH: 2008-2018

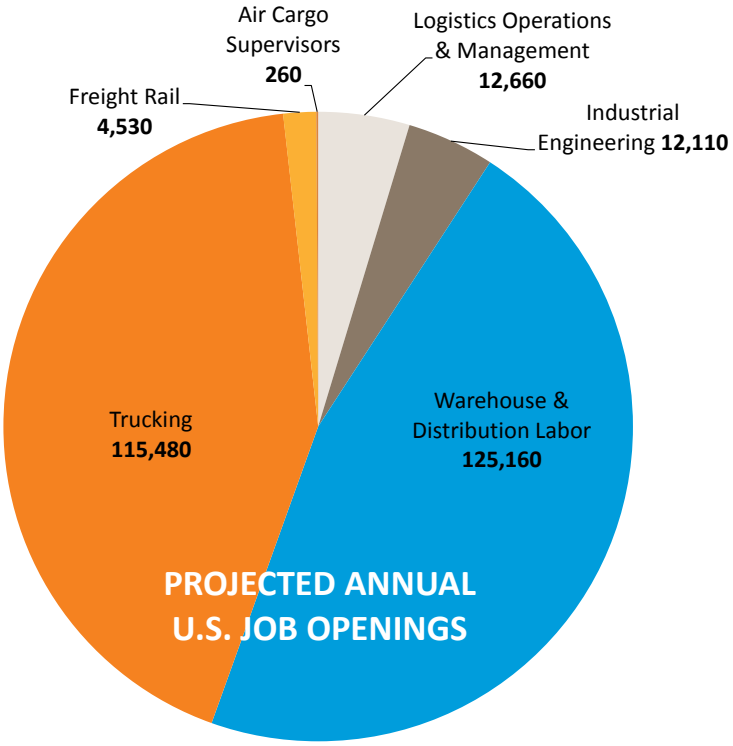


While these employment projections show one perspective of how logistics activity varies throughout the USA, it is not the whole story. Looking at Georgia for example, the data shown previously suggests projected total logistics employment growth of 18% by 2018. The numbers behind this percentage equal a total or net growth of about 11,000 employees. The reality is that business and workforce is more dynamic than just a simple subtraction problem. Every job is unique and has an associated level of turnover, and people also retire and switch jobs, in addition to the overall growth (or contraction) of the industry.

To represent this more complete demand picture, the USDOL also calculates a total of anticipated "job openings" per occupation using many of the factors mentioned above. This industry "need" calculation is an important measure showing a quantity of job opportunities that will need to be filled every year... or in other words, **demand**.

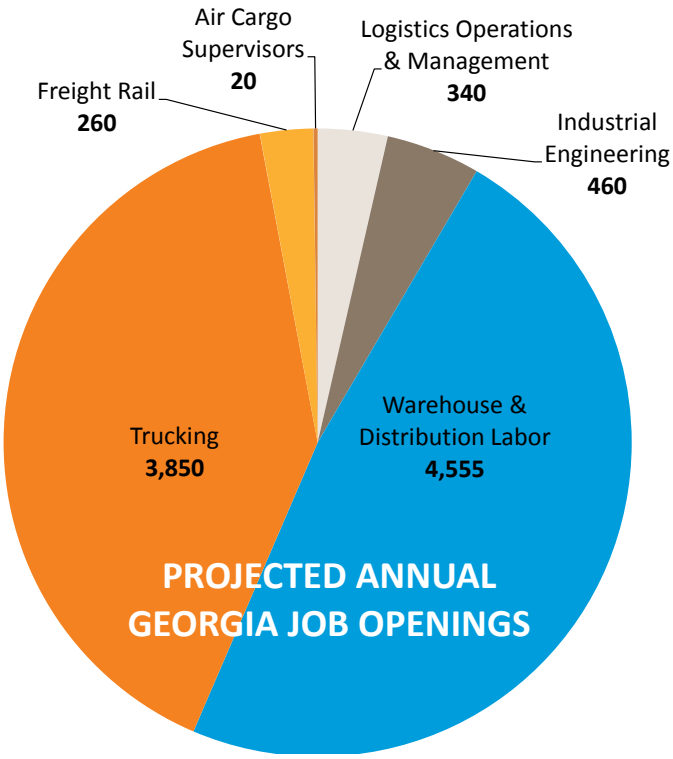
Using the same six sub-categories described earlier, the data was compiled to show the total annual job opportunities projected to be made available by industry. While every category has an equally important role in the overall operations of logistics and supply chains, there is an obvious difference in the distribution of the expected volume of workforce needed.

PROJECTED ANNUAL U.S. LOGISTICS JOB OPENINGS



Based on 2010 figures, the USDOL projects the U.S. to have approximately 270,200 total job openings that will need to be filled every year to keep up with the demand of projected industry growth. In Georgia, this equates to 9,500 job openings made available each year.

PROJECTED ANNUAL GEORGIA LOGISTICS JOB OPENINGS



SUPPLY SIDE OF THE EQUATION

With the demand side now quantified, we need to explore how these workforce needs will be met... or supply. More importantly and specifically, how the demand will be met with a workforce that has the needed training, skill sets, and certifications to keep up with the changing pace of the industry?

To start, we again look to the available national data, this time from the U.S. Department of Education (USDOE). This USDOE data uses Classification of Instructional Programs (CIP) codes to identify every certificate, class, or degree offered, and how many completions each educational institution generates every year nationwide. However, we are again faced with a similar challenge in easily identifying truly "logistics"-related CIP codes.

Using an established "crosswalk" table, the Standard Occupation Codes (SOC) used by USDOL and the USDOE's Classification of Instructional Programs (CIP) codes can be linked together, laying the groundwork to connect educational offerings with the jobs for which they provide workers. The list of correlated logistics educational offerings was then assembled according to the same six sub-categories used in the demand side discussion of this report.

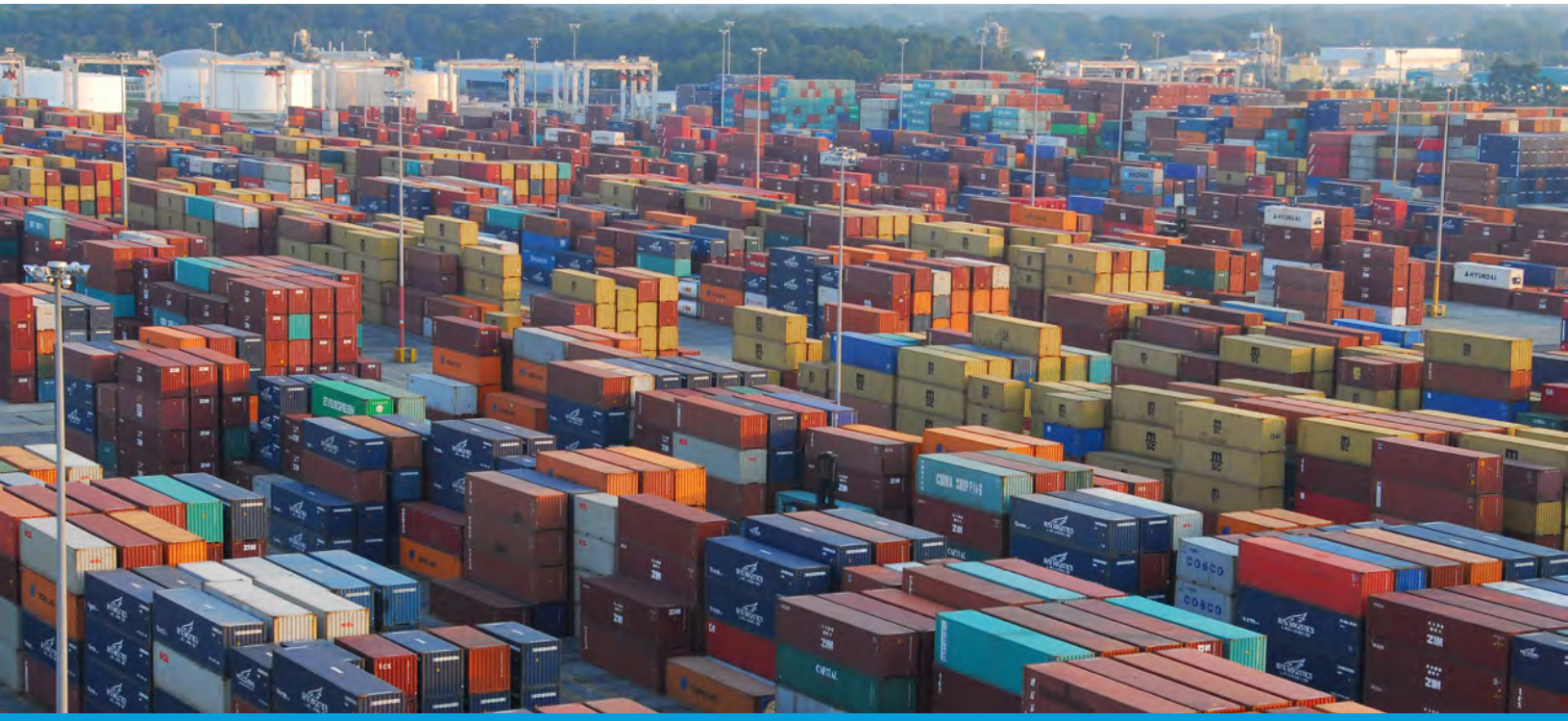
Sub-Category	CIP Code	CIP Title
Logistics Operations & Management	52.0203	Logistics, Materials, and Supply Chain Management
	52.0205	Operations Management and Supervision
	52.0209	Transportation/Mobility Management
Industrial Engineering	14.3501	Industrial Engineering
	15.0612	Industrial Technology
	15.0613	Manufacturing Engineering Technology
	15.0699	Industrial Production Technologies
	15.1501	Engineering/Industrial Management
Warehouse & Distribution Labor	49.0000	Transportation and Material Movement
Trucking	49.0205	Truck/Commercial Vehicle Operator and Instructor
Freight Rail	49.0208	Railroad and Railway Transportation
Air Cargo Supervisors	n/a	None Identified

These logistics education programs throughout the United States represent a vital supply line of workforce and will need significant attention, promotion, and resources in order to meet the healthy industry demand discussed previously. Similar to the demand side of this discussion, where multiple occupations needed to be removed and added in order to create more precise logistics sub-category totals, the same holds true for the educational supply side. Many individuals also enter the logistics workforce without the above listed certificates or degrees, specifically on the degree side where a large pool of general business degrees and bachelor's degrees fills some of this demand. This cross-pollination is not unique to logistics.

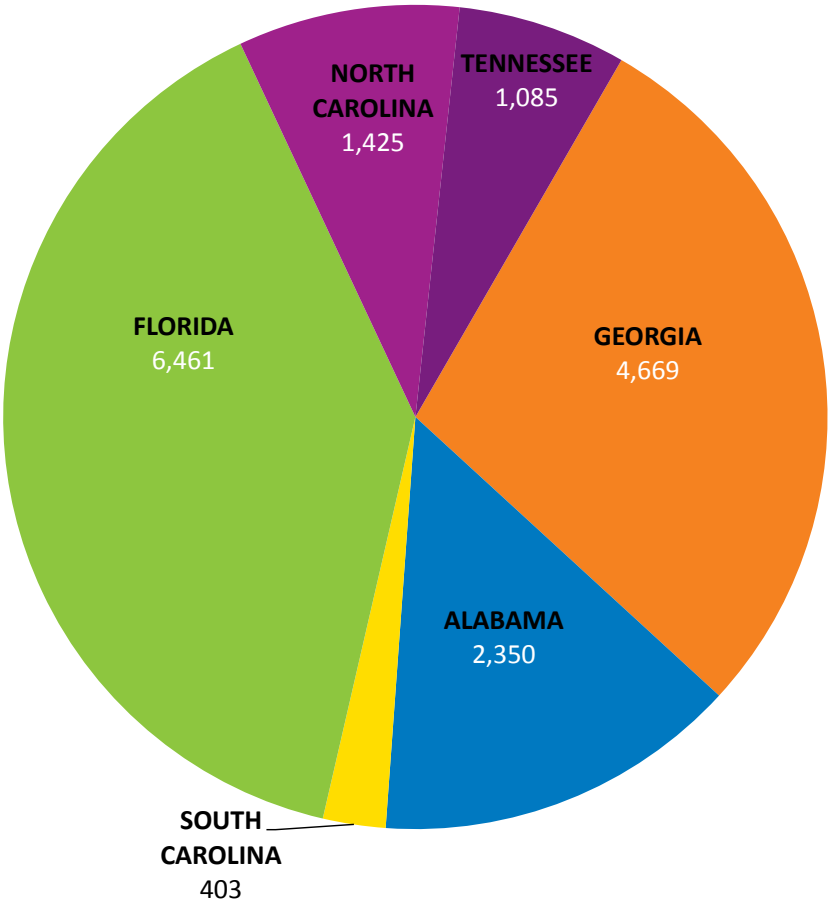
Sub-Category	Current Completion Totals					
	GA	SE	US	GA% of SE	GA% of US	SE% of US
Logistics Operations & Management	323	1,397	8,787	16%	3%	16%
Industrial Engineering	491	1,979	17,240	13%	2%	10%
Warehouse & Distribution Labor	1,943	7,332	32,654	27%	6%	22%
Trucking	1,912	3,742	16,596	51%	12%	23%
Freight Rail	0	0	162	0%	0%	0%
Air Cargo Supervisors	0	0	0	0%	0%	0%

The completions shown above refer to certificates and associates degrees from the technical college systems as well as bachelor's and graduate-level degrees from the nation's colleges and universities, currently totaling 7,642 educational establishments. This data was collected from the National Center for Educational Statistics, and are from 2010 school year; represent students completing their first degree/certificate; and includes all certificates and degrees through PhD.

The occupation category of "Air Cargo Supervisors" does not have a correlated educational degree or certificate associated with it. This does not mean it doesn't require a trained/certified workforce. The data just simply does not provide any numerical answers and will be left out for the rest of this discussion. Similarly, there is only one documented "Freight Rail" certification program of any significant size in the nation. Found at Johnson County Community College, in Overland Park, Kansas it generates 162 completions per year. This will also be left out of the rest of this supply and demand discussion.



SOUTHEAST DISTRIBUTION OF LOGISTICS EDUCATION COMPLETIONS



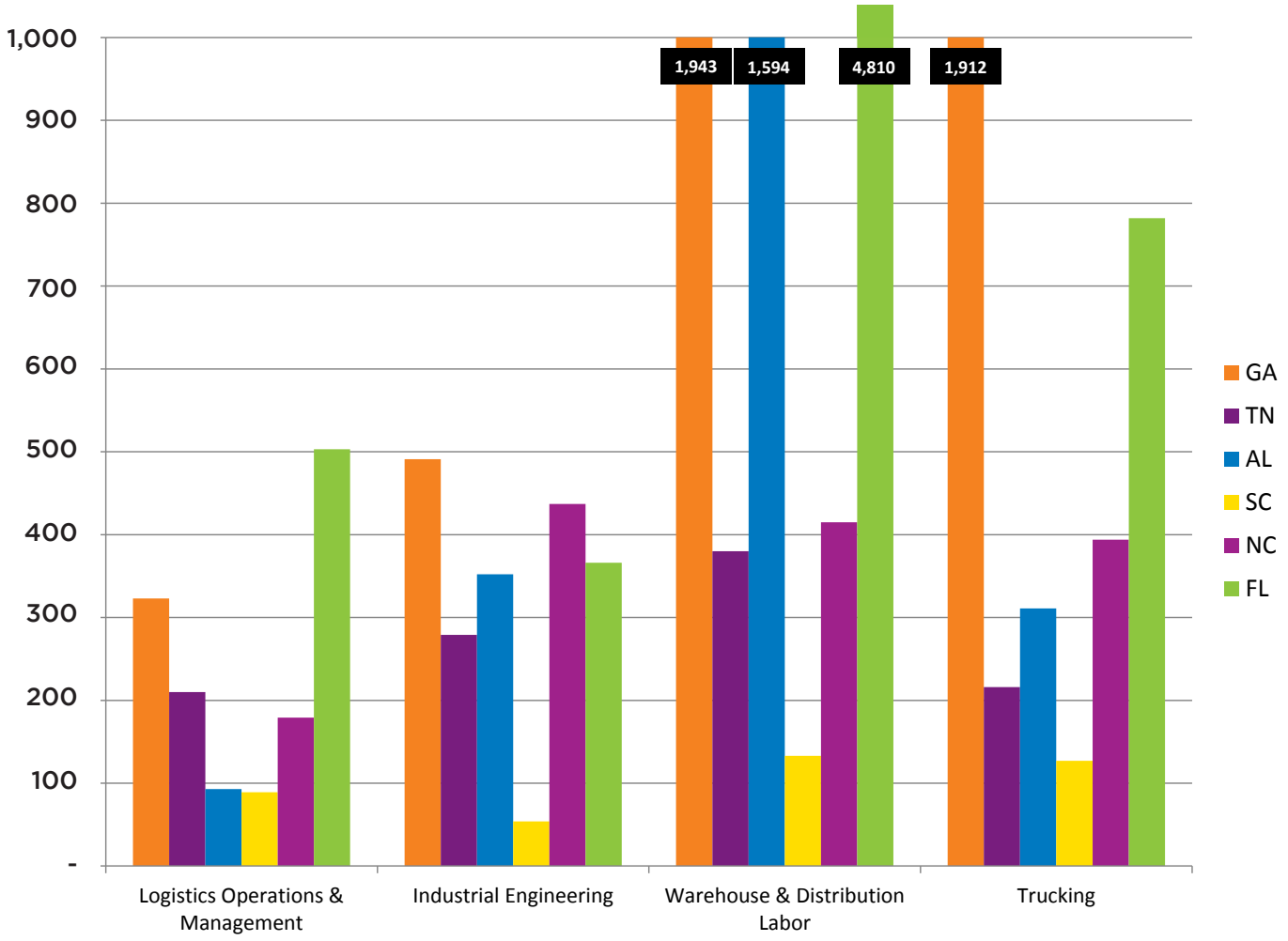
The demand side of this equation projected a demand of 270,200 job-openings per year, including 9,500 in Georgia. Compared to the current supply of trained workers shown above (75,200 in the U.S. and 4,670 in Georgia) means only about 28% of the job openings can be filled with specifically trained or certified workers. This leaves a noticeable gap in this critical supply and demand equation.

As the data is explored across each of the sub-categories totaled by state, a trend similar to the demand side of the equation appears. High volumes of trucking and warehousing completions, specifically of the certificate type (vs. degree) can be seen in Georgia, Florida, and Alabama. The detail behind many of these numbers is also interesting.

For example, the extremely high values in the "Warehousing & Distribution" category specifically for the state of Florida are almost completely attributable to Embry Riddle University. This university, headquartered in the state, has many online/virtual offerings but counts all of their worldwide completion totals in this one location. For this category, this totals 2,900 of the 4,810 completions for the entire state, many of which are workers not even located in the United States.

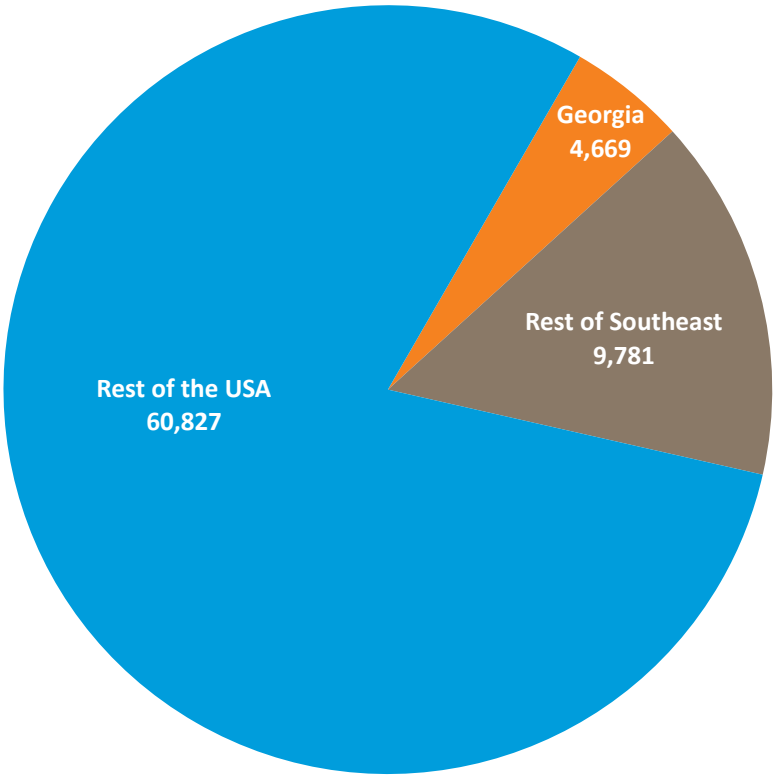
Another outlier worth mentioning regards Alabama, where similar in ratio to Florida, 1,281 of the total "Warehousing & Distribution Labor" completions are generated by one establishment. In the case of Alabama, this is the Air Force Community College whose completions are obtained by students located all over the world. While a great contribution to the overall industry, not truly attributable to Alabama as a potion of the available workforce.

COMPLETION TOTALS BY CATEGORY



Every year, Georgia issues more than 51% of all the truck driving certificates in the Southeast; this equates to one out of every eight for the entire nation. Georgia also provides 27% of the total sub-category supply, and 46% of the industrial engineers in the Southeast every year.

COMPLETION TOTALS BY REGION



CURRENT SELECTED PROGRAM RANKINGS

As previously noted, SCTAI's graphic of the education degree requirements for supply chain employment illustrates the increased need for higher levels of education in this industry. Nationally, there are numerous programs addressing this need for executive-level education in logistics and supply chain. Also of note, many advanced engineering programs address specific areas of expertise in supply chain design and warehouse and distribution operations for example, but are not captured in the rankings of Supply Chain Management and Logistics Degree programs.

U.S. News and World report ranks the top logistics degrees in the country. There are two different rankings, one for colleges and one specifically for grad schools. The following tables present those rankings, as well as a brief summary of the logistics degrees offered by each institution.

COLLEGES – SUPPLY CHAIN MANAGEMENT/ LOGISTICS RANKINGS		
1	Michigan State University	• B.S. in Supply Chain Management • Graduate Programs
2	Massachusetts Institute of Technology	• Graduate Programs
3	Pennsylvania State University	• BABS in Supply Chain and Information Systems • Undergraduate minor in Supply Chain and Information Sciences and Technology Graduate Programs
4	Arizona State University	• B.S. in Supply Chain Management • Graduate Programs
5	Ohio State	• BSBA in Marketing and Logistics • Graduate Programs
6	Carnegie-Mellon University	• Graduate Programs
7	University of Tennessee	• BSBA in Logistics and Transportation • Graduate Programs
8	Purdue University	• Major in Distribution and Dispatching • Graduate Programs
9	University of Maryland	• BS in Logistics, Transportation and Supply Chain Management
10	University of Michigan	• Graduate Programs

GRAD SCHOOLS – SUPPLY CHAIN/LOGISTICS		
1	Massachusetts Institute of Technology	Nine-month Master's of Engineering in Logistics (MLOG); The MIT-Zaragoza Master's of Engineering in Logistics and Supply Chain Management (ZLOG, held in Spain); dual degree within international MBA; PhD, engineering systems division
2	Michigan State University	Master's of Science in Supply Chain Management (MSSCM); full-time MBA with supply chain concentration; PhDs in supply chain management and logistics; Executive MBA with SCM classes
3	University of Pennsylvania	Full-time MBA with dual major in marketing and operations management; executive MBA, PhD in operations and information management
4	Carnegie-Mellon University	MBA with operations and strategy Management track includes supply chain; international MBA with global enterprise management track including operations (supply chain and manufacturing); Phd in manufacturing and operating system
5	Pennsylvania State University	Master's in Manufacturing Management (University Park campus); full-time and executive MBAs with supply chain management courses (Philadelphia campus); PhD in Supply Chain and Information Systems
6	Arizona State University	MBA with supply chain management specialization
7	Ohio State	Master's in Business Logistics Engineering (MBLE); full-time MBA with operations and logistics management concentration; PhD in logistics
8	Stanford	PhD Operations, Information, and Technology Courses, Executive Education courses
9	Northwestern University	Master's of Management and Manufacturing (MMM); Executive MBA with supply chain management coursework
10	University of Tennessee	Full-time MBA and executive MBA programs with concentrations in logistics; PhD in logistics

INTERNATIONAL PROGRAMS

As difficult as it is to classify logistics education on a national level, doing so on a global level is exponentially so. The following list contains schools worldwide found on the AACSB website that offer a Supply Chain/Logistics program (7). Although AACSB does offer International accreditation, other organizations, such as The Foundation for International Business Administration Accreditation (FIBAA) and the International Assembly for Collegiate Business Education (IASBE) also offer business school accreditation on a global level.

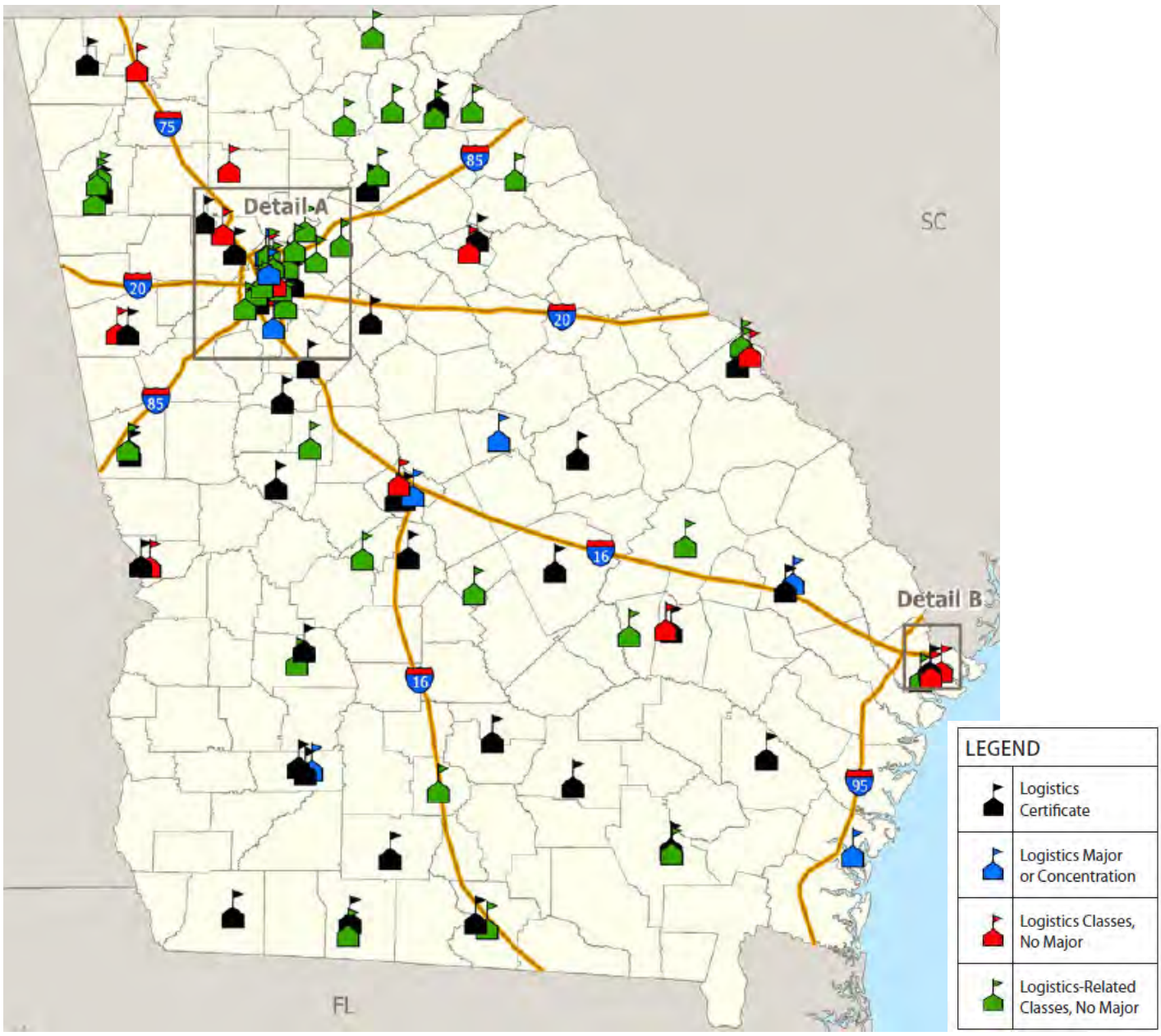
School	Country	AACSB Accred. Status
Sydney, University of, The University of Sydney Business School	Australia	Business & Accounting
University of Technology, Sydney, Faculty of Business	Australia	Business
Calgary, University of, Haskayne School of Business	Canada	Business
HEC Montreal	Canada	Business
Manitoba, University of, I. H. Asper School of Business	Canada	Business
Simon Fraser University, Faculty of Business Administration	Canada	Business
Université Laval, Faculte des sciences de l'administration	Canada	Business
Wilfrid Laurier University, School of Business & Economics	Canada	Business
City University of Hong Kong, College of Business	China	Business
Hong Kong Polytechnic University, Faculty of Business	China	Business
Audencia Nantes School of Management	France	Business
BEM Bordeaux Management School	France	Business
EMLYON, Lyon Graduate School of Business	France	Business
ESSEC Business School	France	Business

School	Country	AACSB Accred. Status
Pforzheim University	Germany	Business
University College Dublin, UCD Michael Smurfit School of Business	Ireland	Business
Maastricht University, School of Business and Economics	Netherlands	Business
Ljubljana, University of, Faculty of Economics	Slovenia	Business
Zurich University of Applied Sciences, School of Management	Switzerland	Business
National Chiao-Tung University, College of Management	Taiwan	Business
Bilkent University, Faculty of Business Administration	Turkey	Business
United Arab Emirates University (UAEU), College of Business and Economics	United Arab Emirates	Business
University of Dubai	United Arab Emirates	Business
Aston University, Aston Business School	United Kingdom	Business
Cranfield University, Cranfield School of Management	United Kingdom	Business
Hull, University of, Hull University Business School	United Kingdom	Business
Lancaster University, Lancaster University Management School	United Kingdom	Business

GEORGIA LOGISTICS EDUCATION INVENTORY

The Georgia Center of Innovation for Logistics recently completed an inventory of all the educational offerings related to the logistics industry in the state. This inventory included institutions that offered any level of logistics related class, certificate or degree and was then categorized appropriately. The categories used for this inventory were:

1) Logistics Related Classes/Majors
2) Logistics Classes – no major offered;
3) Logistics Certificate;
4) Logistics Degree – Major or Concentration;
5) Logistics Masters/PhD Degree.



Logistics Related Classes/Majors		
Abraham Baldwin Agricultural College	Gainesville State College	Morehouse College
Agnes Scott College	Georgia Gwinnett College	North Georgia College and State University
Armstrong Atlantic University	Georgia Perimeter College	Oglethorpe University
Atlanta Christian College	Georgia Piedmont Technical College	Paine College
Atlanta Metropolitan College	Georgia Southwestern State University	Piedmont College
Bauder College	Gordon College	Savannah River College
Brenau University	Gwinnett College	Shorter College
Brewton Parker College	Gwinnett Technical College	Thomas University
Brown Mackie College - Atlanta	Herzing College - Atlanta	Toccoa Falls College
Columbus State University	ITT Technical Institute	Valdosta State University
East Georgia College	Lagrange College	Waycross College
Emmanuel College	Life University	Westwood College
Emory University	Mercer University- Atlanta	
Fort Valley State University		Young Harris College

Logistics Classes - No Major		
Argosy University - Atlanta	Kennesaw State University	University of West Georgia
Augusta State University	Macon State College	Wesleyan College
Dalton State College	Reinhardt College	University of Phoenix
Georgia State University	University of Georgia	Mercer University

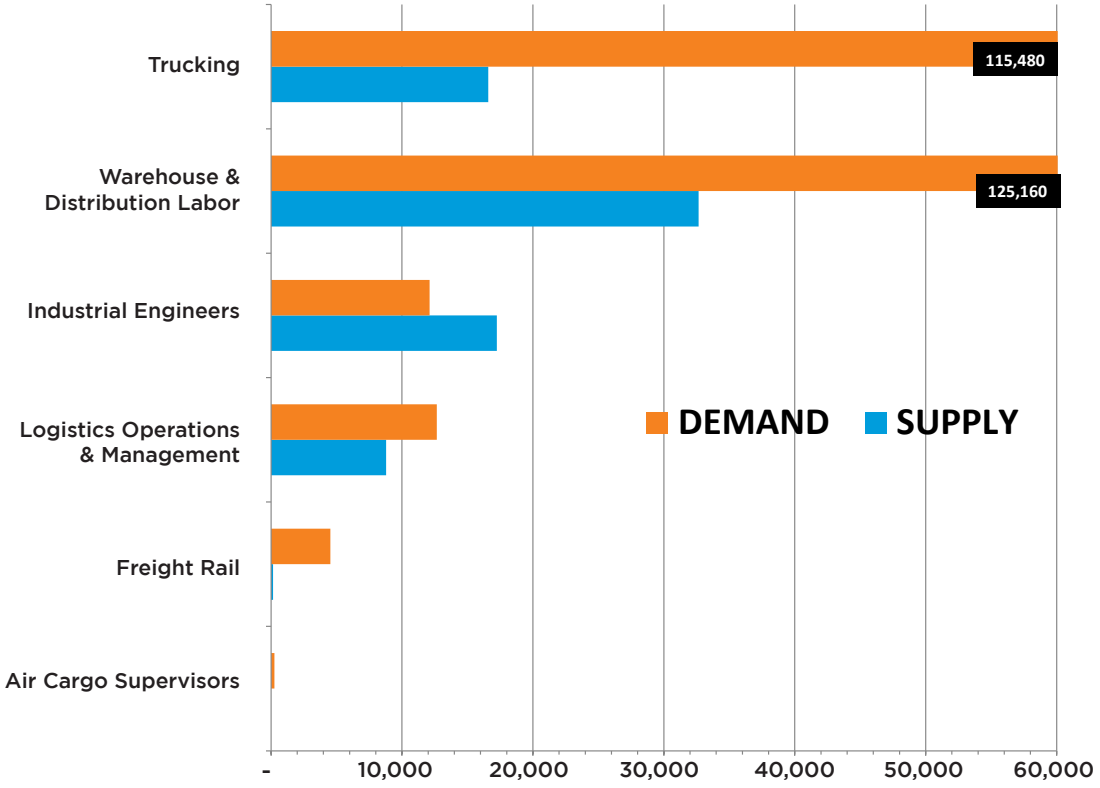
Logistics Certificates		
Albany Technical College	Dekalb Technical College	Savannah Technical College
Alliance Tractor Trailer Training Center	Devry University - Georgia	South Georgia College
Altamaha Technical College	Georgia Northwestern Technical College	South Georgia Technical College
Athens Technical College	Lanier Technical College	Southern Crescent Technical College
Atlanta Technical College	Middle Georgia Technical College	Southeastern Technical College
Augusta Technical College	Moultrie Technical College	Southwest Georgia Technical College
Bainbridge Technical College	North Georgia Technical College	Wiregrass Georgia Technical College
Chattahoochee Technical College	Oconee Fall Line Technical College	
Columbus Technical College	Ogeechee Technical College	
Darton College	Okefenokee Technical College	

Logistics Major Or Concentration		
Albany State University	Clark Atlanta University	Middle Georgia College
American InterContinental University-Buckhead	College of Coastal Georgia	Savannah State University
American InterContinental University-Dunwoody	Georgia College and State University	South University
Central Georgia Technical College	Georgia Military College	Southern Polytechnic State University

Logistics Masters Or Ph.D.		
Embry Riddle - Masters	Georgia Institute Technology – PhD	Georgia Southern University - PhD
Clayton State - Masters		

THE BOTTOM LINE

As difficult as it is to classify logistics education on a national level, doing so on a global level is exponentially so. The following list contains schools worldwide found on the AACSB website that offer a Supply Chain/Logistics program (7). Although AACSB does offer International accreditation, other organizations, such as The Foundation for International Business Administration Accreditation (FIBAA) and the International Assembly for Collegiate Business Education (IASBE) also offer business school accreditation on a global level.



The difference between this supply and demand of trained workers determines the shortages the industry will potentially face every year, and the numbers are impressive. **In total the completions being generated from U.S. education institutions would fill about 28 percent of the expected job-openings every year.** The question is how to bring these supply and demand numbers closer to equilibrium by raising the supply side of the equation.

	Annual National Shortage	Annual Georgia Shortage
Logistics Operations & Management	3,873	17
Industrial Engineering	+5,130 (surplus)	+ 31 (surplus)
Warehouse & Distribution Labor	92,506	2,612
Trucking	98,884	1,938
Freight Rail	4,368	260
Air Cargo Supervisors	260	20

These sub-categories are again a representative sample of a larger pool of logistics employment opportunities. For example, experts say a nationwide shortage of truck drivers could be closer to 120,000 and could balloon to more than 240,000 by the end of next year and could present a shortage of 600,000 by 2016. This particular mass shortage is not new, and stems from an expected 100% turnover rate to continue in this part of the industry.

IDEAS FOR INCREASING SUPPLY:

1)Documentation of logistics as an independent industry sector
a. Federal data level (USDOE, USDOL, USDOC)
b. State level (Economic Development, Dept. of Transportation)
Delineating Supply Chain and Logistics as a set of standard occupational codes would serve to more appropriately spotlight the workforce needed in this industry. Currently, disparate data is collected and found within the categories for manufacturing, transportation and warehousing. However, this prevents a true picture of the interconnected workforce needed in today's global economy and supply chains.

2)Earlier visibility of logistics in the education process.
a. Specifically in technical/career high schools.
b. Introductory logistics classes as options in the core college curriculum.
Educators consistently mention that students should be given a more thorough introduction in logistics related careers earlier in the process at both the high school and college levels. Professors repeatedly cite interactions with college-level students who have their first exposure to a logistics class in their junior year, find it interesting and appealing as a career choice, but feel they are too far along in their current field of study to make a change and delay graduation. Likewise, many high school level programs for career pathways either do not include logistics and transportation at all or rely solely on an automotive class to somehow provide introduction in logistics.

3)Enhanced opportunity for internships specifically aimed at providing real-world logistics experiences.
a. Facilitate greater communication and collaboration between educational institutions and logistics enabled businesses to provide more and meaningful internship opportunities. This requires understanding the needs of the businesses within a reasonable radius of a university/college and ideally establishing a recurring position that allows better matching of students with opportunities.

4)Better coordination and support for technical colleges
a. Showcase existing collaboration and articulation agreements with higher education institutions.
b. Increase funding and scholarship availability for students attending technical colleges.
Technical colleges are often overlooked due to the lack of scholarships and financial incentives available for traditional colleges. Increased scholarship opportunities can boost the awareness of technical education as a tremendous opportunity for reaching a career goal. Technical schools often time have articulation agreements with higher education institutions allowing for smoother transition between high school and college as well as beyond high school for those who need retraining to take advantage of new job opportunities.

5)Reduced or eliminated hurdles for military personnel transitioning into civilian life
a. Leverage training and certificates already received to achieve certifications related to logistics
Many veterans returning from deployment have already received highly skilled training in logistics related fields that are easily transferable to civilian jobs. Acknowledging the relevance of this training through accelerated certification and licensing will help capitalize on this valuable labor pool while skills and experience are still fresh.

6)Enhanced marketing and promotion of the entire spectrum of logistics education.
a. This would complement existing degree and graduate level school rankings.

SUMMARY

Gathering the data around logistics related supply and demand is inherently difficult due in part to the vast number and often disparity between job codes and instructional program classifications. With the growing complexity in supply chain management, it is vital that we examine this supply and demand equation and determine a path toward closing the gap.

Mining the data for a simple sub-set of logistics related jobs as outlined in this report has shown the impending gap between workforce demand and our ability to meet that demand. Add to that the anecdotal evidence of greater workforce needs directly impacting logistics and you quickly see how broad and far reaching the impacts to supply chain can be. As an example, about **460,000 new airline pilots** will be needed over the next 20 years to fly the world's aircraft according to a study by Boeing. Additionally, the study projects that more than **600,000 maintenance technicians** will be needed. Considering that air cargo currently accounts for about 10% of global air operations, between 45,000 and 50,000 pilots would be needed to fly all-cargo aircraft between now and 2031. During the same period, global air cargo is expected to **grow 5.2%** a year.

As with air cargo, much of the supply side data doesn't even exist to show if we are or are not meeting the education needs required for logistics in manufacturing and all other modes of transportation. A positive first step would be to establish a standard for logistics industry measurement and data collection that is consistent at the federal and state level.

SOURCE MATERIAL FOR REPORT

From page 7:
[1]Pohlen, T.L., 2011, "Meeting the Challenge of Educating the Transportation and Logistics Professional". Transportation Journal, 50(1), pp.84-90
[1]"New masters degrees for the future masters of a new age", 2008, Logistics & Transport Focus, 10(1), pp. 6

From page 22:
[1]"Supply Chain/Logistics", 2011, US News and World Report, from http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-business-schools/logistics-rankings
[1]Terry, L., 2007, "Back to School? Start Your Search Here". Inbound Logistics, from http://www.inboundlogistics.com/cms/article/back-to-school-start-your-search-here/
[1]From https://datadirect.aacsb.edu/public/profiles/search.cfm#results

Main "Demand Side" USDOL Source:
http://www.onetonline.org/find/industry?i=48

Main "Supply Side" USDOE Source:
http://nces.ed.gov/ipeds/datacenter/