Labor Market Analysis for Information Technology and Advanced manufacturing

INTRODUCTION

The Greater Pensacola Chamber, in late 2013, commissioned a regional study of the talent supply situation as it related to critical industry clusters within the Pensacola area economy. Over the course of the intervening months, dozens of businesses and individuals, as well as regional education institutions convened together to a) analyze current and future market demands; b) determine how best to meet those demands and c) structure a pathway forward that would encourage regional education/training providers to align themselves to key market needs and close the gap between industry workforce needs and local training/education outcomes.

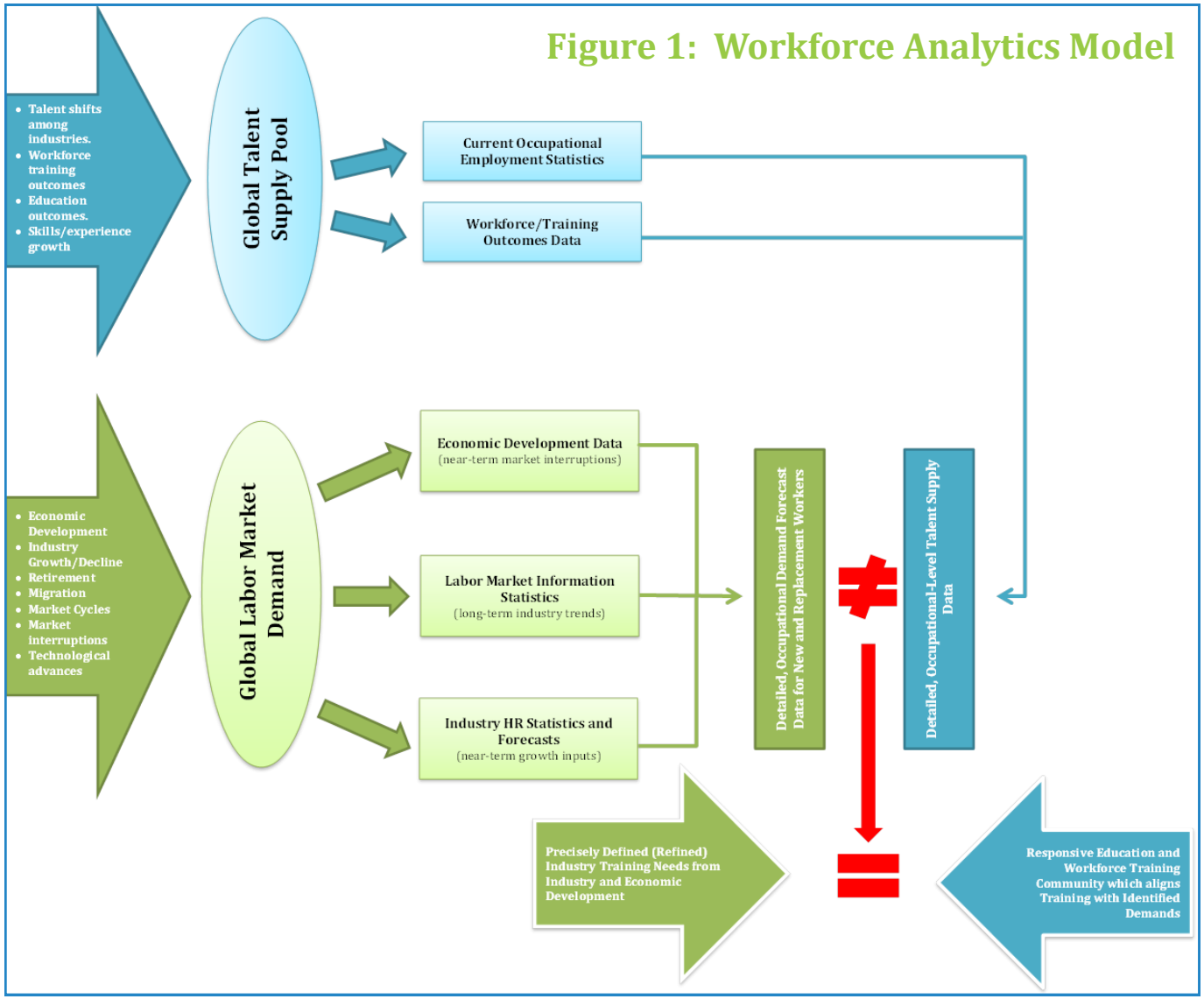
The process began with the Chamber workforce committee examining high-level data which provided them with a holistic overview of labor market outcomes in the region as those outcomes related to Pensacola's targeted industry clusters. Based on an in-depth analysis of the talent supply situation as well as market forecasts related to each industry cluster, the Chamber elected to pursue an in-depth analysis of two key industry clusters: Information Technology and Advanced Manufacturing (as defined in Appendix C). These clusters were chosen because they are high-impact clusters which offer substantial benefits to the community in terms of economic impact and wage earnings and they suffer labor shortages which, if not corrected could potentially stunt economic development in the region.

PROJECT LEADERSHIP

- **University of West Florida's Haas Center for Business and Economic Research**
- **Greater Pensacola Chamber**
- **CareerSource Florida**
- **Gulf Power Company**

Workforce Analytics Process. Once the clusters were identified, the Chamber implemented a well defined process that would allow them to hone in on the key critical skills/occupations that were in short supply but high demand and identify the types of programs that would ensure that those gaps could be closed. We highlight the model of this process in Figure 1.

Figure 1: Workforce Analytics Model



Global talent supply, in the model, is a function of several processes: shifting talent demands among industries which free up talent, workforce and education training outcomes and the growth in skills and experience among existing workers. These various elements manifest themselves in two critical data series: Current Occupational Employment Statistics which indicate the

current skills base of the workforce and Workforce/Training Outcomes Data which indicate, at a general level, who is currently being trained with what skills for which occupations.

On the other side, global labor market demand is a function of number of activities including economic development/industry recruitment, industry growth or decline, retirements, migration patterns, market cycles and technological advances. Demand elements manifest themselves in three data series which include data provided by economic development professionals which forecasts which industries will be recruited to the region, industry-level human resource statistics which offer detailed projections of skills demands as well as occupational demands and labor market information statistics which forecast longer-term growth patterns based on traditional industry structures. These traditional and non-traditional data series combine to paint a detailed picture of skills and occupational demands for a labor market.

When supply and demand are roughly equal, and when industry, economic development and education/workforce training partners are comfortable with available talent as well as available talent production, then the system is in balance. However, when this is not the case the system must be adjusted. Severe over-production of talent in certain fields can lead to unemployment problems for trainees because you have too many workers chasing too few jobs. Underproduction, on the other hand, can stunt industry and economic growth and lead to long-term labor shortag-

es. A realignment, in these cases, is critical in order to ensure that sustained economic growth and development can continue to occur in the regional market.

The process adopted by the Pensacola Chamber involved dozens of industry and education experts who gathered to feed data into the model at the appropriate points. This included economic development experts who estimated occupational/skills growth patterns based on industry recruitment, a diverse array of companies who provided vital data from the human resources perspective coupled with their medium-term growth forecasts and workforce data analytics experts who added traditional labor market information statistics to the mix. Once the critical gaps were identified at a high level based on these data inputs, participating industry professionals returned to the table to flesh out the types of skills upgrades that were necessary to close those gaps. The end result was a clearly defined picture of workforce/education training needs in the sectors of information technology and advanced manufacturing for the Pensacola regional economy.

The process also involved separate, but parallel meetings of the education/training community who, informed by their internal knowledge of education/training practices, attempted to identify program modifications which were necessary to meet the talent requirement of local industry. These two processes merged in the end with economic development and industry experts coming together with workforce training and education providers to chart a course towards the future. In the two sections that follow, we highlight key data relevant to each of the two industry clus-

ters, identify the overarching outcomes of the workforce analytics process for each of the two clusters and we also present the recommendations that were agreed upon by the industry and education participants at the final joint meetings. We begin with the Information Technology Cluster.

INFORMATION TECHNOLOGY

Cluster Overview: The Information Technology cluster is unique in that it serves as a solid foundation for nearly all high-impact, high-wage industry clusters present in the modern economy including healthcare, financial services, call centers, government, etc. We consider the IT cluster as a "super cluster" which encompasses the following traditional clusters: Back Office/Professional Services; Research and Development in IT and Cybersecurity. Because the skill sets relevant to these particular clusters overlap significantly coalesce around the IT talent pool, these clusters were combined under the banner of the IT cluster.

Cluster Outlook: The outlook for the information technology cluster, on a global level, is exceedingly strong with rapid sustained growth forecast across the broader economy. The Pensacola area has been a beneficiary of these growth patterns. We outline past growth patterns and future industry recruitment projections as provided by the Pensacola Chamber below:

- **Since 2010:** 7 announced projects in the cluster; 440 net new jobs (IT); 2,581 net new jobs (contact center/financial services/3rd party administrator); 315 retained jobs
- **Currently:** 3 active existing industry expansion projects; 20 net new jobs

Information Technology Cluster Industry Experts:

- Silver Bullet
- AppRiver
- SpectrumIT
- Internet Solutions
- CollegeFrog
- IHMC
- Verteks Consulting
- Navy Federal Credit Union
- Santa Rosa Medical Center
- AT&T
- Baptist Health Care System
- Global Business Solutions, Inc.
- Techsoft
- Digital Boardwalk
- Innovation Coast
- Apogee
- PayCellSystems
- iGate/CHCS

- ◊ **Currently:** 2 active attraction projects; 210 net new jobs
- ◊ **Calendar year 2014:** 2 requests for proposal; 8 net new jobs

Cluster Impact: Sustained growth in the IT cluster is critical not only to a diverse workforce and a high-tech economy, but also offers a significant wage premium relative to traditional Pensacola metro occupations. For example, the average earnings per job (defined in Appendix C) in the IT cluster is $70,667 per year for the Pensacola metro area (Escambia and Santa Rosa Counties). As a comparative example, the tourism dependent Accommodation and Food Services sector reports an average earnings per job figure of $17,962 —well below the IT cluster average. Average earnings per job across all job for the Pensacola metro area is $46,345. Thus IT cluster earnings are well over the metro average and exceed, by a wide margin, the Accommodation and Food Services sector average.

Cluster Workforce: The cluster is reliant on a number of occupations which form the backbone of the cluster. Industry representatives identified the 10 occupations/skills groupings presented in the top table to the right as "most critical" for the regional economy. These occupations translate roughly into the 7 standard occupations (as recognized by the Bureau of Labor Statistics) presented in the bottom table. Utilizing traditional supply demand analytics techniques, analysts discovered that the region will need approximately 752 individuals over the next five years to meet demand for the Pensacola metro. Net new demand resulting from economic development projects will add 340 to this total for a total demand off 1092. Education/training programs will produce approximately 1052 trained indi-

Industry Recognized Occupations in IT
Software developers and Programmers
Information Security
Network Administration/Security
Database Administration/Developers
Data Transformation/Analyst
Project Management
Desktop Support
Quality Assurance/Testing
Designer/User Experience (UX)
Electronics Engineering

Standard Occupations in IT
Computer Engineers
Computer Repair and Maintenance
Computer Systems
Digital Design
Electrical/Electronic Technology
Electrical Engineers
Electrical Installation and Repair

viduals with various baskets of skill sets to meet this need—however, there is a significant skills type mismatch between supply and demand. For example, the region is forecast to need roughly 119 digital designers over the next five years; however, local institutions will produce 282—an oversupply. In three critical areas—computer engineers, computer repair & maintenance and computer systems, the supply of available talent will fail to meet the demands of long-term growth and economic development opportunities. Moreover, for computer engineering, the nation-wide shortage of talent will make it extremely difficult to recruit these individuals to the region as well. Support for the IT cluster therefore requires a nuanced approach with significant funding devoted to attracting potential trainees towards areas of most critical need.

Key Findings And Recommendations:

1. ***Finding:*** Cross curricular opportunities are not occurring in skill areas of priority to industry.

   Recommendation: Programs in both graphical design and software programming need to cross train.

2. ***Finding:*** "Soft skills" such as problem solving and critical thinking can be further imbedded into existing student evaluations.

   Recommendation: Faculty implements skills such as problem solving and critical thinking into ***all*** assignments, projects and grading rubrics.

3. ***Finding:*** Industry strongly desires an external project based work and learn opportunity coupled with a mentoring component.

   Recommendation: Business leaders develop private apprentice program

for students centered on project/application learning that has a mentoring component. Convene task force to begin implementation.

4. ***Finding:*** Various adjustments need to be made to curriculum to align outcomes with industry needs.

   Recommendation: Amend and adjust curriculum to address industry relevance and demand. Specific curricular changes can be found in Appendix A.

ADVANCED MANUFACTURING

Cluster Overview: The Advanced Manufacturing cluster is considered, for the purposes of this analysis, to be a "super cluster" which encompasses aviation manufacturing and maintenance, offshore vessel services and the technologically evolving (and increasingly technologically dependent) traditional manufacturing clusters. It encompasses skills associated with traditional manufacturing such as craft labor but it also requires advanced skills beyond traditional manufacturing with overlap with IT and other critical occupational groups across the American economy.

Cluster Outlook: The Advanced Manufacturing cluster has, consistent with nationwide trends, experienced relatively flat growth over the past two decades. There are two explanations for these trends: the tendency of American companies to offshore production in order to reduce labor costs and the tendency of companies to leverage technological advances to replace human labor with mechanical labor. The latter trend will continue and will perhaps accelerate. The upside of the acceleration of technological advances will reverse the inclination to offshore and will result in jobs flowing back into the American economy. This trend is manifest-

Advanced Manufacturing Cluster Industry Experts:

- ARCO
- Arizona Chemical
- Armstrong World Industries
- Ascend Performance Materials
- Cerex Advanced Fabrics
- Custom Control Solutions
- ExxonMobil
- GE Wind & Energy
- Gulf Power Company
- Hitachi Cable
- International Paper
- K2 Mansfield Industrial
- Marianna Airmotive
- OffShore Inland
- OREN International
- Overhead Door
- Pensacola Energy
- Taminco
- The Mundy Companies

ing itself in economic development activity regionally. Below, we highlight economic development trends as reported by the Greater Pensacola Chamber for Advanced Manufacturing:

- **Since 2010:** 6 announced projects in the cluster; 207 net new jobs; 39 retained jobs
- **Currently:** 8 active existing industry expansion projects; 225 net new jobs
- **Currently:** 8 active attraction projects; 815 net new jobs
- **Calendar year 2014:** 5 requests for proposal; 755 net new jobs

Cluster Impact: The advanced manufacturing cluster currently accounts for 5,932 jobs over 320 establishments generating an earnings per job total of $68,635. As a comparative example, the tourism dependent Accommodation and Food Services sector reports an average earnings per job figure of $17,962 —well below the Manufacturing cluster average. Average earnings per job across all jobs for the Pensacola metro area is $46,345. Thus, Manufacturing cluster earnings are well over the metro average and exceed, by a wide margin, the Accommodation and Food Services sector average.

Cluster Workforce: The cluster draws from a substantial variety of occupations for its staffing needs ranging from civil engineers to welders. Industry cluster representatives identified the five occupational groupings presented in the table to the right which represent the key sources of demand over the next few years. The titles in bold are broadly descriptive of the skill sets that were defined by the industry. The five core occupational groups included Industrial Maintenance Techni-

Industry Recognized Occupations Advanced Manufacturing
Maintenance Technicians: Industrial Maintenance, Welding, Industrial Engineering Technicians, Aircraft/General Mechanics
Advanced Manufacturing Technicians: Instrumentation, Electrical, Mechanical and Technical, Programmable Logic Control, Motor Control, Electrical & Instrumentation/Controls
Process Technicians: Process operator, Process technologist, Machinist
Industrial Plumbing: Plumbing, Pipefitting, Industrial Piping, and Tubing Mechanics
Quality Assurance Technicians: Quality Assurance, Inspection, Statistical Process Control, Laboratory Technician

cians, Advanced Manufacturing Technicians, Process Technicians, Industrial Plumbers and Pipefitters and Quality Assurance Technicians. These broad categories of skill sets equate roughly to the eight standard occupations presented in the table on the previous page.

Over the next five years, total demand for new and replacement workers is forecast, in the eight critical occupations to the right, to total approximately 1,305 workers. Expanded economic development opportunities are forecast to add approximately 745 to this baseline for a total demand figure of 2,150 new and replacement workers. Regional education and workforce training programs are forecast to train 300. A substantial gap therefore exists between total workforce demand and total production of a trained workforce in the region - at least as it relates to the formal training structure.

Standard Occupations In Advanced Manufacturing
Aircraft Mechanics
Civil Engineers
Communication Electronics
Electrical
Installation, Maintenance and Repair Workers/ Industrial Machinery Repair
Metal, Plastic and Machine Work
Plumbing
Welding/Soldering

Key Findings And Recommendations:

1. ***Finding:*** Three key training programs should be implemented to meet industry demand.

   Recommendation: Develop task forces to research and implement best practices/programs, industry certifications, resources needed and curriculum for the following training programs at the post-secondary level:

   - Process Technician
   - Electrical & Instrumentation
   - Industrial Maintenance (Millwright)

2. ***Finding:*** The Pensacola MSA has an overproduction of training programs

that are taught in a silo. Most jobs in manufacturing require a cross-cutting skillsets and only a small portion of these positions are focused on solitary crafts such as welding or electrical..

Recommendation: Evaluate programs at George Stone Technical Center, Locklin Technical Center and Pensacola State College such as welding and electricity to analyze duplication and develop multi-craft or cross discipline training programs to meet industry needs.

3. ***Finding:*** Various adjustments need to be made to curriculum to align outcomes with industry needs.

   Recommendation: Amend and adjust curriculum to address industry relevance and demand. Specific curricular changes can be found in Appendix A.

SUMMARY

The exercise of walking the Greater Pensacola community through the workforce analytics model from the stage of selecting which target industries and skills to include in the analysis through the process of refining and defining those skill sets to suit the needs of industry resulted in substantial business, education and community engagement. The process led to the high-level findings highlighted in this executive summary and the more granular curriculum changes outlined in the Appendix. The conclusions in this document are supported by data provided by the participating experts, the education partners and the experts who provided secondary data analysis on market and workforce trends and outcomes. A further description of data sources and methodologies can be found in Appendix B. For further details on the underlying data and tables, please contact UWF's Haas Center for Business and

Participating Education Partners:

- Escambia County School District
- Santa Rosa County School District
- George Stone Technical Center
- Locklin Technical Center
- Pensacola State College
- University of West Florida

Economic Research.

As participants reflected on the process (as compared to the outcomes) additional process-related findings and recommendations arose which we present below:

1. ***Finding***: Continual primary data collection from business and industry partners is needed to maintain an accurate outlook of demand.

   Recommendation: Survey business and industry partners annually on future workforce needs in key occupational clusters to determine the following:

   - ⇒ Certifications desired or required
   - ⇒ Current vacancies
   - ⇒ Net new jobs in the next year
   - ⇒ Openings due to retirements and natural attrition in the next year
   - ⇒ Net new jobs in the next five years
   - ⇒ Openings due to retirements and natural attrition in the next five years

   Partner with industry organizations such as the Northwest Florida Manufacturers Council and ITGulfCoast or Innovation Coast to gather, distribute and share results.

2. ***Finding***: Education and training organizations and institutions need to strategically work together to implement a training pipeline in key industries.

   Recommendation: Continue meaningful conversations between Economic Development Organizations and education to include an annual meeting led by the Economic Development Organizations in Escambia & Santa Rosa Counties with the following partners in education:

- ⇒ Escambia County School District
- ⇒ Santa Rosa County School District
- ⇒ George Stone Technical Center
- ⇒ Locklin Technical Center
- ⇒ Pensacola State College
- ⇒ University of West Florida

Agenda needs to include: economic development project activity and trends, new training programs under consideration and implementation thereof, articulation among secondary and post-secondary training programs in each industry clusters, shared funding opportunities, etc.

3. ***Finding***: Training programs need annual updates on new trends and technology emerging in local industry clusters.

   Recommendation: Continue meaningful conversations between industry and education to include holding an annual combined advisory council in the two "macro-clusters" of advanced manufacturing and information technology with partners in education and business/industry to discuss new trends and technology in demand occupations as identified in the future workforce survey.

   Suggested annual schedule:

   February: future workforce needs survey to business/industry
   June: EDO & Education Meeting
   June: Combined Advisory Meeting

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APPENDIX A: SUGGESTED CURRICULUM ADJUSTMENTS

Information Technology

Software Developers and Programmers

- Students need skills in "requirements gathering" for when they are looking to build systems or products.
- Preferred or required certifications:
  - Security Certifications such as CompTIA Security+ (if they do not have a security plus certifications on the government side, workers are unable to even touch the computers).
  - Computing environment certifications.

Information Security

- Students need skills on the infrastructure side
  - Have to know how to write "secured" programs
  - From a DoD side, have to have processes down to validate security
- Students need to know how to read/understand how encryption works.

Network Admin/Security

- Security Certifications such as CompTIA Security+
- Align to focus more on day to day operational
- Not only need to know how to use tools but also how to use them as required by regulations that are in place.
- Business partners would like to see a lab with practical experience touching routers and switches.

Database Admin/Development

- Students need broad based exposure from small to large databases.
- Need to look at both hierarchical and non-hierarchical.

Data Transformation/Analysts

- Students need to practice taking large data sets and playing with big data tools.
- Need better understanding on how to analyze data from a business perspective, to meet the end goals.

APPENDIX A: SUGGESTED CURRICULUM ADJUSTMENTS

- Students also need training on linking data sets to maps and satellite imagery.
- Also need to look into doing emulation/simulation for data transformation.

Project Management

- Need PMP certification and process.

QA Testing

- Getting experience with automated testing tools is important. Students need to build software that can be tested. And need understanding of the software development life cycle and processing requirements.
- This is a position that is touch to educate on though as it really needs to be grown into. It is often grown out of an individual business process.

Designers/User Experience

- Programmers typically do not have the graphical experience to show usefulness to a user.
- Some businesses are currently using adobe tools and others are using visual studio.

Advanced Manufacturing

Industrial Maintenance, Welding, Industrial Engineering Technicians, Aircraft General Mechanics

- Students need to know industrial codes. Transition from residential and commercial training to industrial. NFPA79 was brought up as a specific example as the electrical standard for industrial machinery.
- On the mechanical side most industry has gone to multi-craft. It was discussed teaching the basics of techniques such as precision alignment, oil analysis, vibration analysis, etc.
- Another specific example of education that needed to change was the teaching

APPENDIX A: SUGGESTED CURRICULUM ADJUSTMENTS

of Solid Works. Students need to be learning Auto CAD.

Instrumentation, Electrical, Mechanical and Technical, Programmable Logic Control (PLC), Motor Control, Electrical & Instrumentation

- PLC program students need to understand AC/DC drives, pneumatic controls, and switch gears.
- Experience in high voltage work is preferred but industry recognizes this training is most appropriate as a learned skill on the job.
- Troubleshooting was also identified as being a key. This does not mean just parts exchanging either. IP and Armstrong both have a hands on test environment for their potential new hires for PLC, but students need to know the basics of PLC.
- SAP experience is preferred for applicants.

Process Operator, Process Technologist, Machinists

- General mechanic and machinist knowledge.
- Consideration of PTECH programs with implementation from best practices from existing programs below:
    - Remington College
    - Mississippi Gulf Coast Community College
    - Alabama Southern (not PTECH specific program)
    - Lee College

Plumbing, Pipefitting, Industrial Piping, and Tubing Mechanics

- Emphasis on pneumatic fittings and pipefitting.

Quality Assurance, Inspections, Statistical Process Control, Laboratory Technician.

- No specific curricular changes.

Preferred Certifications for most Job Categories

- Lean Manufacturing and Six Sigma

APPENDIX B: DATA SOURCES & METHODOLOGIES

This appendix describes the data sources and methodologies used to inform the analysis presented in the document and which guided the course of the focus groups discussed in the main document.

For both Manufacturing and Information Technology clusters the North American Industry Classification codes where use to delineate workforce composition. The goal was to ensure that data was sufficiently detailed to allow stakeholders and decision makers to focus on important gaps between the workforce/education training system in the area and the needs of the two industry clusters.

To begin, we inventory the relevant workforce/education training programs in the state and determine the degree to which they meet current and projected workforce needs. The process used is as follows: after identifying the critical occupations associated with the Information Technology and Manufacturing clusters in the Pensacola area, we identified the education and workforce training programs that support those occupations. We utilized two primary sources to identify the linkages between occupations and training programs.

The first is the National Crosswalk Service Center's crosswalk, which connects Standard Occupation Codes (SOCs) to Classification of Instructional Program (CIP) codes. The second is Georgia State University's Occupational Supply and Demand System, which provides the same type of information on linkages from an alternative theoretical perspective. The inputs to this process are then the classification of

APPENDIX B: DATA SOURCES & METHODOLOGIES

every training program to a CIP code and every occupation to a SOC code. To determine potential gaps, we link demand for occupations (via SOC) to the production of trained graduates (via CIP) and examine balance.

In many cases this process requires the combination of occupations into occupational groups rather than looking at specific occupation-level supply/demand numbers. The end results are tables that allow us to use the occupational data to identify critical occupations. The metrics used included details on the demand for occupations and occupational groups within the two relevant clusters, the total demand for trained works across the occupational groups, the total supply of available workers to meet those demands and both one-year and five-year forecast gaps between the demand for workers and the available supply in the critical occupation groups.

Part of this process was informed by a market snapshot of job seeker/postings data for the region from by Help Wanted Online and the Conference Board. These data indicate the number individuals seeking a job in each occupational code and how many jobs are currently available for that code. This does not capture the entire market for a given occupational category but it does present a broad overview of current market conditions.

Supply information was enhanced by data extracted from the National Center for Educational Statistics (NCES) for all relevant education institutions within the area.

APPENDIX B: DATA SOURCES & METHODOLOGIES

One and five-year forecasts are derived from internal Haas Center models based on market conditions, historical enrollment patterns, and overall economic activity, among other factors. These data indicate how well the education/workforce training system could be expected to meet workforce demands in the relevant occupations/groups over the next year and the next five years.

APPENDIX C: DEFINITIONS

For the purposes of the earnings analyses presented in the document, industry clusters are defined as follows:

- **Information Technology** = NAICS Codes 425110, 511210, 518210, 541511, 541512, 541513 and 541519
- **Advanced Manufacturing** = NAICS Codes 31-33
- **Accommodation and Food Services** = NAICS Code 72

Average earnings per job = Total annual earnings of a regional industry (wages, salaries, profits, benefits, and other compensation) divided by the number of jobs in the industry.