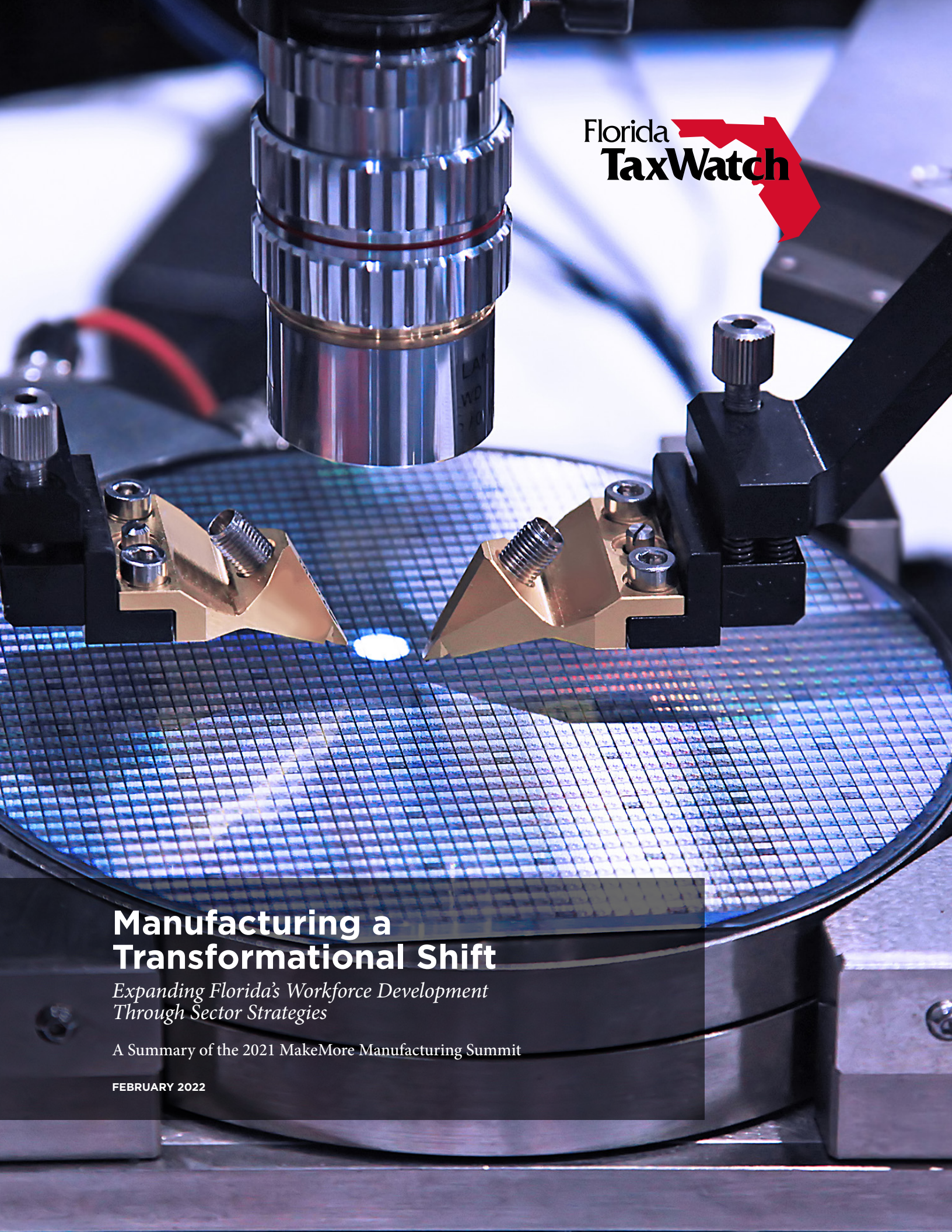

Florida TaxWatch

Manufacturing a Transformational Shift

Expanding Florida's Workforce Development Through Sector Strategies

A Summary of the 2021 MakeMore Manufacturing Summit

FEBRUARY 2022

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Senator George S. LeMieux
Chairman of the Board of Trustees

Dominic M. Calabro
President & Chief Executive Officer

Dear Fellow Taxpayer,

Florida TaxWatch has long recognized the importance of Manufacturing as one of Florida's leading industries, and a key driver of future job growth and economic strength.

As part of our continued focus on this industry, we were honored to be asked again this year to participate in and record the discussions of the third annual MakeMore Manufacturing Summit. As our report did in 2019, this report summarizes the discussions of each session of the Summit, providing an overview of the information presented and discussed, and key thoughts on moving forward.

This year's event consisted of three virtual sessions and one in-person session, with subject matter experts discussing ways to grow Florida's Manufacturing sector through the use of "sector strategies": regional industry-focused approaches to building skilled talent that have proven to be an effective way to align public and private resources to address the talent needs of Florida manufacturers.

Throughout the Summit, the MakeMore hosting partners fostered a dialogue about the importance of growing Florida's Manufacturing sector and the resources available to make that possible. Through collaboration and the leveraging of resources, we can accelerate the productivity and technological performance of the state's Manufacturing sector.

Florida TaxWatch is proud to present this summary of the third annual MakeMore Manufacturing Summit and we look forward to discussing the challenges and opportunities facing Florida's Manufacturing sector with policymakers during the 2022 legislative session and beyond.

Sincerely,

Dominic M. Calabro

Dominic M. Calabro
President & CEO

Dear Attendees, Policymakers, Stakeholders, and Interested Parties,

In a series of three virtual and one in-person events, beginning in June 2021 and ending in October 2021, Associated Industries of Florida, CareerSource Florida, the Florida Chamber of Commerce, Enterprise Florida, and FloridaMakes hosted the third annual "MakeMore Manufacturing Summit." The Summit brought together thought leaders from all segments of Florida's Manufacturing industry to elevate the importance of the Manufacturing industry in Florida and to identify ways to strengthen and advance Florida's economy by improving the competitiveness, productivity, and technological performance of its Manufacturing sector.

Manufacturing helps drive Florida's economy. More than 22,000 Manufacturing companies provide more than 382,000 Floridians with high-wage and high-value jobs. In 2016, Florida ranked 34th among the 50 states in Manufacturing productivity. By last October, Florida had climbed to number 30. Through collaboration and the leveraging of resources, we can continue to accelerate the productivity and technological performance of Florida's Manufacturing sector.

We are proud to present this summary of the MakeMore Manufacturing Summit, prepared by our friends at Florida TaxWatch, and we look forward to discussing the challenges and opportunities facing Florida's Manufacturing sector with policymakers during the 2022 legislative session and beyond.

Sincerely,

Brewster Bevis, President & CEO
Associated Industries of Florida

Michelle Dennard, President & CEO
CareerSource Florida

Mark Wilson, President & CEO
Florida Chamber of Commerce

Kevin Carr, CEO
FloridaMakes

Marc Adler, Acting Secretary of Commerce
Enterprise Florida, Inc.

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INTRODUCTION

FloridaMakes is a statewide, industry-led, public-private partnership operated by an alliance of Florida's regional manufacturers' associations. The sole mission of FloridaMakes is to strengthen and advance Florida's economy by improving the competitiveness, productivity, and technological performance of its manufacturing sector, with an emphasis on small- and medium-sized firms. Since inception in 2016, FloridaMakes has had an economic impact of $2.6 billion with almost 17,000 jobs created and/or retained.[1]

The MakeMore Manufacturing Summit was born in 2018 as a leadership-focused initiative originally developed by FloridaMakes in partnership with the Associated Industries of Florida (AIF), CareerSource Florida, Enterprise Florida, and the Florida Chamber of Commerce. The collective goal of the Summit is to: (1) elevate the state's more than 22,000 Manufacturing companies and demonstrate their impact on the economy; and (2) recognize the importance of diversifying the economy and prioritizing the growth of an industry that provides high-wage, high-value jobs and that can ultimately improve Florida's quality of life.

The 2021 Summit was conducted via three virtual events and one in-person event, beginning in June 2021 and ending in October 2021. The three virtual events focused on Business Growth (June 22-23), Talent Development (July 27-28), and Technology (August 24-25). The October in-person-event (October 26) provided a recap of the virtual events and a look at the future of Manufacturing in Florida.

The COVID-19 pandemic underscored the important role Florida's Manufacturing sector plays in providing products that are crucial to public health and safety, to national security, and to the continuity of many other industries. The pandemic revealed the vulnerability of global supply chains to shocks and disruptions, and occurred at a time when technologies, process innovations, and demand growth are reshaping the Manufacturing sector worldwide.

Through the Summit, the MakeMore hosting partners hope to foster a dialogue about the importance of growing Florida's Manufacturing sector and the resources available to make that possible. Through collaboration and the leveraging of resources, the Manufacturing ecosystem can accelerate the productivity and technological performance of the state's Manufacturing sector.

The winners of this year's Sterling Manufacturing Business Excellence Awards, Florida Advanced Technology Education (FLATE) Awards, and Bob Provitola Manufacturing Leadership Award are identified in Appendix A. The manufacturing advocacy priorities crafted by the FloridaMakes Advocacy Council are identified in Appendix B.

Publisher's Note: All charts/graphs are presented here as they were presented in the sessions.

1 Summit statement by Zoraida Velasco, Executive Vice President, FloridaMakes, October 26, 2021.

SUMMIT TAKEAWAYS

The world is changing. The COVID-19 pandemic has punished those who have not adapted and rewarded those who have. The pandemic underscored the important role Florida's Manufacturing sector plays in providing products that are crucial to public health and safety, national security, and the continuity of many other industries. The pandemic revealed the vulnerability of global supply chains to shocks and disruptions, and occurred at a time when technologies (e.g., Industry 4.0), process innovations, and demand growth are reshaping the Manufacturing sector worldwide.

During the pandemic, Florida's Manufacturing sector experienced 12 consecutive months of over-the-year job losses. Manufacturing employment has slowly begun to recover as Florida manufacturers continue to meet the most extraordinary challenge in response to the COVID-19 pandemic. As of March 2021, the Manufacturing sector had recovered about 60 percent of the lost jobs.

In its review of the three virtual sessions, Florida TaxWatch identified four major challenges that must be addressed if we are to grow Florida's Manufacturing sector:

- Finding people with the right skills necessary to keep up with the needs of Manufacturing and technology, particularly for emerging industries;
- Developing resilient and sustainable supply chains—interactive, dynamic, networks of people, processes, and technologies;
- Accelerating the adoption and implementation of Industry 4.0 technologies; and
- Attracting the next generation of manufacturers.

The 2021 MakeMore Manufacturing Summit brought together distinguished subject matter experts to discuss these challenges and identify strategies to overcome them. The strategies presented during the Summit reflect "sector strategies," which are collaborative, regional, industry-focused approaches to building skilled talent. Sector strategies have proven to be an effective way to align public and private resources to address the talent needs of Florida manufacturers.

Challenge 1.0—Finding people with the right skills necessary to keep up with the needs of Manufacturing and technology, particularly for emerging industries.

Strategy 1.1—To find good people, get them on the payroll, and make sure they are "invested" in the company, many manufacturers have adopted a strategy of hiring selectively and investing in training. Manufacturers are hiring bright, motivated people who are capable of learning and then bringing them up to speed very quickly. This "fast track" accelerated training approach has emerged as one of the more-promising ways to meet short-term industry needs for skilled and experienced employees.

Strategy 1.2—Many manufacturers are "growing their own" talent pool through apprenticeships, internships, and "boot camps." Exposure to a skilled trade through an apprenticeship or internship has shown to be a promising pathway for filling many of the skilled jobs that are hard to fill in the Manufacturing industry. These "learn as you earn" models combine on-the-job training and classroom instruction with mentorship and wage increases as an employee's skills and knowledge increase. Participants earn nationally recognized certification and the employer gets a dedicated and skilled employee.

Strategy 1.3—Make better use of the existing 14 Regional Manufacturers Associations and 24 local workforce boards across the state. Roughly 80 percent of Florida manufacturers have less than 20 employees. Most of Florida's Manufacturing sector job growth has been coming from this group and it is this group that needs the most help. Florida's 14 Regional Manufacturers Associations act as a conduit between the small Manufacturing businesses and educational and informational support, CEO roundtable discussions, networking

events, public relations tools, human resource needs, grants, and awards and recognition at a regional and state level.

Florida's 24 local workforce boards help with short-term recruiting through job postings; provide recruitment services; and hosting hiring events. For intermediate hiring needs (jobs that need to be filled but require some training), the network assists manufacturers through provision of training funds to offset training costs and work-based opportunities (e.g., on-the-job training) and customized training.

Strategy 1.4—Recruit employees in "feeder industries" such as Leisure and Hospitality. Leisure and Hospitality industry employees have many of the soft skills that Manufacturing employers report as missing from applicants applying for vacancies. Soft skills feed into meaningful career paths. Manufacturing affords employees in these feeder industries who have the requisite soft skills (e.g., communications and leadership) an opportunity for higher wages and a career in Manufacturing.

Strategy 1.5—Make better use of untapped and/or underutilized resources. Veterans Florida is a non-profit organization created to help military veterans make the transition to civilian life and to promote Florida's status as a veteran-friendly state. Veterans Florida provides a host of services to veterans, including career service assistance, workforce training grants, and skills bridging as they transition from active duty.

The Able Trust provides Floridians with disabilities opportunities for successful employment. The Able Trust's youth programs provide career development and transition to many students with disabilities annually, helping to reduce the dropout rate and prepare young adults for life beyond high school.

Florida communities would be safer, and taxpayers would save considerable money, by training eligible inmates in vocational skills and transitioning them into the job market upon completion of their sentences. Prison Rehabilitative Industries and Diversified Enterprises (PRIDE) has a proven track record of training inmates, teaching them work ethics and job skills, providing industry-recognized credentials (e.g., Certified Production Technician), and helps with their successful reentry into society.

Florida has about 1.4 million adults without a high school diploma. Roughly one-in-four (24 percent) of Florida's 14 million adults is barely literate, meaning they cannot do basic arithmetic and are functioning at or below Level 1 literacy, (cannot read past 3rd grade reading level). This adult population is uniquely positioned to serve perhaps as an immediate pool of talent who can then be upskilled and trained to help drive and meet Florida's industry needs.

Strategy 1.6—It is important to "cast a wider net." How people recruit employees is changing, and the same is true for the Manufacturing industry. When recruiting talent, especially from other companies, it is important to promote the company as more than just a job and describe the pathway to company and employee growth. Creating an environment that focuses on the employees (e.g., good benefits, work/life balance, company/family events, etc.) helps with retention and attendance and makes people want to come in and do their best.

Strategy 1.7—Enlighten today's youth about high-tech Manufacturing and its contribution to innovation, productivity, economic growth, and high-quality Manufacturing. Late elementary school years is a critical point for students to see how and why science and math classes lead to real-world possibilities, especially for young girls.

Strategy 1.8—Ensure that students coming out of their educational programs have the credentials and skills to get a good job and be successful. It is critical to go out into the community to find out what jobs are available today and work with those companies to make sure they are offering the credentials or degree programs to make workers more prosperous.

Challenge 2.0—Developing resilient and sustainable supply chains—interactive, dynamic, networks of people, processes, and technologies.

Strategy 2.1—Use platforms such as the Connex Florida database and the Associated Industries of Florida/ National Association of Manufacturers database to connect manufacturers and suppliers to purchasers. These platforms will help manufacturers across the state better compete for business by connecting them to other Florida businesses in need of their materials and supplies.

Strategy 2.2—Decrease the risk in deploying advanced technology. Now, more than ever, companies are looking to leverage their supply chain by modernizing systems and tools; reducing complexity by consolidating and simplifying technologies; and by re-thinking how supply chain success should be measured. Digital supply networks are moving away from linear supply chain models and one discreet process to an integrated network, which is where the future of supply chain models is heading.

Challenge 3.0—Accelerating the adoption and implementation of Industry 4.0 technologies.

Strategy 3.1—Automation allows Manufacturers to reduce their labor costs and improve their operating efficiency. Automation, for example, can eliminate non-value added and repetitive tasks otherwise performed by employees; however, automation will not solve the problem of too few skilled and experienced employees.

Strategy 3.2—Manufacturers need to get an early start building connections between teachers, students, and workforce technology practices. It is critical to get teachers and students over the fear of using technology. It is important to get teachers to visit local Manufacturing industries to see technology (e.g., sensors and probes) in the workplace. These field trips give teachers a broader perspective on how technology is used so they can better teach it in the classroom. The surrounding ecosystem for innovation must include nearby colleges and universities, government and non-government organizations, and investment and funding.

Strategy 3.3—Modernize workforce practices in the classroom. If Industry 4.0 equipment and tools are not available in the schools, it will be hard for students to develop the skills. This lack of access applies not only to the tools, but to the infrastructure required to run the tools.

Challenge 4.0--- Attracting the next generation of Manufacturers.

Strategy 4.1—Getting local Manufacturing companies involved in the schools is key. There are not a lot of economic sectors going into the schools. Manufacturing is playing a leadership role here. Today's K-12 students do not know how to relate to Manufacturing jobs. Manufacturers cannot afford to wait until students reach the university level to teach them technological concepts. If we do not start early, we will not be able to develop the pipeline by the time they get to the college level. It is up to the Manufacturing industry to go into the schools to educate school guidance counselors, administrators, students, and parents that Manufacturing jobs are widely available and a lucrative career choice.

Strategy 4.2—Construct a pathway from high school directly to Manufacturing. For Manufacturing, the focus has to be on the high schools. It is important that Florida's system of public education include curriculum to address the needs of the Manufacturing industry. A four-year college education is not for everyone. The Florida Department of Education (FLDOE) is looking to redo curriculum frameworks around IT, engineering technology, and advanced manufacturing. There is the need to show people what their earnings will be when they get their high school diploma and go into a Manufacturing career. There needs to be one or more incentives to get high school students to start thinking about Manufacturing careers.

Strategy 4.3—Adopt a school. Designed to provide high school and college students with access to valuable educational resources and constructive hands-on learning experiences, the Adopt-a-School Program connects students and their schools with manufacturers in their area to give them an in-depth look at the world of Manufacturing. Manufacturers can participate in activities such as hosting students on tours of their facilities, visit schools to give talks offering insight into their industry, mentor interested students and promote valuable internships. Schools in the program provide their students an insightful look at careers in growing Manufacturing industries and offer them exciting learning opportunities outside the traditional brick and mortar walls.

Strategy 4.4—Recruit qualified instructors who are subject matter experts (SMEs) and who have the requisite academic credentials and teaching skills. As many Floridians in their 50's and 60's contemplate retirement, an increasing number consider a career change instead, one that allows them to give back to the community. Retirees are finding it easier than ever to switch careers to teaching. Pursuing a teaching job after retirement has grown as an alternative to traditional retirement. Retirees who become teachers have the chance to put some of their life experiences to use and pass along their wisdom to the next generation.

Strategy 4.5—Continue investments in programs like GrowFL and FloridaMakes. As the official representative for the National Institute of Standards and Technology Manufacturing Extension Partnership (NIST/MEP) program, FloridaMakes connects statewide business associations and local providers to help small- and medium-sized manufacturers grow their businesses through technology adoption, business growth, and talent development. GrowFL is Florida's only organization exclusively dedicated to support and accelerate the growth of second-stage companies,[2] by providing their leaders with connections with other second-stage company leaders, resources, and organizations whose expertise, experience, and products lead to the second-stage company's continued growth and prosperity.[3] Programs like FloridaMakes and GrowFL generate thousands of high-paying new jobs while growing Florida's Manufacturing sector.

Strategy 4.6—Manufacturing must take steps to improve collaboration between educational institutions and industry stakeholders. The Florida Federation for Advanced Manufacturing Education (Florida FAME) is a good example of a program designed to help bridge the gap between educational institutions and Manufacturing. Based on Toyota's Advanced Manufacturing Technician (AMT) program, this "earn-while-you-learn" model provides students a pathway to earn an industry recognized degree while gaining valuable experience at a sponsoring company.

Strategy 4.7—Keep taxes low and minimize regulations that stifle Manufacturing job creation. To keep Florida open for business and bring in more Manufacturing jobs to Florida, the legislature should continue its efforts to keep taxes low and minimize regulations that stifle Manufacturing job creation. For example, Florida is the only state that subjects commercial leases to state and local sales taxes. Reducing and eventually repealing what is known as the business rent tax has long been a priority of Florida TaxWatch and the business community.

Strategy 4.8—Reestablish economic development incentives to attract out-of-state manufacturers. Reduced funding to Enterprise Florida and the elimination of economic development incentive programs like the Qualified Target Industries (QTI) program has put Florida at a competitive disadvantage with states like Texas and Georgia when it comes to attracting new businesses to Florida. Florida's business-friendly business climate, good weather, and beaches have their advantages; however, the use of economic development incentives has launched an "arms race" between states competing for new businesses and new job creation. The recreation of

2 Second-stage growth companies have at least 6 employees and $750 thousand in revenue and possess the intent and desire to grow beyond secnd-stage. They are a small, but mighty, group of entrepreneurial leaders in Florida, accounting for just 10% of the companies but generating more than 30% of the jobs.

3 Florida TaxWatch, "Florida TaxWatch Statement About Renewal of FloridaMakes Funding," retrieved from https://floridataxwatch.org/Press-Room/Art-MID/35144/ArticleID/18705/Florida-TaxWatch-Statement-About-Renewal-Of-FloridaMakes-Funding, July 5, 2019.

these economic development incentive programs will send a message to out-of-state manufacturers that Florida is "open for business" and ready to attract high-wage Manufacturing jobs.

Strategy 4.9—Increase enrollment in Florida's 48 technical schools and 28 state colleges, specifically in high-value, short-term Career and Technical Education (CTE) programs that lead to a meaningful credential. Last year, FLDOE's "Get There Florida" campaign was launched as a way of increase enrollment. The two main elements of the campaign are a customizable communications toolkit and a targeted digital campaign. Florida has committed funds to help scale integrated education and training programs to get adult students in their basic skills courses or General Education Development (GED) prep classes concurrently with quality CTE courses. Learning CTE course competencies along with basic education skills will help many Floridians graduate and progress with a sense of career purpose. Educators see success rates go "through the roof" when this model is adopted and successfully used. This model is not possible without industry support.

Strategy 4.10—Better messaging and marketing. Career opportunities presented by the Manufacturing sector are not very well-known. There is a need to "get the word out" about career opportunities in Manufacturing. Manufacturers need to do a better job educating parents, high schools, colleges and universities, and workforce agencies about job and career opportunities in Manufacturing. Middle- and high-school students need to better understand what Manufacturing is and, just as important, what it is not.

Strategy 4.11—Invest in new and emerging technologies to train and develop employees. Blended training programs are common ways to improve the skills of Manufacturing employees. Most of these programs are structured around formalized competency models, which have a knowledge component and a skill component. Investments in augmented reality, virtual reality, and mixed reality permits students to apply what they learn in an extended reality (XR)[4] environment before stepping foot on a manufacturing floor. This promotes a faster time to competency.

LOOKING AHEAD

During the 2021 legislative session, access to the state Capitol and to legislators and legislative committees was severely restricted due to the COVID-19 pandemic. As the 2022 legislative session approaches (January 11, 2022), additional effort will be needed to secure the passage of legislation that is important to manufacturers and the business community, including:

- Reauthorization of the Qualified Target Industry (QTI) tax refund to encourage quality job growth in targeted, high value-added, jobs;
- Improved workforce training, education, and infrastructure;
- Incentives for Manufacturing employees to return to work;
- Upskilling;
- Lawsuit abuse (tort) reform;
- Scheduled corporate tax increases; and
- Federal tax reform.

The need for the Manufacturing and business community to work closely with the governor and legislature to effect changes that grow Florida's Manufacturing cannot be overstated. This brings us back to the one overarching strategy—collaboration—which is enabled through a sector strategy framework. It takes partnerships and cultivating work experience opportunities alongside our education partners to bring about and manage this change.

4 Extended reality includes augmented reality, virtual reality, mixed reality, and everything in between.

"It's important to have all the key players in the room when you're making the decisions... Having your local universities, having your school system, having local manufacturers, everybody in the same room, it really helps support that collaboration and really makes people feel more comfortable working together…"

—Jason Jones, Vice President of Business Development, Sentry View Systems

MANUFACTURING IN FLORIDA

Florida is home to more than 22,000 Manufacturing companies, 80 percent of which have 20 or fewer employees.[5] Florida manufacturers produce a variety of goods including aerospace products, batteries, food and beverages, communications equipment, pharmaceuticals, medical devices, semiconductors, boats, and more. Manufacturers in Florida account for 4.95 percent of the total output in the state, employing 4.4 percent of the non-agricultural workforce.[6]

Manufacturing helps to drive Florida's economy, with a total Manufacturing output (2019) of $58.9 billion.[7] Florida exported $41.99 billion in manufactured goods exported in 2020. Still, about half of the cargo containers—ships, planes, and trucks—leaving Florida leave Florida empty. This means Floridians pay more than they would have paid if these cargo containers left Florida filled with Florida-made goods.

Manufacturing is made up of two segments, durable goods and non-durable goods. Durable goods include the manufacturing of transportation equipment, computer and communications equipment, fabricated metal products, etc., and employs about two-thirds of Florida's Manufacturing employees. Non-durable goods include food and beverages, paper products, chemicals, etc., and employs about one-third of Florida's Manufacturing employees.

Manufacturing provides Floridians with high-wage jobs, with average annual wages (2020) of $66,740.[8] In August 2021, there were 382,300 Manufacturing jobs (seasonally adjusted) in Florida, an increase of about 9,600 jobs from the same time last year.[9] Employment in the Manufacturing sector is concentrated in the northeast, central, and southeast parts of the state. More than one-half (57.5 percent) of all Manufacturing jobs are located in seven Florida counties: Miami-Dade County (more than 39,000); Orange and Pinellas counties (more than 30,000 each); and Hillsborough, Broward, Brevard, and Duval counties (more than 20,000 each).[10]

5 FloridaMakes, "Florida ManuFacts," retrieved from www.floridamakes.com/florida-manufacts.stml, June 25, 2021.

6 Florida Department of Economic Opportunity, "Florida Manufacturing: August 2021 Labor Statistical Data," September 17, 2021.

7 National Association of Manufacturers, "2021 Florida Manufacturing Facts," retrieved from https://www.nam.org/state-manufacturing-data/2021-florida-manufacturing-facts/, June 28, 2021.

8 Florida Department of Economic Opportunity," Florida Manufacturing, August 2021 Labor Statistical Data," September 17, 2021.

9 Ibid.

10 Ibid.

VIRTUAL SESSION 1

BUSINESS GROWTH

JUNE 22-23, 2021

The theme of the first virtual event, held on June 22 and 23, 2021, was Business Growth. The first session focused on key factors that impact a manufacturer's business, including breakout sessions on Organizational Management, Business Sustainability, and Supply Chains; a panel discussion on Emerging Industries; and a panel discussion on Business Climate.

FloridaMakes CEO Kevin Carr set the stage for the first virtual event with an interview of Rogan Donelly, CEO and third-generation owner of the drinkware company Tervis. Under CEO Donelly's leadership, Tervis has expanded its drinkware offerings, which has resulted in new sourcing and manufacturing practices, as well as new and expanded channels of distribution.

CEO Donelly discussed Tervis' culture of continued innovation even though Tervis' product has remained essentially the same over 75 years. CEO Donelly attributes the continued popularity of Tervis products to the fact that the company has listened to the consumer and the marketplace and taken appropriate actions to remain relevant. During the COVID-19 pandemic, with so many people working from home, Tervis had to change the way it communicated with its employees, suppliers, and distributors. One benefit arising from the COVID-19 pandemic is improved work/life balance among Tervis employees.

Tervis relies on a large supply chain, most of which is within the state of Florida. As the effects of COVID-19 began to subside, supply chain issues and labor shortages began to emerge. High demand has reduced the availability of key supplies. Raw materials and fuel costs have increased, as has the cost of shipping. The challenge facing Tervis and other manufacturers is finding ways to absorb these increases. Tervis has single-sourced some supplies for critical components and has relied on alternative suppliers. Tervis has been able to use multiple supply chains to maintain inventory (surpluses) and to maintain good relations with its supply chain partners.

The COVID-19 pandemic also created shortages of human capital, as more workers have chosen not to return to the workforce. Tervis has tried to remain nimble and use creative ways to recruit and retain experienced employees. Tervis has acknowledged that the available labor is not as experienced as it would like and has implemented a six-week training program for temporary workers. To recruit new employees, Tervis has used job fairs. Tervis has provided referral bonuses to employees who refer a new employee and signing bonuses to new employees. Longer-tenured Tervis employees are eligible for retention bonuses.

CEO Donelly explained the importance of using technology and automation to improve efficiency. On the operations floor, automation has improved Tervis' assembly and shipping processes. On the product side, technology has ushered in a shift from woven decorations to wraps to ultraviolet ink that prints directly on the glassware.

> *"If we didn't update our technologies, if we didn't stay relevant in those areas, then we'd be doing a big disservice not only to our company but also to the consumer."*
>
> —Rogan Donelly, Owner/CEO, Tervis

FLORIDA'S MANUFACTURING LANDSCAPE

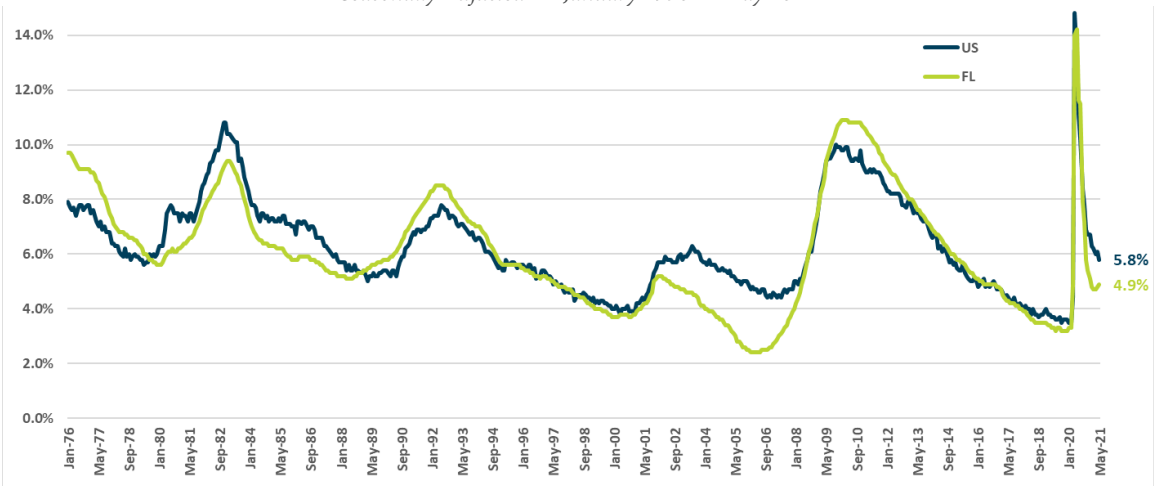
Adrienne Johnston, Director, Division of Workforce Services
Florida Department of Economic Opportunity

Employment Overview

For historical context, Figure 1 compares Florida's unemployment rate (seasonally adjusted) to that of the U.S. from January 1976 to May 2021. As shown, Florida's unemployment rate closely parallels the unemployment rate for the country. Compared to the COVID-19 pandemic, the increase in unemployment rate during the Great Recession was more gradual, peaking at more than ten percent in the Fall of 2010. As the economy began to recover, Florida's unemployment rate began to decrease, dropping below four percent at the end of 2019.

Figure 1. Unemloyment Rate

Seasonally Adjusted -- January 1976 — May 2021



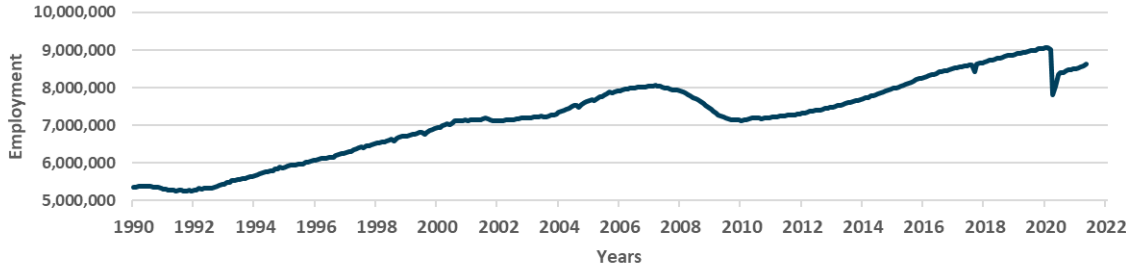
Source: Florida Department of Economic Opportunity, Bureau of Workforce Statistics and Economic Research, Local Area Unemployment Statistics Program (LAUS) Prepared June 2021

With the onset of the COVID-19 pandemic in early 2020, there was a sharp increase in the unemployment rate, going from a historic low in February 2020 to a historic high of more than 14 percent in May 2020. There were a lot of people leaving the labor force at this time. Figure 1 shows how quickly Florida's economy recovered—in the 15 months from February 2020 to May 2021, Florida's unemployment rate decreased from more than 14 percent to 4.9 percent as more people come back into the labor force.

Figure 2 shows a similar trend. Florida's nonagricultural employment (seasonally adjusted) declined during the Great Recession and increased steadily thereafter. With the onset of the COVID-19 pandemic, more than one million Floridians left the workforce. As the economy continues its recovery, the number of nonagricultural employees in the workforce continues to approach pre-pandemic levels.

Figure 2. Total Nonagricultural Employment

Seasonally Adjusted -- 1990–2022



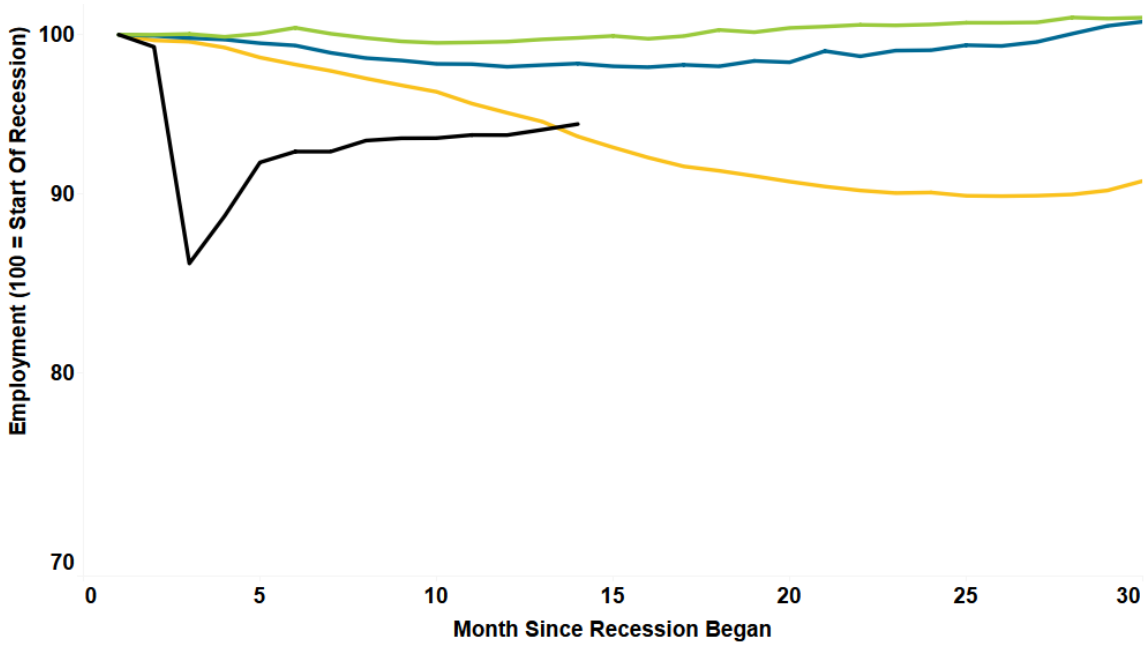
Source: Florida Department of Economic Opportunity, Bureau of Workforce Statistics and Economic Research, Current Employment Statistics (CES) Prepared June 2021

Figure 3 compares the changes in employment from the onset of historical recessions. Fourteen months after the onset of the Great Recession in December 2007, the impact of the Recession on employment had not been fully realized and would not be for another 10 months or so. In contrast, the impacts of the COVID-19 pandemic on employment were more immediate and more severe, hitting bottom in about three months and the beginning to recover.

With the COVID-19 pandemic, Florida's Manufacturing sector experienced 12 consecutive months of over the year job losses. The job loss bottomed out in about three months and has slowly begun to recover. As of March 2021, the Manufacturing sector had recovered about 60 percent of the lost jobs; however, the number of lost jobs over the year was about 7,200 jobs.[11]

Figure 3. Employment Change Since Recession Began

Florida, Seasonally Adjusted



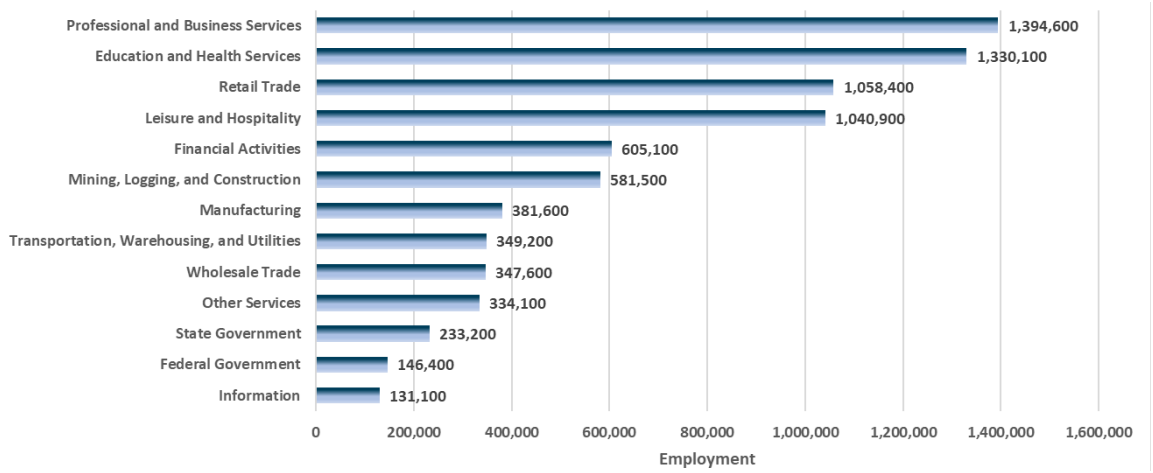
Source: Florida Department of Economic Opportunity, Bureau of Workforce Statistics and Economic Research.

11 Summit statement by Adrienne Johnston, Director, Division of Workforce Services, Department of Economic Opportunity.

Florida's top industries by employment are shown in Figure 4. The Professional and Business Services sector employs the most (1.4 million) Floridians, with Manufacturing ranked seventh with more than 381,000 jobs as of May 2021. The economic sector from the list that employs the fewest number of employees is the Information sector, with just more than 131,000 jobs.

Figure 4. Top Industries by Employment

Not Seasonally Adjusted / May 2021

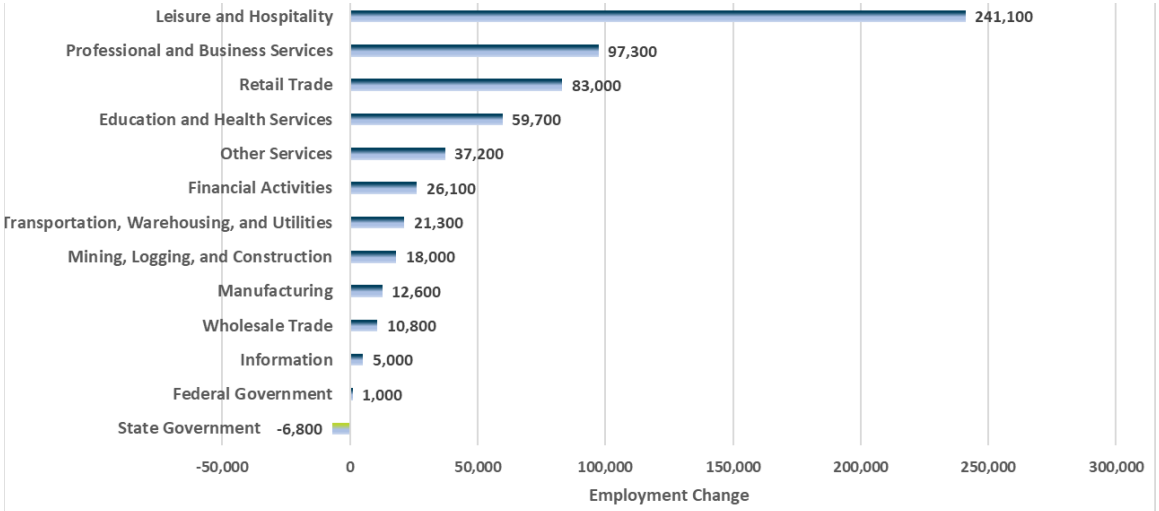


Source: Florida Department of Economic Opportunity, Bureau of Workforce Statistics and Economic Research, Current Employment Statistics (CES) Prepared June 2021

Figure 5 shows how the COVID-19 pandemic affected different sectors of the economy differently (job gains). From May 2020 to May 2021, the Leisure and Hospitality sector was the driver of job gains, with more than 241,000 lost jobs recovered. Manufacturing ranked ninth, having recovered more than 12,000 jobs.

Figure 5. Top Industries by Over-The-Year Change in Employment

Not Seasonally Adjusted / May 2020–May 2021



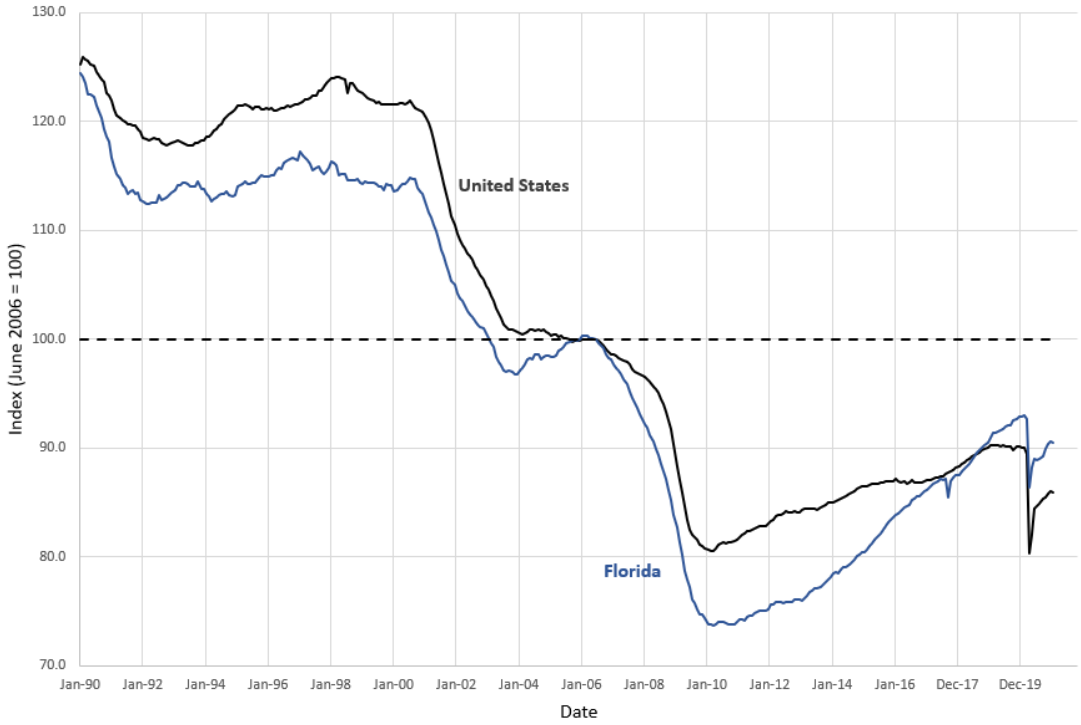
Source: Florida Department of Economic Opportunity, Bureau of Workforce Statistics and Economic Research, Current Employment Statistics (CES) Prepared June 2021

MANUFACTURING EMPLOYMENT

Figure 6 compares the manufacturing employment index[12] for Florida and the U.S. from January 1990 to the present. The index declined steadily from January 1990 until the Great Recession. Since the Great Recession, the manufacturing employment index showed a steady incline until the onset of the COVID-pandemic, at which time Florida's manufacturing employment index was trending higher than that of the U.S.

Figure 6. Manufacturing Employment Index, U.S. vs. Florida

January 1990–Present



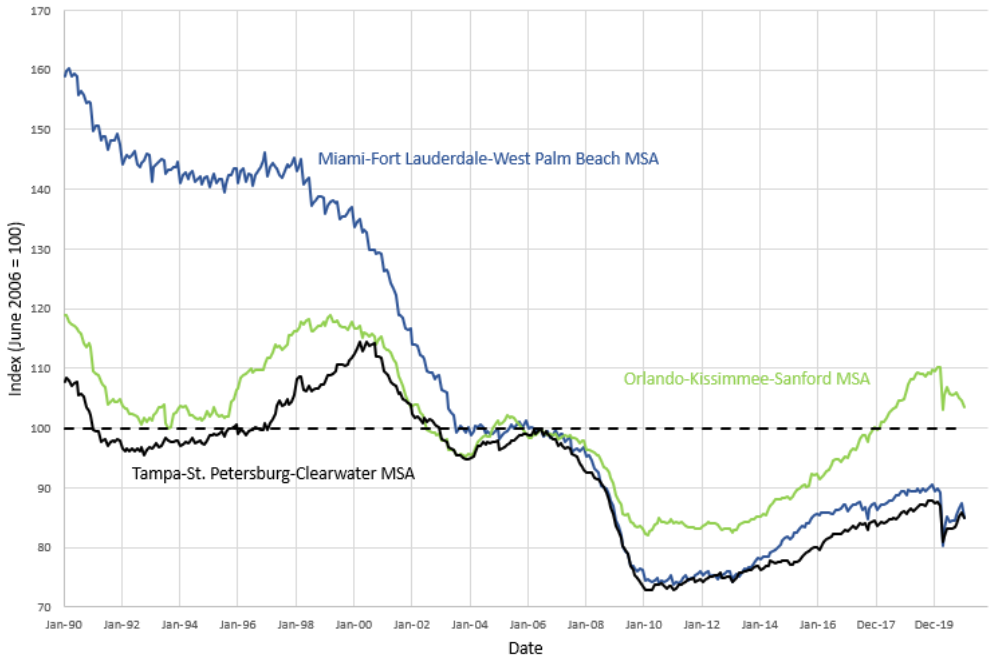
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics Program

The performance of Manufacturing in Florida's top three metropolitan statistical areas (MSAs) over the years is shown in Figure 7. In January 1990, most of Florida's Manufacturing jobs were located within the Miami-Ft. Lauderdale-West Palm Beach MSA. All three MSAs began to experience a decline in Manufacturing jobs, with the Miami-Ft. Lauderdale-West Palm Beach SMA experiencing the most severe decline. All three MSAs have shown an incline since the end of the Great Recession, with the Orlando-Kissimmee-Sanford MSA rapidly becoming one of the top areas for Manufacturing.

12 The manufacturing employment index represents business sentiment regarding labor market conditions and is considered a strong non-farm payrolls leading indicator. An index value above 50 percent indicates a positive development for Manufacturing sector employment while a value below 50 percent indicates a negative development.

Figure 7. Manuacturing Employment Index, Florida MSAs

January 1990–Present



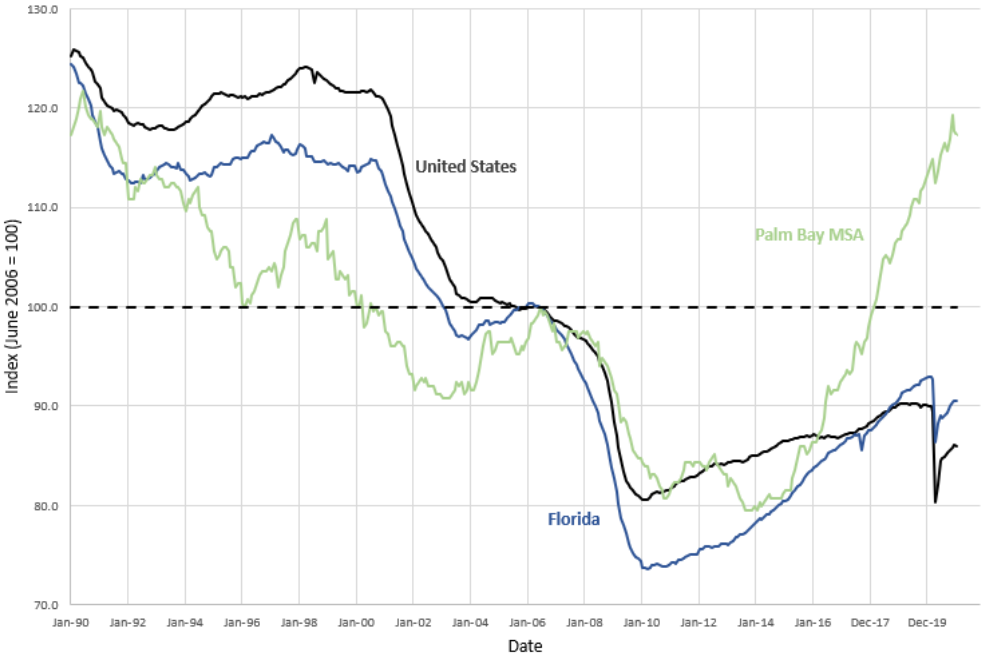
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics Program

The Palm Bay (Brevard County) MSA is worth noting because its trend differs from that of Florida and the U.S., especially over the past several years (see Figure 8). Whereas other areas showed a pattern of decline in Manufacturing employment in response to the COVID-19 pandemic, Brevard County did not show that same level of decline. This area of the state has continued to show robust growth, with Manufacturing employment near the level it was at in the1990s. This is a standout area in terms on Manufacturing growth.

Figure 9 shows the number of reemployment assistance / unemployment insurance claims by industry sector during the COVID-19 pandemic. Not surprisingly, the Leisure and Hospitality and Self-Employed sectors were especially hard hit. The Manufacturing sector did suffer, with almost 14,000 Manufacturing employees filing reemployment assistance/unemployment insurance claims as a result of COVID-19.

Figure 8. Manuacturing Employment Index, Palm Bay MSA vs. U.S. & Florida

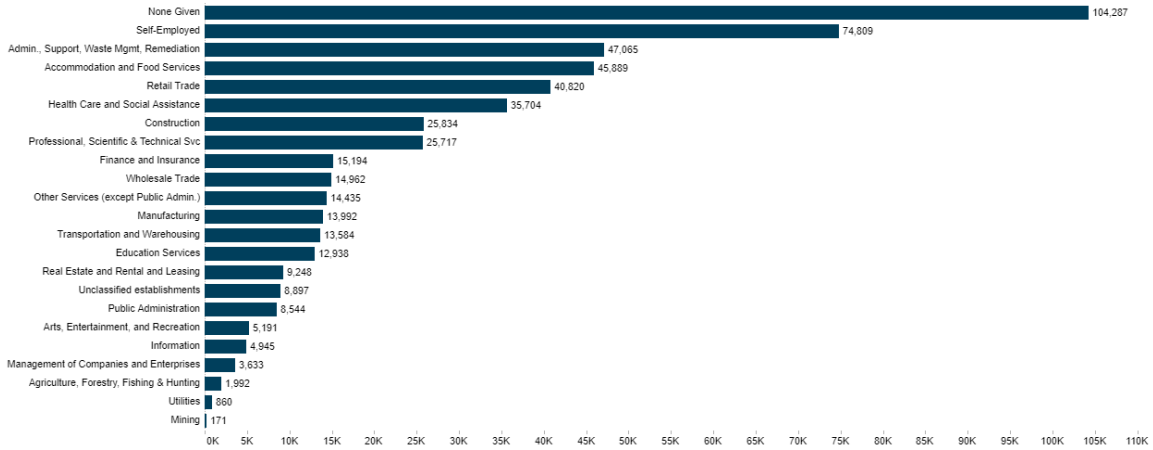
January 1990–Present



Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics Program

Figure 9. Initial Claimants by Industry

All Counties

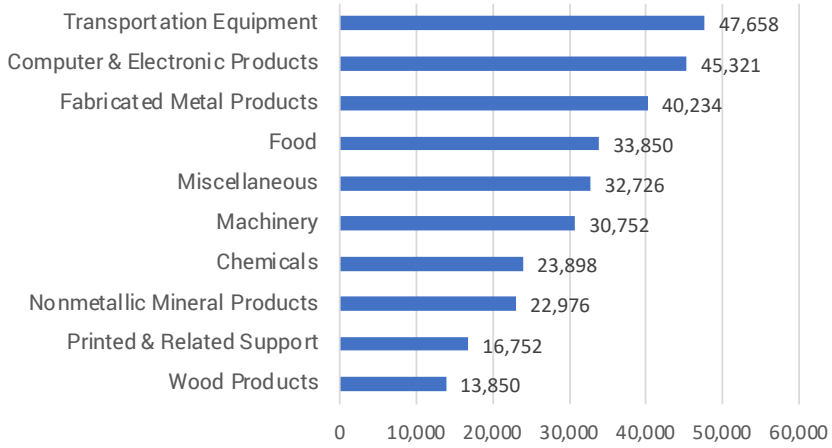


Source: Florida Department of Economic Opportunity

THE FUTURE OF MANUFACTURING

It is important to look at where Florida's Manufacturing sector is headed. Florida's current (2020) top ten Manufacturing industries are shown in Figure 10. Transportation equipment manufacturing provides the most Manufacturing jobs (47,658), followed closely by computer and electronic product manufacturing (45,321), and fabricated metal product manufacturing (40,234). Florida's Manufacturing sector is projected to continue to add jobs through 2028, with the largest increase in jobs posted by the fabricated metal products (2,252), transportation equipment (1,877), and chemical industries (1,811). The printed and related support industry (-1,470) and computer and electronic products industry (-1,577) are projected to lose a total of about 3,000 jobs (see Figure 11).

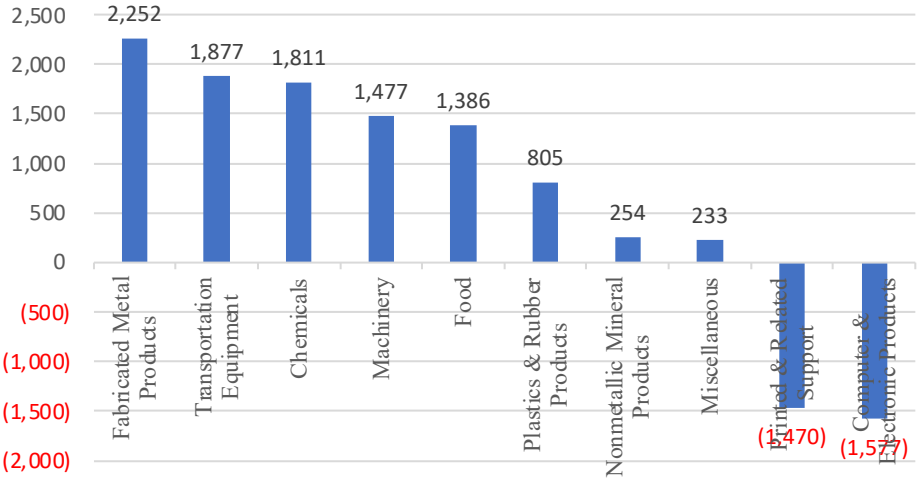
Figure 10. Top 10 Manufacturing Industries Employment (2020)



Source: "By the Numbers: Florida's Manufacturing Growth," Department of Economic Opportunity, June 2021.

Figure 11. Top Manufacturing Industries Projected Change in Employment

2020–2028



Source: "By the Numbers: Florida's Manufacturing Growth," Department of Economic Opportunity, June 2021.

BREAKOUT A: ORGANIZATIONAL MANAGEMENT

A panel of distinguished thought leaders was convened to discuss Organizational Management and share their insights about "best practices" for ensuring a manufacturer's organizational management team is competent, effective, and aligned with the needs and challenges of the Manufacturing industry. Distinguished speakers and panelists for the Organizational Management breakout session include:

- Patti Gander, Business Advisor, FloridaMakes (facilitator);
- Chris White, Owner, Coach Chris (facilitator);
- Jason Petro, President/Owner, UpRev; and
- Jason DeFranco, President, Team Solutions Dental.

Participants discussed the importance of a well-crafted organizational chart. One key takeaway is that a company's organizational chart is its "accountability report." An organizational chart is more than a graphical representation of an organization's structure. It should go beyond illustrating reporting relationships and chain of command. It should be more "position-oriented" than "person-oriented." It should be made scalable by including vacant boxes that show where future growth and development will occur.

An effective organizational chart should include more than names and titles in boxes. It should also include key performance indicators, mission, roles and responsibilities, etc., to provide new employees greater clarity. If done properly, employees will have a clearer understanding of their roles and responsibilities, how they relate, and how their performance will be measured. A well-crafted organizational chart provides a crystal-clear view of how the company operate, which encourages employee buy-in.

BREAKOUT B: BUSINESS SUSTAINABILITY

A panel of distinguished thought leaders was convened to discuss Business Sustainability and share their insights about "best practices" for capital growth with an aim toward sustainability. Distinguished speakers and panelists for the Business Sustainability breakout session include:

- Pete Previte, General Manager, Pharus Group (facilitator);
- Marni Spence, Principal, Clifton Larson Allen (facilitator);
- David Carrier, President/CEO, Quantum Flo; and
- Jack Harrell, Jr., CEO, Harrell's Inc.

Harrell's Inc., CEO Jack Harrell, Jr., discussed the transition from a family-owned business to an Employee Stock Ownership Plan (ESOP). An ESOP allows employees to own shares of the business and to benefit from their appreciation in value over time. Transitioning to an ESOP was good for Harrell's in the following ways:

- It helps to preserve the company—letting an outside trust manage shares that are exclusively available to employees helps ensure business continuity after company leadership retires. An ESOP also creates continuity because shares are regularly redistributed employees as people leave.
- It lowers employee turnover—as a long-term benefit, ESOPs encourage companies to develop longevity at their current employer. This improves loyalty, reduces turnover, and saves the company money on recruiting, hiring, and training new staff.
- It increases employee motivation—when employees own stocks in their employer, it gives them an incentive to work hard to grow the company's value.
- It offers employees tax benefits—money and stocks you contribute to an ESOP is tax-deductible up to a certain value. Dividends and loan repayments are also tax-deductible.[13]

One key takeaway is the need to understand that, although a company's employees show up as an "expense" on the balance sheet, a company's employees are in fact its greatest "asset."

13 Indeed for employers, "What is an ESOP (Employee Stock Ownership Plan)?" retrieved from https://www.indeed.com/hire/c/info/what-is-esop, July 7, 2021.

BREAKOUT C: SUPPLY CHAINS

A panel of distinguished thought leaders was convened to discuss Supply Chains and share their insights about "best practices" for ensuring a manufacturer's resilient and sustainable supply chain. Distinguished speakers and panelists for the Supply Chains breakout session include:

- Paula DeLuca, Business Advisor, FloridaMakes (facilitator);
- Michael Aller, Director, Supplier Development, FloridaMakes (facilitator); and
- Mark Nys, Director of Business Development, Parametric Solutions.

Participants provided an overview of Connex Florida, a statewide supply chain connection platform for Florida-based manufacturers to engage in the marketplace and streamline connections to prospective suppliers and customers. One of Connex Florida's most important features is its extensive database of small and large manufacturers around the state, highlighting their specific production capabilities and capacities. At present, the database includes more than 8,900 manufacturers in a variety of industries. Manufacturers can create profiles detailing their company's description, contact information, key people, capability statements, certifications, NAICS codes, materials, and equipment. The ability to identify regional manufacturers for a more localized supply chain is a principal benefit of the database.

Another core feature of Connex Florida deals with providing visualizations of supplier, manufacturer, and customer relationships. Companies that create accounts in Connex Florida can create a visual network, illustrating their supplier chain. This enables companies to better understand their own supply chain vulnerabilities, improve connections to other companies, and plan for customer demand more accurately. All of these features assist manufacturers in connecting with each other, identifying alternative suppliers, and increasing business opportunities during times of supply chain disruption or critical demand.

One key takeaway is the need for a resilient and sustainable supply chain. Manufacturers need to develop the capacity to mitigate the impacts of supply chain disruption and recover quickly from a disruption.

EMERGING INDUSTRIES

A panel of distinguished thought leaders was convened to discuss Emerging Industries and share their insights about what it means to advance their business goals as they emerge. Distinguished speakers and panelists for the Emerging Industries session include:

- Joel Gunter, Enterprise Florida (moderator);
- Lonnie Bernardoni, Vice President, Supply Chain & Manufacturing, Luminar Technologies;
- Angela Reamer, Director, Manufacturing, Monin; and
- Jesse Cruz, President, Brewer International.

It was pointed out that Florida now appears to be on the back side of the COVID-19 pandemic. As Florida's economy continues to recover, companies are trying to quickly ramp up their work force and make up for "lost time." This creates a challenge in finding people with the right skills necessary to keep up with the needs of Manufacturing and technology, particularly for emerging industries. The COVID-19 pandemic has made people more apprehensive and fearful of rejoining the workforce. This is particularly true with respect to emerging industries where there is a "fear of the unknown" that talented and experienced recruits have to overcome.

As Florida's economy continues to recover and consumer and employee confidence continues to improve, Florida manufacturers continue to pursue experienced people who can "hit the ground running." The challenge facing Florida Manufacturers is finding good people, getting them on the payroll, and making sure they are "invested" in the company.

Given the struggle to find qualified people who have expertise in the areas that manufacturers need, manufacturers are hiring selectively and investing in training. Manufacturers are now looking to hire bright, motivated people who are capable of learning and then bringing them up to speed very quickly. Finding people with similar (but not exact) skills and experience helps to shorten the learning curve. This "fast track" accelerated training approach has emerged as one of the more-promising ways to meet short-term industry needs for skilled and experienced employees.

Panelists acknowledged the importance of "growing your own" talent pool through apprenticeships and grants. Exposure to a skilled trade through an apprenticeship has shown to be a promising pathway for filling many of the skilled jobs that are hard to fill in the Manufacturing industry.

Apprentice Florida is a partnership that includes CareerSource Florida, the Florida Department of Economic Opportunity, and the Florida Department of Education. Apprentice Florida is a talent pipeline in targeted sectors, driving economic development across the state. Unlike traditional postsecondary education programs, which are designed to prepare students for any number of career pathways, apprenticeships are designed by and for the employer with a specialized focus on the unique needs of a specific job. Apprenticeship programs have been shown to reduce employee turnover, improve safety, and improve productivity. For every $1 invested into apprenticeships, employers receive an average return of $1.50.[14]

Another resource available to Florida manufacturers to help close the skills gap is training grants. Training grants available through CareerSource Florida reimburse companies for employee training that is focused on industry or business-specific skills, technical or computer skills, or foundational Skills (e.g., leadership). More than 195,000 employees and 2,900 businesses have benefited from these training grants. [15]

Panelists acknowledged that career opportunities presented by the Manufacturing sector are not very well-known and emphasized the need to "get the word out" about career opportunities in Manufacturing. Manufacturers need to do a better job educating parents, high schools, colleges and universities, and workforce agencies about job and career opportunities in Manufacturing.

It is important that Florida's system of public education include curriculum to address the needs of the Manufacturing industry. A four-year college education is not for everyone. Florida's K-12 and Florida College System institutions need to teach skills like balancing a checkbook or how a 401(k) works.

Panelists acknowledged that how people recruit employees is changing, and the same is true for the Manufacturing industry. It is important to "cast a wider net." Florida's desirability level is really high and that gives Florida manufacturers an advantage over many other places. When recruiting talent, especially from other companies, it is important to promote the company as more than just a job and describe the pathway to company and employee growth. Creating an environment that focuses on the employees (e.g., good benefits, work/life balance, company/family events, etc.) helps with retention and attendance and makes people want to come in and do their best.

"It all begins and ends with the people in the factory..."

—Angela Reamer, Director, Manufacturing, Monin

Manufacturing boot camps, like the one-week camp in Indian River County, afford young adults up to age 21 the opportunity to tour local manufacturers and participate in hands-on activities designed to develop skills relevant

14 Apprentice Florida, "Is Apprenticeship Right for Your Business?" Apprentice Florida, retrieved from https://apprenticeflorida.com/, July 9, 2021.

15 CareerSource Florida, "Train Your Team and Strengthen Your Business," retrieved from https://careersourceflorida.com/training-grant/, July 9, 2021.

to Manufacturing, including interviewing and resume-writing skills. Orientation sessions for participating students and their parents/guardians are held prior to the start of the boot camp. Transportation to and from manufacturing locations is provided, as are breakfast and lunch each day.

A similar program funded by Pasco, Pinellas, and Hernando counties, gives adult job seekers a taste of what a Manufacturing career would be like, in addition to guaranteeing them an interview with a local company if they successfully complete the two-week program. During the two-week boot camp, participants work in teams and as individuals to complete a wide range of projects, and tour manufacturers' facilities. Those completing the boot camp also receive their Occupational Safety and Health Administration (OSHA) safety certificate, which many employers require before new hires can start work. Participants are also given a free crash course in essential soft skills.

> *"From a manufacturer's perspective, if they are really in need of hiring people, the boot camp is a much better model than your traditional career fairs because we are vetting each candidate… When they go through the program, they are being evaluated on every project that they do by multiple instructors, and they're evaluated on soft skills."*
>
> —Tom Mudano, Executive Director, AmSkills[16]

Panelists acknowledged the need to better utilize Florida's 14 regional manufacturers associations to create networks of local suppliers as a way to help each other. Roughly 80 percent of Florida manufacturers have less than 20 employees. Most of Florida's Manufacturing sector job growth has been coming from this group and it is this group that needs the most help. Florida's 14 Regional Manufacturers Associations were identified as a conduit between the small Manufacturing businesses and educational and informational support, CEO roundtable discussions, networking events, public relations tools, human resource needs, grants, and awards and recognition at a regional and state level. Participants discussed the use of Regional Manufacturers Associations to create networks of local suppliers as a way to help each other.

Panelists discussed the need for continued investments in programs like GrowFL and FloridaMakes. As the official representative for the National Institute of Standards and Technology Manufacturing Extension Partnership program, FloridaMakes connects statewide business associations and local providers to help small and medium-sized manufacturers grow their businesses through technology adoption, business growth, and talent development. Through the second quarter of 2021, 581 manufacturers who had received services through FloridaMakes reported (through a third-party survey) a combined total economic impact of $2.6 billion, and a total of 17,236 jobs created and retained.[17] Programs like FloridaMakes generate thousands of high-paying new jobs while growing Florida's manufacturing sector.

A 2017 report by Florida TaxWatch used the REMI PI+ economic forecasting model to calculate GrowFL's economic impact over the next 10 years. The analysis projected that GrowFL will create 43,794 private sector jobs with an average salary of $97,815. In addition, expanding the program would produce $4.61 billion in additional personal income and generate an estimated $4.72 billion in GDP over the next 10 years.[18]

16 Brian Hartz, "Up Skill: Innovative Manufacturing 'Boot Camp' Sees High Demand," Business Observer, October 9, 2020, retrieved from https://www.businessobserverfl.com/article/amskills-boot-camps-tampa-bay-manufacturing-jobs, July 8, 2021.

17 Statement by Summit speaker Zoraida Velasco, Executive Vice President, FloridaMakes.

18 GrowFL, "New Research Shows GrowFL Projected to Produce More Than 40,000 Jobs in the Next Ten Years," retrieved from https://growfl.com/new-research-shows-growfl-projected-produce-40000-jobs-next-ten-years/, July 8, 2021.

> *"Expanding the GrowFL program has proved to be an effective way to grow the state economy… Second-stage companies are now responsible for a significant portion of all Florida jobs, and it is vital that we continue to invest in these companies so our economy can continue to be one of the nation's best for years to come."*
>
> —Dominic M. Calabro, President and CEO, Florida TaxWatch[19]

Manufacturing will continue to play an important role in making Florida's economy more competitive. Continued investment in programs like GrowFL, which supports and accelerates the growth of second-stage companies by providing their leaders with focused, efficient, and timely access to important resources, and FloridaMakes, which improves the productivity of Florida's Manufacturing sector, is critical to the continued growth of Florida's Manufacturing sector.

> *"One of the things I have really made a point to do is to get involved with as many smart and talented manufacturing leaders and pick their brain, and also just surrounding myself with as many smart and talented networkers, people who are focused on growth, in this space as I can…"*
>
> —Jesse Cruz, President, Brewer International[20]

Panelists acknowledged that automation is a "double-edged sword." Automation allows Manufacturers to reduce their labor costs and improve their operating efficiency. Automation, for example, can eliminate non-value added and repetitive tasks otherwise performed by employees; however, automation will not solve the problem of too few skilled and experienced employees. Designers, engineers, programmers, and other highly-skilled employees will always be in demand.

19 GrowFL, "New Research Shows GrowFL Projected to Produce More Than 40,000 Jobs in the Next Ten Years," retrieved from https://growfl.com/new-research-shows-growfl-projected-produce-40000-jobs-next-ten-years/, July 8, 2021.

20 Summit statement by Jesse Cruz, President, Brewer International.

BUSINESS CLIMATE

A panel of distinguished thought leaders was convened to attendees on recent policy changes that will affect Florida's Manufacturing and general business climate. Distinguished speakers and panelists for the Business Climate session include:

- John Krug, Senior Manager, Economic Development, Niagara Bottling (moderator);
- The Honorable Chip LaMarca, Florida State Representative, District 93;
- Tom Feeney, President & CEO, Associated Industries of Florida; and
- Carolyn Johnson, Senior Director of Business, Economic Development and Innovation Policy, Florida Chamber of Commerce.

Panelists shared their observations over the past year and provided insight into what lies ahead for Florida's manufacturers. Panelists commended Florida's political leaders for their successful navigation through the COVID-19 pandemic. Florida industries stayed open where other states were closed. This gave Florida's economy considerable momentum coming out of the pandemic.

During the 2021 legislative session, several key pieces of legislation were passed that will improve Florida's business climate and help manufacturers. Florida passed legislation requiring out-of-state retailers doing business in Florida to collect and remit the required Florida sales taxes due, just like every law-abiding Florida business currently does today. Florida's Impact Estimating Conference estimates that this will generate more than $1.3 billion in new revenues annually.

This new revenue will be used to replenish the Unemployment Compensation Trust Fund which was depleted by the COVID-19 pandemic. This will help to ensure that necessary unemployment compensation is available for Florida workers seeking re-employment. When the trust fund reaches pre-pandemic levels, this revenue will be used to buy down Florida's business rent tax.

Legislation was passed that grants immunity for civil liability to businesses against COVID-19-related injury and death lawsuits. The new law applies to business entities, hospitals, nursing homes, educational facilities, government entities, and houses of worship.

It was pointed out that Florida has led the nation in K-12 education reform over the past 20 years and that Florida's system of higher education is consistently ranked number one by U.S. News and World Report. Participants emphasized the need for "better messaging" and doing a better job telling our story about Florida's Manufacturing careers and opportunities. Middle- and high-school students need to better understand what Manufacturing is and, just as important, what it is not. There is a need to create pathways for students for careers in Manufacturing, and the gap between skills that are being taught in our schools and skills the Manufacturing and business communities must be closed as well.

Panelists emphasized the need for more advocacy by Manufacturing interests now that state Capitol has reopened. As the 2022 legislative session approaches (January 2022), additional effort will be needed to secure the passage of legislation that is important to Manufacturers and the business community, including:

- Reauthorization of the Qualified Target Industry (QTI) tax refund to encourage quality job growth in targeted, high value-added, jobs;
- Improved workforce training, education, and infrastructure;
- Incentives for Manufacturing employees to return to work;
- Upskilling;
- Lawsuit abuse (tort) reform;
- Scheduled corporate tax increases; and
- Federal tax reform.

The COVID-19 pandemic underscored the importance of a robust and resilient supply chain. It is important to use platforms such as the Connex Florida database and the Associated Industries of Florida/National Association of Manufacturers database to connect manufacturers and suppliers to purchasers.

VIRTUAL SESSION 2

TALENT DEVELOPMENT

JULY 27-28, 2021

The theme of the second virtual event, held on July 27 and 28, 2021, was Talent Development. The second session focused on securing properly trained employees to ensure that Florida's Manufacturing workforce has the requisite skills to succeed and to grow Florida's Manufacturing sector, and included breakout sessions on sector strategy best practices, untapped resources for skilled workers, technology acceleration and the talent pipeline, and Florida's business climate for talent development.

SECTOR STRATEGY DEFINED

Andra Cornelius, Senior Vice President, Business and Workforce Development, CareerSource Florida

CareerSource Florida plays a vital role in creating a statewide talent pipeline development framework through the creation of strategies, polices, and investments to grow Florida's workforce system. CareerSource Florida's business-based Board of Directors is appointed by the governor and represents a cross-section of stakeholders who have an interest in Florida's talent development system.

A key focus of the Board and the network has been identifying the skills employers demand, responding to the talent needs of businesses with strategies and workforce investment, and strengthening the pathway to good jobs and careers, particularly for Floridians who face barriers to employment. CareerSource Florida works closely with the 24 local workforce development boards—along with many state agencies, business, education, and economic development partners—to connect employers with qualified and skilled talent and provide Floridians with employment and career development opportunities to help them achieve economic prosperity.

"Sector strategies" (regional industry-focused approaches to building skilled talent) have proven to be an effective way to align public and private resources to address the talent needs of Florida manufacturers.

> *"Regions that embrace sector strategy have much more success in coalescing everyone around the industry in achieving new programs, new opportunities for attracting talent, etc. We bring everyone together who's involved collectively, share data, share resources, and achieve a common goal much more efficiently and effectively by working together."*
>
> —Tina Berger, Director of Manufacturing Talent Development, FloridaMakes

Florida manufacturers have met and continue to meet the most extraordinary challenge in response to the COVID-19 pandemic. Florida's economy is rebounding and CareerSource Florida and its many partners are focused on building an inclusive economic recovery that provides meaningful opportunities for all Floridians to achieve their full potential. Workforce development has never been more important to the success of Florida businesses and to Floridians than it is today. It is even more critical after the pandemic.

The federal Workforce Innovation and Opportunity Act (WIOA)[21] has challenged organizations like CareerSource Florida to change the way they help businesses and job seekers—to change our way of thinking from transactional (helping an individual job seeker) to transformational (system changes to change how we help entire populations of

21 Public Law 113-128.

job seekers and entire business sectors to meet our talent needs). Sector strategies do just that. The WIOA compels Florida's workforce system to think strategically about how to support those business sectors or industry clusters through collaborative solutions that create long-term, sustainable talent pipelines. In workforce parlance, this is what is referred to as sector strategies. Since 2015, CareerSource Florida has commissioned state and regional convenings, invested funding, created policy as well as capacity-building tools to enable all areas of the state to fully implement this framework.

There are six key elements to an effective sector strategy solution: (1) they are built on and around great data; (2) they are founded on a shared regional vision; (3) they are guided by industry; (4) they lead to strategic alignment; (5) the transform how employer and job-seeker services are delivered; and (6) they measure, improve, and sustain outcomes of local workforce partnerships (see Figure 12).

Effective sector strategies rely on strong sector partnerships (e.g., industry partnerships, workforce collaboratives, or regional skills alliances). Sector strategies allow us to be transformational rather than transactional in our approach to supporting them. We can consider the talent pipeline for an entire industry sector (manufacturing) instead of meeting the immediate needs of just one business.

For economic development professionals, there is an opportunity for meaningful alignment with the workforce system since we are all focused on targeting and prioritizing industries for economic growth, winning communities, and intentional inclusiveness focused on those individuals that need our help the most.

Figure 12. Sector Strategy Solutions

Source: CareerSource Florida

CareerSource Florida has developed a sector strategy policy and toolkit (https://careersourceflorida.com/sector-strategies/) to enable local areas to self-assess where they are in implementation with an eye toward keeping in lock step with industry needs. Using this self-assessment allows local boards to drill down to see how integrated and effective their sector strategy efforts are to date and to identify next steps going forward.

Turning to work-based learning opportunities, apprenticeships represent a proven solution for recruiting, training, and retaining world-class Manufacturing talent. Exposure to a skilled trade through an apprenticeship has shown to be a promising pathway for filling many of the skilled jobs that are hard to fill in the Manufacturing industry.

Apprenticeship Florida is a partnership that includes CareerSource Florida, the Florida Department of Economic Opportunity and the Florida Department of Education. Apprenticeship Florida is funded by a State Apprenticeship Expansion grant from the U.S. Department of Labor to advance Registered Apprenticeship as a talent pipeline in targeted sectors, driving economic development across the state.[22] Apprenticeships provide a number of primary benefits, including:

- Transfer of knowledge and specific skillsets;
- Training is customized;
- Provides a stable pipeline to replace workers who will be retiring;
- Employees are motivated, since wage increases are tied to what employees learn; and
- Emphasis on employee safety.[23]

CareerSource Florida can help more businesses develop these work-based learning opportunities. There is a growing momentum in this area as CareerSource Florida continues to find ways to innovate work-based learning. The reality of the current labor market is that Florida currently has more jobs looking for people than people actively looking for jobs. Businesses still struggle to find employees with proper skill set and experience. According to the Florida Chamber Foundation's Scorecard, there are currently 528,300 open jobs and 523,000 unemployed persons.[24] The Manufacturing sector has seen an 80 percent increase in online job openings from June 2020.[25]

"Addressing this skills gap is both everyone's problem to have and yet, not precisely, anyone's to solve."

—Andra Cornelius, Senior Vice President, Business and Workforce Development, CareerSource Florida.

This brings us back to the same solution—collaboration—which is enabled through a sector strategy framework. It takes partnerships and cultivating work experience opportunities alongside our education partners.

"It's important to have all the key players in the room when you're making the decisions. That way you can find out where the issues are, create solutions and collaborate to solve the issue… Having your local universities, having your school system, having local manufacturers, everybody in the same room, it really helps support that collaboration and really makes people feel more comfortable working together so you're not standing out there on your own."

—Jason Jones, Vice President of Business Development, Sentry View Systems

The good news is the path to lifelong sustainable skills development begins with a job. Work-based learning experiences excel at improving the skills of workers and creating more competitive opportunities. Soft skills feed into meaningful career paths. Employees in "feeder industries" such as Leisure and Hospitality have many of the soft skills that Manufacturing employers report as missing from applicants applying for vacancies. Manufacturing affords employees in these feeder industries who have the requisite soft skills (e.g., communications and leadership) an opportunity for higher wages and a career in Manufacturing.

22 Apprenticeship Florida, "Filling Florida's Skills Gap Through Apprenticeships."

23 Statement by 2021 Summit participant Bayne Beecher, Production Control Manager, PGT Custom Windows & Doors.

24 Florida Chamber Foundation, "The Florida Scorecard," retrieved from https://thefloridascorecard.org/?AspxAutoDetectCookieSupport=1, August 10, 2021.

25 Statement by Summit participant Andra Cornelius, Senior Vice President, Business Development, CareerSource Florida.

SECTOR STRATEGY BEST PRACTICE:
THE TECHNICIAN BOOT CAMP

A panel of distinguished thought leaders from the Space Coast Economic Development Council and its partners was convened to discuss the Technician Boot Camp. Distinguished speakers and panelists for the Technician Boot Camp session include:

- Lynda Weatherman, President & CEO, EDC of Florida's Space Coast (moderator);
- Frank Margiotta, Dean, Career & Technical Education, Eastern Florida State College;
- Brian Hulsberg, President & GM, Spacecoast Cable & Harness, Inc.;
- Marilyn Barger, Executive Director, Florida Advanced Technological Education Center (FLATE); and
- Mike Ennis, Business Advisor, Florida Makes / EDC of Florida's Space Coast.

The Brevard County Technician Boot Camp, a hands-on training program designed for the Space Coast's Manufacturing industry, was launched in the fall of 2020. In collaboration with local businesses, the Economic Development Commission of Florida's Space Coast (EDC), and FloridaMakes identified the skills and training needed to advance careers in Manufacturing. Working with the Eastern Florida State College (EFSC), the EDC and FloridaMakes designed a 32-week intensive training course called the Technician Boot Camp.

> *"This program is another example of how the college is working closely with local industry and economic development officials to tailor training that creates a pipeline of highly skilled workers… Workforce programs such as this are a central part of our mission and are growing as aerospace, high-tech, and manufacturing companies expand in our community. We're excited to be part of the effort."*
>
> —Dr. Jim Richey, President, Eastern Florida State College[26]

Participation in the Technician Boot Camp is on-line and on weekends, over two 16-week semesters. Worth 12 credit hours toward completion of an Engineering Technology Associate in Science (ETAS) degree, the Technician Boot Camp augments the credentials for the Certified Production Technician (CPT) program, an industry-recognized certificate that counts as 15 credit hours toward the ETAS degree. Students who complete both the Technician Boot Camp and the CPT programs are within 33 credit hours of the ETAS degree.

The curriculum for the Technician Boot Camp focuses on safety, manufacturing processes and procedures, quality practice and measurement, and maintenance awareness. Specific course requirements include:

- **Applied manufacturing mechanics**, ETIC 2001 (3 credit hours)—provides a hands-on approach to identification, use, care of tools, blueprint reading, geometric dimensioning, and tolerances used in all aspects of operations and manufacturing;
- **Through-hole and surface-mount soldering**, EETC 1610 (3 credit hours)—high-reliability through-hole soldering inspection techniques, current industry soldering inspection techniques, electrostatic discharge awareness and prevention, surface mount techniques, and introduction to rework and repair;
- **Non-destructive and destructive testing**, ETIC 2121 (3 credit hours)—covers the history, advantages and disadvantages of non-destructive testing (NDT) and new developments in nondestructive evaluation (NDE). Topics include detecting discontinuities in components during material processing, introduction to destructive testing, and the use of equipment such as hardness testers and other testing equipment to perform the methods in NDT; and

26 Eastern Florida State College, "EFSC Launching 'Technician Boot Camp' for Local Industry," retrieved from https://www.easternflorida.edu/news-events/news-releases/2021/04-27-technician-boot-camp-announcement.cfm, August 10, 2021.

- **Cabling and wire harness assembly**, EETC 1612 (3 credit hours)—follows the standards for electronics assembly manufacturing. Presents common understanding of the IPC/WHMA-A-620 document, terms and definitions. Includes collection of visual, electrical, and mechanical quality acceptability requirement for cable, wire, and harness assemblies.

Those with CPT credentials qualify for Assembler jobs, and there are currently more than 50 job openings in the Melbourne area paying $14/hour. Those with Technician Boot Camp credentials on top of this qualify for Engineering Technician jobs, and there are currently more than 100 job openings in the Melbourne area paying $18/hour.[27]

It is important to note the degree program that Technician Boot Camp courses are part of is available at more than 20 Florida colleges. The Technician Boot Camp model can easily be replicated across the state. The Technician Boot Camp provides a great opportunity for Florida colleges and communities to work with their EDCs and workforce agencies. Because Technician Boot Camp courses are provided on the weekends, participation does not interfere with participants' regular employment.

> *"I believe this new training program will be an excellent asset for North Brevard. As a business owner, I will definitely support the training of individuals looking to excel in the Manufacturing arena."*
>
> —Brian Hulsberg, President & General Manager, Spacecoast Cable & Harness, Inc.

The biggest challenge in providing this program is finding qualified instructors who are subject matter experts (SMEs) and who have the requisite academic credentials (Masters degree) and teaching skills. As many Floridians in their 50's and 60's contemplate retirement, an increasing number consider a career change instead, one that allows them to give back to the community. Pursuing a teaching job after retirement has grown as an alternative to traditional retirement. Retirees who become teachers have the chance to put some of their life experiences to use and pass along their wisdom to the next generation.

Retirees are finding it easier than ever to switch careers to teaching. Every state has alternative certification paths for aspiring public- school teachers. About 20 percent of the 35,000 people who use alternative certification are age 50 and older, according to the National Center for Education Information (www.ncei.com), a research group on teacher training.[28]

Traditional tuition assistance and financial aid are not available to support this program. Although a college may have several needs-based scholarships students can apply for, it makes sense for those wishing to participate in the Technician Boot Camp to work through their employers or invest in themselves.

Some employers offer tuition reimbursement if the coursework is related to their field. This makes the employee with CPT credentials more valuable to the employer and provides support for future development of employee.

27 Job openings and estimated wages from Indeed.com, retrieved July 14, 2021.

28 Robert K. Otterbourg, "Retirees Try Teaching as a Second Career," Kiplinger, April 30, 2009, retrieved from https://www.kiplinger.com/article/retirement/t012-c000-s001-retirees-try-teaching-as-a-second-career.html, August 10, 2021.

SECTOR STRATEGY IN ACTION:
ADVANCED MANUFACTURING WORKFORCE LEADERSHIP COUNCIL

A panel of distinguished thought leaders was convened to discuss the work of the Advanced Manufacturing Workforce Leadership Council. Distinguished speakers and panelists for the session include:

- Tina Berger, Director of Talent Development, Florida Makes (moderator);
- Roy Sweatman, Owner, Southern Manufacturing Technologies;
- Dee Setzer, HR Manager, Ft. Walton Machining, Inc.;
- Josh Parkin, Plant Manager, JBT AeroTech and
- Pete Cirak, Quality Assurance Director, Seal Dynamics.

Florida's Advanced Manufacturing Workforce Leadership Council, through a sector strategy approach, provides an essential business feedback loop to ensure Florida's training and workforce system has a deep understanding of, and is responsive to, the talent needs of the advanced manufacturing industry sector. Membership includes Manufacturing executives, plant managers and human resources executives representing Florida's regional manufacturing association network. Council members work with other industry stakeholders to share best practices and address statewide talent and workforce policy matters.

Panelists discussed the challenge of attracting the next generation of manufacturers. Florida's Manufacturing workforce is older—about 55 percent of Florida's Manufacturing workforce is aged 45 or older, and less than three percent is aged 16 to 20. Manufacturers are watching their existing workforce age and retire as years of experience is walking out the door. In addition, there are an estimated 2.1 million Manufacturing jobs that will not be filled between 2021 and 2030 due to lack of skilled talent (recent Deloitte analysis). More than one-third of Manufacturers surveyed said that it is harder today to find the right talent needed to fill positions than in 2018.

Traditionally, the focus of the K-12 education system has been on promoting the notion that everyone needs a four-year college degree. As a result, many have piled up significant student loans and still have trouble finding a good job. The critical question becomes "how to reach out to critically under-represented populations, particularly young girls and women?"

Getting local Manufacturing companies involved in the schools is key. There are not a lot of economic sectors going into the schools. Manufacturing is playing a leadership role here. Today's K-12 students do not know how to relate to Manufacturing jobs. It is up to the Manufacturing industry to go into the schools to educate school guidance counselors, administrators, students, and parents that Manufacturing jobs are widely available and a lucrative career choice. As they learn more about the opportunities in Manufacturing, light bulbs come on as students start to better understand the alternative career path Manufacturing offers.

> *"From a business imperative standpoint, we need a sustainable pipeline of skilled and motivated workers… We found out through early intervention with the K-12 education system that there really is a lack of awareness of the great jobs and careers that are available within the Manufacturing sector."*
>
> —Josh Parkin, Plant Manager, JBT AeroTech

Credentials plus college credits help to get over the stigma of what Manufacturing is and promotes the importance of credentials. Establishing and sharing performance metrics with educators is important. Being an active member of local committees permits manufacturers to provide feedback to educators on those metrics to ensure curriculum is relevant up to date and effective.

> *"… as a manufacturer, if you want to influence and be more effective or cause more effect on improving their systems, you've got to be a part of it…"*
>
> —Pete Cirak, Quality Assurance Director, Seal Dynamics

Traditional apprentice programs often experience low participation because the required courses are only offered in the evening, usually inside a classroom at a local college or vocational school. Participants must balance work-life responsibilities of family, transportation, and personal time to further their education.

Designed through a sector strategy approach led by FloridaMakes' Advanced Manufacturing Workforce Leadership Council, Florida's Industrial Manufacturing Technician (IMT) apprenticeship is competency-based and focused on advancing entry-level skills of existing and new employees in IMT occupations.[29] Apprentices must complete 2,000 hours of on-the-job training and 200 non-working hours of online instruction. The on-line portion of the program uses Manufacturing Skill Standards Council (MSSC) on-line courses, which are interactive and feature state-of-the-art e-learning simulation and technologies.

The curriculum is nationally recognized as an industry standard for entry level training.[30] The apprenticeship allows employers to grow talent internally while motivating employees with a flexible program that builds a career in advanced manufacturing. The curriculum can be customized to align with a particular company's specific policies and on-the-job training programs. Upon completion, apprentices receive Certified Production Technician MSSC certifications, which is an industry-recognized national manufacturing credentials.

Manufacturing's critical skills shortage can be addressed in part by enlightening today's youth about high-tech Manufacturing and its contribution to innovation, productivity, economic growth, and high-quality Manufacturing. Late elementary school years is a critical point for students to see how and why science and math classes lead to real-world possibilities, especially for young girls.

Designed to provide high school and college students with access to valuable educational resources and constructive hands-on learning experiences, the Adopt-a-School Program connects students and their schools with manufacturers in their area to give them an in-depth look at the world of Manufacturing. Manufacturers can participate in activities such as hosting students on tours of their facilities, visit schools to give talks offering insight into their industry, mentor interested students and promote valuable internships. Schools in the program provide their students an insightful look at careers in growing Manufacturing industries and offer them exciting learning opportunities outside the traditional brick and mortar walls.[31]

> *"…the only way we're going to solve the skill shortage in manufacturing is if everybody gets into training and realizes they have to 'grow your own' especially with apprenticeships. If we all do that, the skills shortage will go away."*
>
> —Roy Sweatman, Owner, Southern Manufacturing Technologies

29 FloridaMakes, "About the FloridaMakes' IMT Program," retrieved from https://www.floridamakes.com/imt-program.stml, August 12, 2021.

30 Ibid.

31 Association for Manufacturing Excellence, "The Association for Manufacturing Excellence Launches Adopt-a-School Educational Initiative," retrieved from https://www.ame.org/files/press-release/ame_launches_adopt-a-school_initiative.pdf, August 12, 2021.

UNTAPPED RESOURCES:
STATEWIDE SOURCES FOR SKILLED WORKERS

- A panel of distinguished thought leaders was convened to discuss the organizations they represent and the benefits their organizations bring to the talent pipeline. Distinguished speakers and panelists for the Untapped Resources session include:
- Joseph D'Souza, Vice President of External Engagement, The Able Trust;
- Remero Green, Director of Mission Programs, PRIDE Enterprises;
- Dehryl McCall, Senior Director of Business & Workforce Development, CareerSource Florida; and
- Jeremy Sinnemaki, Director of Veterans Employment and Training Services, Veterans Florida.

Panelists discussed the challenge of making the best use of untapped or underutilized resources. Between 2021 and 2030, more than one million Manufacturing jobs that will go unfilled for a lack of skills. There are resources that are untapped or (at best) underutilized. Veterans Florida is a non-profit organization created by the state of Florida to help military veterans make the transition to civilian life and to promote Florida's status as a veteran-friendly state. Veterans Florida provides powerful tools for veterans to take advantage of the benefits of living and working in Florida, including:

- **Career assistance services**—assists veterans and their families with interview preparation, resume preparation, and matching their interests to career opportunities. Veterans Florida works with employers to educate them on the values veterans bring to the workforce and the skills veterans have that employer may not be aware of; and to help them get the skills they need but may be lacking due to their military service.
- **Workforce training grants**—provides incentives for employers to hire veterans so they can get the skills/certification they need. Employers are reimbursed (up to $8,000 or one-half the cost of the training) when training is completed.
- **State skillbridge provider**—during last 180 days of active service, with commander approval, a veteran can remain on active duty with full pay and benefits and work a civilian job. The employer does not pay while the veteran is on active duty, which is a huge benefit to the employer. The employer can train the veteran the way they want to while they are still on active duty. There is no requirement to hire the veteran at the end of the program.
- **Agriculture**—a six-month training fellowship that provides veterans and servicemembers with comprehensive, hands-on experience and equips the veteran with the knowledge, skills, and abilities to be competitive for leading careers in Florida's agriculture industry.
- **Entrepreneurship**—helps veterans start a business or grow a business and connects veterans with various entrepreneurial resources and mentors.

The Able Trust is a key leader in providing Floridians with disabilities opportunities for successful employment. The Able Trust youth programs provide career development and transition to many students with disabilities annually, helping to reduce the dropout rate and prepare young adults for life beyond high school.

Almost 81 percent of Florida's high school seniors with disabilities graduated with a high school diploma last year. Just shy of 59 percent of students with disabilities are either entering post-secondary institutions and training programs or becoming competitively employed within a year of graduation. One-in-four Floridians are disabled and about 1.2 million are of working age. The gap between the employment participation rate of people with disabilities and the general population is more than 40 percent. This number is unchanged over the past 40 years. Of the 1.2 million working age Floridians with disabilities, only 480,000 are employed.

> *"So… the real opportunity for Florida's talent pipeline is the 720,000 people with disabilities that could be filling your vacant positions."*
>
> —Joseph D'Souza, Vice President of External Engagement, Able Trust

The obvious question is "why aren't businesses taking advantage of this pool of workers?" A July 2020 Able Trust survey of the hiring practices and perceptions of more than 600 businesses found that 81 percent of the respondents felt persons with disabilities performed the same as persons without disabilities. Further, 15 percent reported that employees with disabilities outperformed co-workers with no reported disability.[32] When asked why persons with disabilities were not hired:

- 23 percent said the work could not be completed by disabled person;
- 23 percent had concerns about liability;
- 18 percent thought the accommodations would cost too much;
- 8 percent were concerned about workers compensation;
- 7 percent had concerns about customer discomfort; and
- 7 percent did not have "buy-in" from management.[33]

Florida communities would be safer and taxpayers would save considerable money by training eligible inmates in vocational skills and transitioning them into the job market upon completion of their sentences. This job-centered approach lowers the number of repeat offenders and reduces criminal justice costs for all Floridians.

Prison Rehabilitative Industries and Diversified Enterprises (PRIDE) is a great source of talent for manufacturing jobs. PRIDE trains 2,000 inmates each day, and there is an average of 3,500 participants annually in PRIDE work program. PRIDE has a proven track record training inmates, teaching them work ethic, job skills, and providing industry-recognized credentials, such as the Certified Production Technician (CPT).[34]

As the only program of its kind in the U.S., PRIDE helps inmates learn real world job skills and helps with their successful reentry to society through 37 work programs and 19 state correctional facilities. Participants are three times less likely to commit new crimes than non-participants. The recidivism rate for PRIDE participants (less than 8.63 percent) is about one-third the state average (24.5 percent). The average entry salary wage for PRIDE placements (2020) was $12.73/hour.

CareerSource Florida connects employers with qualified, skilled talent and Floridians with employment and career development opportunities to achieve economic prosperity. CareerSource Florida, together with its partners (Department of Economic Opportunity, Department of Education, Department of Children and Families, Enterprise Florida, FloridaMakes, 24 local workforce development boards, and 100 career centers throughout Florida), helps to connect businesses with the talented workforce and training needed to increase prosperity of workers and employers, reduce welfare dependency, meet employer needs, and enhance productivity and competitiveness.

CareerSource Florida and network of 24 workforce boards across the state have established advanced manufacturing as a priority industry sector, assisting with recruitment, hiring, and training. Last year the network provided services to more than 4,700 manufacturers, connecting them to talent, workforce and training needs, helping them to succeed and grow. CareerSource Florida operates two state-level training grants:

- **Quick Response Training Grant**—provides grant funding for customized, skills-based curriculum development and training, through partial reimbursement, to new or expanding businesses in Florida's targeted industries (qualified targeted industries). These are high-skill industries with exportable goods or

32 The Able Trust, "2020 Disability Inclusion and Employment Trends Survey," July 2020.

33 Ibid.

34 CPT certification recognizes individuals who demonstrate mastery of the foundational, core competencies of advanced manufacturing production at the entry-level to front-line supervisor through successful completion of the certification assessments.

services and wages of 125 percent above state or local wages.

- **Incumbent Worker Training Grant**—created for the purpose of providing grant funding for continuing education and training of incumbent employees at existing Florida businesses. The program will provide reimbursement grants to businesses that pay for preapproved, direct, training related costs. Currently, companies may receive a reimbursement rate up to 50 percent or 75 percent.

Local workforce boards help with short-term recruiting through job postings (which allow employers to search for qualified applicants); provide recruitment services (e.g., pre-screening of candidates); and hosting hiring events (e.g., job fairs and virtual hiring events). For intermediate hiring needs (jobs that need to be filled but require some training), the network assists manufacturers through provision of training funds to offset training costs and work-based opportunities (on the job training) and customized training.

For current employees who require upskilling, businesses can utilize local incumbent worker grants. For long-term talent development needs, registered apprenticeships represent a time-tested "earn-while-you-learn" model that combines, on-the-job training and classroom instruction with mentorship and wage increases as an employee's skills and knowledge advance. Apprentices earn nationally recognized certification, and the employer gets a dedicated skilled employee.

FLORIDA WORKFORCE NEEDS STUDY

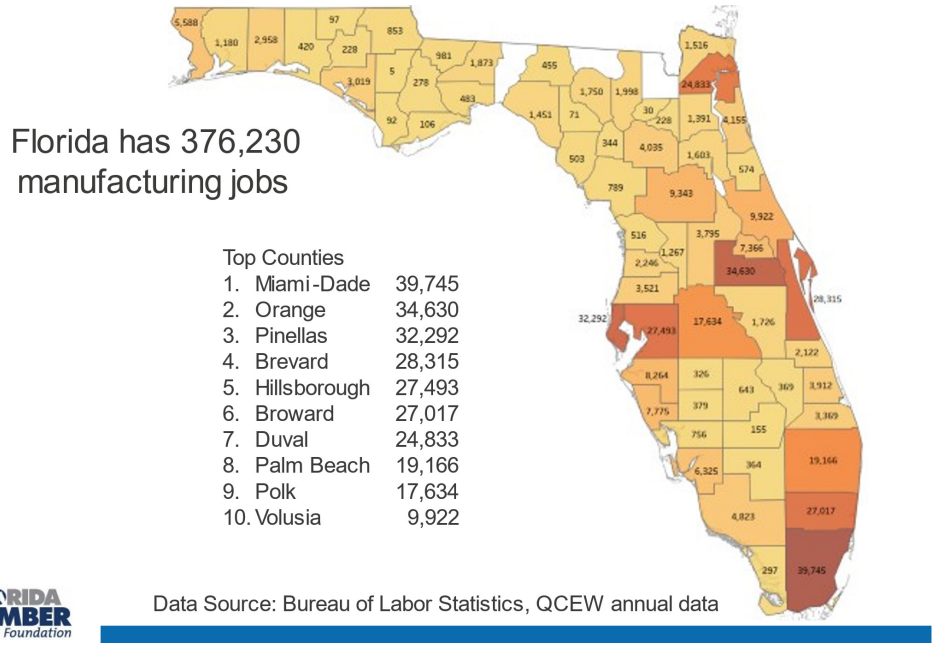
Dr. Jerry Parrish, Chief Economist and Director of Research,
Florida Chamber Foundation

The Florida Chamber's 2030 Blueprint includes 39 goals, one of which is to improve Florida's economy from 17th in the world to 10th by the year 2030. The Chamber recently released its *Florida Workforce Needs Study*, a "first-of-its-kind" job market report that provides a comprehensive look at the skills Floridians need to have in order to shift from oversupplied occupations to in-demand occupations with more demand than supply (and higher wages).

Florida currently has 376,230 Manufacturing jobs (see Figure 13).[35] This represents a reduction of almost 5,600 Manufacturing jobs since June 2019. Among the 50 states and the District of Columbia, Florida currently ranks 12th in the number of Manufacturing jobs. The goal established in the Chamber's 2030 Blueprint is to break into the top five by 2030. To do that, Florida is going to going to have to create a couple of hundred thousand new Manufacturing jobs.

35 Florida Chamber Foundation, "The Florida Scorecard."

Figure 13. Florida's Manufacturing Jobs by County



One of the Chamber's goals for 2030 is to double the Gross Domestic Product (GDP)[36] that comes from Florida's rural counties. Manufacturing is especially important to the economies of Florida's rural counties. Manufacturing affords these rural counties an opportunity to dramatically grow their GDPs, since Manufacturing has the highest contribution to GDP per capita than any other economic sector. Up to 30 percent of jobs in rural counties are Manufacturing jobs. Currently, only 2.28 percent of Florida's GDP comes from the rural counties; the Chamber's goal is to increase to 4.62 percent by 2030.

Manufacturing jobs make up 5.1 percent of all Florida jobs. These jobs produce 6.1 percent of Florida's total private sector wages. Manufacturing jobs pay well—even though the number of Manufacturing jobs has decreased, the average annual wage (2020) is $66,698 (see Figure 14). In 2020, every state in the nation lost Manufacturing jobs because of the COVID-19 pandemic. Overall, the U.S. lost 4.5 percent—Florida lost 2.0 percent (fourth lowest).

36 Gross domestic product (GDP) is a monetary measure of the market value of all the final goods and services produced in a specific time period.

Figure 14. Florida's Manufacturing Wages by County

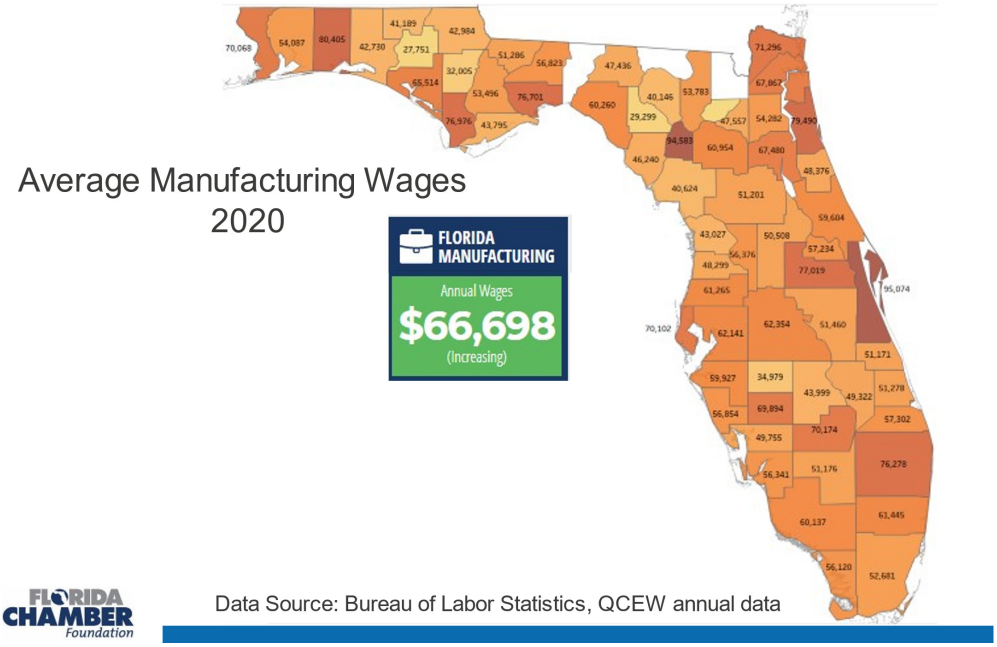
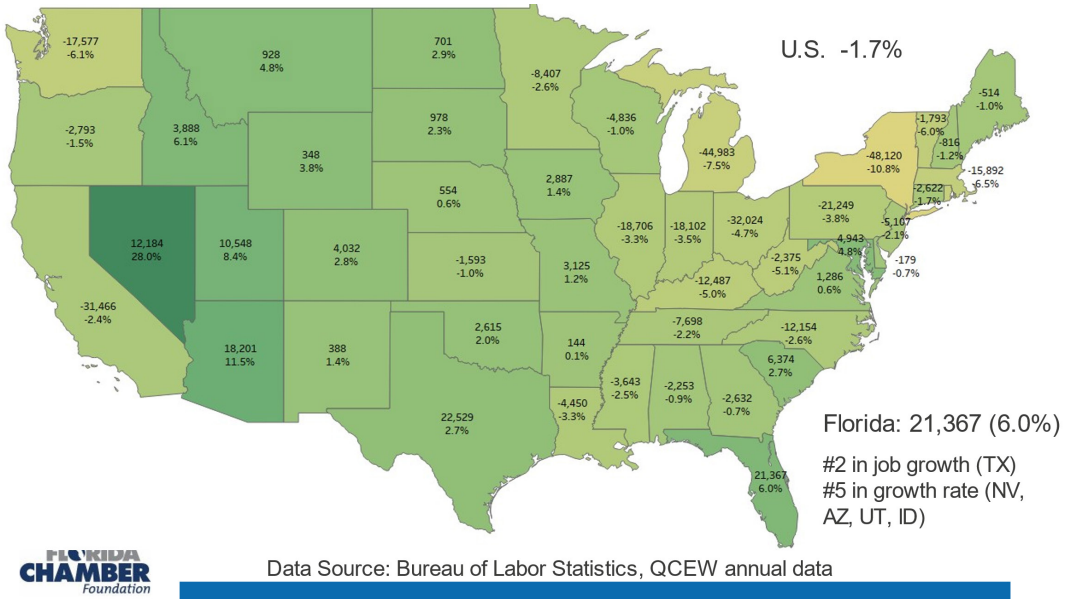


Figure 15 shows Manufacturing job changes by state from 2016 to 2020. Overall, the number of U.S. Manufacturing jobs declined 1.7 percent. Florida ranked second in term of Manufacturing job growth during this period with 21,367 new Manufacturing jobs, a growth of 6.0 percent. Only Texas had higher Manufacturing job growth. In terms of Manufacturing job growth rate, Florida ranked fifth, trailing only the smaller western states of Nevada, Arizona, Utah, and Idaho. These western states have benefitted from the exodus of companies from California (-31,466 jobs).

Figure 15. U.S.—Manufacturing Jobs Changes by State (2016-2020)



The Chamber's recently released *Florida Workforce Needs Study* forecasts workforce needs by industry, then by occupational group. This study looks at actual skills that are needed to get people back into the workforce or to transfer into a higher-wage, higher growth, industry. Table 1 shows the greatest differences between the estimated supply and demand for skill competencies in Florida.

Table 1. Top 10 Greatest Demand-Supply Shortages (Gaps)

Skill Competency	Salary	Gap
Employability Skills	$51,857	277,752
Media/Avtech: Telecom	$54,825	123,747
Maintenance/Facility Services	$46,838	117,888
Social Sciences & Services	$55,133	69,177
Marketing Research & Intelligence	$57,126	68,667
Mathematics	$57,106	55,716
Quality/Compliance	$54,788	41,408
Electrical/Electronics	$55,360	36,099
Healthcare: Therapy	$57,170	34,431
HR: Employee Relations	$54,566	34,008

Source: Florida Chamber Foundation, "Florida Workforce Needs Study."

Identifying these workforce needs affords the Florida College System the opportunity to take these skills and develop the necessary certification programs and degrees to close the identified gaps. Employers can also use this information to establish training programs to address these identified gaps and to help people transition from one industry to another.

Manufacturing has been hiring people from other sectors for a long time. Employees who begin their career in Hospitality & Food Services, Office & Administrative Services, and Retail are most likely to transition into Manufacturing as their next job. Florida is attractive to manufacturers in other states. With no state income tax, a better quality of life, and a great business climate, Florida has much to offer manufacturers looking to relocate their business.

Floridians currently pay too much for inbound goods. Making sure that shipping containers and trucks are filled with Florida products when they leave the state will make Florida manufacturers more competitive.

Reduced funding to Enterprise Florida and the elimination of economic development incentive programs like the Qualified Target Industries (QTI) program has put Florida at a competitive disadvantage with states like Texas and Georgia when it comes to attracting new businesses to Florida. Florida's business-friendly business climate, good weather, and beaches have their advantages; however, the use of economic development incentives has launched an "arms race" between states competing for new businesses and new job creation. The recreation of these economic development incentive programs will send a message to out-of-state manufacturers that Florida is "open for business" and ready to attract high-wage Manufacturing jobs.

The importance of better marketing of Florida's Manufacturing cannot be overstated. Marketing connects manufacturers, wholesalers, and distributors, and helps to make sure Florida's manufactured products reach their intended end user.

FLORIDA DEPARTMENT OF EDUCATION'S FOCUS ON CAREER AND TECHNICAL EDUCATION

Henry Mack, Chancellor, Division of Career, Technical, and Adult Education, Florida Department of Education

Florida has approximately one million students in Career and Technical Education (CTE) each year. With the issuance of Executive Order 19-31, Florida became "hyperfocused" on making Florida the number one state in the nation for workforce education, as well as ensuring that Florida students are prepared to fill the high-demand, high-wage Manufacturing jobs of today and the future. Executive Order 19-31 has made the Florida Department of Education think about how to better couple and align local education offerings with employer needs. This is critical for the future of Florida's economy and is especially critical for those who have been historically neglected or marginalized.

Florida ranks in the bottom ten states in terms of adult education. Florida has a crisis on its hands with about 1.4 million adult Floridians without a high school diploma. Roughly one-in-four (24 percent) of Florida's 14 million adults is barely literate, meaning they cannot do basic arithmetic and are functioning at or below Level 1 literacy, (cannot read past 3rd grade reading level). This adult population is uniquely positioned to serve perhaps as an immediate pool of talent to drive and meet Florida's industry needs. The challenge will be getting those 1.4 million adults without a high school diploma and the nearly four million barely literate adults to reengage in a quality post-secondary education program.

> *"It's for this reason that this priority has risen to the top, at least in terms of how to bridge the skills gap and the divide between what employers are saying they want and need, and what the education system is able to supply… How we are engaging, in other words, these adults in and about the communities in which they live, to reengage them into a quality career and post-secondary education and training, is again the priority of the Department."*
>
> —Henry Mack, Chancellor, Division of Career, Technical, and Adult Education, Florida Department of Education

As a result of our undersupply in information technology (IT) and advanced manufacturing and engineering technology-related skills and graduates, Florida needs to "double down" on advanced manufacturing and IT—we need to think about how to better embed technology education into our career pathways. The governor has committed nearly $26 million from WIOA leadership dollars to target special populations such as adult learners, veterans, and displaced workers to enroll in high-quality certification programs that are IT and advanced manufacturing based.

Last year, the "Get There Florida" campaign was launched as a way of increase enrollment in Florida's 48 technical schools and 28 state colleges, specifically in high-value, short-term CTE programs that lead to a meaningful credential. The two main elements of the campaign are a customizable communications toolkit and a targeted digital campaign.

The toolkit includes social media graphics, 15- and 30-second video clips, fliers and one pagers, press release and presentation templates, and logo files personalized for each school. The digital campaign is targeted to prospective learners in areas close to a technical or state college.[37]

37 Advance CTE, "Learning That Works!," retrieved from https://blog.careertech.org/?p=17083, August 11, 2021.

Florida has committed another $46 million of WIOA Title II leadership dollars to help scale integrated education and training programs to get adult students in their basic skills courses or General Education Development (GED) prep classes concurrently with quality CTE courses. Learning CTE course competencies along with basic education skills will help many Floridians graduate and progress with a sense of career purpose. Educators see success rates go "through the roof" when this model is adopted and successfully used. This model is not possible without industry support.

The undersupply in Manufacturing is also critical. The average gap in skills between what the education system is supplying and what industry needs is estimated to be between 80,000 and 100,000. The Florida Department of Education (FLDOE) is looking to redo curriculum frameworks around IT, engineering technology, and advanced manufacturing. Cybersecurity competencies and outcomes are being updated at all levels. The FLDOE is also looking at Industry 4.0 and other forms of advanced manufacturing training and how that can be embedded across the education system.

The FLDOE's priority is not just on teaching skills, but on equipping students with employability and entrepreneurial-related competencies and skills that we know the industry, market and economy needs. The FLDOE has set aside $1.5 million to scale entrepreneurship training and education. The FLDOE is looking to scale and triple the number of apprenticeships. The FLDOE has established the "earning while learning" model as a high priority. Moneys have been set aside to help manufacturers start an apprenticeship program.

TECH ACCELERATION AND THE TALENT PIPELINE

A panel of distinguished thought leaders was convened to discuss how education providers have adjusted and upgraded programs and curriculums to meet rapidly progressing technology needs. Distinguished speakers and panelists for the Tech Acceleration and the Talent Pipeline session include:

- NiñaFe Awong, Director, Career & Technical Education, Florida Department of Education (Moderator);
- Dante Leon, Associate Vice President, Daytona State College;
- Dr. Nancy Ruzycki, Associate Professor, University of Florida; and
- Chad Schron, Senior Director, Tooling U-SME.

The COVID-19 pandemic has accelerated technology by an estimated ten years, transforming forever the way business is done. When non-essential businesses were shuttered because of the pandemic, most of the instructional content went on-line. Adherence to public health protocols permitted a return to face-to-face instruction a year ago.

Training and retraining your workforce on technology is important given the competition for talent. To be prepared to be part of the 21st century workforce, K-12 students are going to have to have these technological skills. Manufacturers cannot afford to wait until students reach the university level to teach them technological concepts. If we do not start early we will not be able to develop the pipeline by the time they get to the university level.

The Florida Department of Education (FLDOE) put science, especially in middle schools, on its Top 10 list for critical teaching shortages in 2016. In 2017, FLDOE added computer science & literacy and mathematics to the list. Manufacturers need to get an start early building connections between teachers, students, and workforce technology practices. It is critical to get teachers and students over the fear of using technology.

It is important to get teachers to visit local Manufacturing industries to see technology (e.g., sensors and probes) in the workplace. These field trips give teachers a broader perspective on how technology is used so they can better teach it in the classroom. Kindergarten teachers, for example, are using temperature probes to help explain hot and cold.

Improving the pedagogy of STEM learning is critical. The University of Florida has received a $5 million grant from the U.S. Department of Education to improve the pedagogy of Science, Technology, Engineering, and Mathematics (STEM) learning among K-9 students. The project, "Engaged Quality Instruction through Professional Development" (EQuIPD) will involve 11 urban and rural counties within Florida, including Hillsborough, Palm Beach, Hardee, Hendry, Okeechobee, Glades, DeSoto, Highlands, St. Johns, Sarasota and Manatee counties.

These districts account for over 30% of elementary schools on Florida's lowest 300 list and contain 12 schools listed as persistently underperforming (FLDOE, 2017). Schools in the EQuIPD project will benefit directly from targeted teacher professional development programs that will ultimately increase the number of highly qualified STEM elementary and middle school teachers in these schools, resulting in improved student learning activities and outcomes.

Manufacturing must take steps to improve collaboration between educational institutions and industry stakeholders. The Florida Federation for Advanced Manufacturing Education (Florida FAME) is a good example of a program designed to help bridge the gap between educational institutions and Manufacturing. Based on Toyota's Advanced Manufacturing Technician (AMT) program, this "earn-while-you-learn" model provides students a pathway to earn an industry recognized degree while gaining valuable experience at a sponsoring company.

In two years, FAME graduates earn an Engineering Technology Associate of Science degree, and log approximately 1,800 paid on-the-job hours at their sponsoring company. If selected, students participate in the 40+ hour per week training program where they attend college two days a week and work three days a week (at least 24 hours) at their sponsoring company.38 Florida FAME will soon launch its first nine-student cohort.

Manufacturers must continue to invest in new and emerging technologies to train and develop employees. Blended training programs are common ways to improve the skills of Manufacturing employees. Most of these programs are structured around formalized competency models. Most of the competency models have a knowledge component, and a skill component. By focusing on knowledge (e.g., instructional entry, digital books, videos, e-learning, etc.) and skills (structured on-the-job programs, apprenticeships, etc.), employees have a clearer understanding of what they need to know and what they need to be able to demonstrate to be effective.

As a result of COVID-19 social distancing and travel restrictions, advanced technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) have slowly become part of Manufacturing's emerging reality. These three types of technologies are collectively known as extended reality (XR). Investments in augmented reality, virtual reality, and mixed reality permits students to apply what they learn in an XR environment before stepping foot on a manufacturing floor. This promotes a faster time to competency.

> *"If you're going to crash a machine, if you're going to make a mistake, make it in VR before you go out there on the manufacturing floor."*
>
> —Chad Schron, Senior Director, Tooling U-SME.

There are barriers at all levels of Florida's education system to impact and modernize workforce practices in the classroom. If Industry 4.0[39] tools are not available in the schools, it will be hard for students to develop the skills. This lack of access applies not only to the to the tools, but to the infrastructure required to run the tools. Even if school districts are fortunate enough to get virtual reality (VR) packages into CTE classrooms, the districts may not have a computer system that can make it go (VR is very computational heavy). The questions to be answered are "where is the money coming from?" and "who is helping to support schools in the development of new programs?"

38 Retrieved from https://fame-usa.com/, August 13, 2021.

39 The Fourth Industrial Revolution (Industry 4.0) is the ongoing automation of traditional Manufacturing and industrial practices, using modern smart technology.

Meeting this challenge will require significant funding. The cost to provide the IT infrastructure to be able to run 4.0 was estimated at a minimum of $100K per district. More working groups around the state are needed to bring together industries and universities and districts to identify the barriers and come up with ways to address them.

> *"Infrastructure is a huge problem. Having the right technology brought in is another problem. Being able to maintain that technology over time… and then there's the sustained training that is required."*
>
> —Dr. Nancy Ruzycki, Associate Professor, University of Florida

BUSINESS CLIMATE FOR TALENT DEVELOPMENT

A panel of distinguished thought leaders was convened to attendees on recent policy changes that will affect Florida's Manufacturing and general business climate. Distinguished speakers and panelists for the Business Climate for Talent Development session include:

- Karin Hoffman, Founder & CEO, Key Innovative Solutions (moderator);
- The Honorable Clay Yarborough (D-12), Florida House of Representatives;
- Matthew Choy, Policy Director, The Florida Chamber of Commerce;
- Dan McGrew, Vice President, Strategic Policy and Performance, CareerSource Florida; and
- William W. Large, President, Florida Justice Reform Institute.

With the onset of the COVID-19 pandemic, the governor issued an executive order that identified essential businesses that were permitted to remain open. Manufacturing was included among the essential businesses and Manufacturing workers were considered "front-line" workers. This was necessary to make sure the production of essential items (e.g., personal protective equipment, toilet paper, food, etc.) kept pace with demand. Everything that Floridians needed while they were home quarantined still had to be made. Florida's Manufacturing sector remained a bedrock of strength during the pandemic.

The Florida Legislature created the Manufacturing and Supply Chain Caucus, co-chaired by Senator Tom Wright (District 14) and Representative Tommy Gregory (District 73). The legislature recognized that manufacturers and supply chain companies are reliable and supportive community partners who have played a significant role in Florida's economic recovery. The Caucus will focus on bringing awareness to the educational, societal and economic benefits of Florida manufacturers, and will serve as a resource for members of the legislature and community who wish to learn more how they can support their local manufacturing associations.

> *"Before the start of the pandemic, manufacturing and supply chain companies have consistently seen record-breaking economic growth through the years. Today, this industry continues to thrive as they saw an increase in jobs and productivity… In response to the pandemic, we heard story after story of their ingenuity in creating new supply chains that provided much needed public safety equipment for our healthcare workers and first responders."*
>
> —The Honorable Tom Wright, Florida Senate

> *"Florida's vibrant manufacturing sector drives nearly five percent of the state's overall Gross State Product and provides over 380,000 high-wage jobs with an average salary of over $61,000… This sector is thriving and is poised for exponential growth; the formation of the legislature's Manufacturing and Supply Chain Caucus will be key in highlighting the importance of the industry to Florida's economic diversification."*
>
> —Kevin Carr, CEO, FloridaMakes

Other legislative actions addressed how businesses dealt with the COVID-19 pandemic and the state's talent pipeline. The passage of House Bill 1507 will help Manufacturing by making sure Florida's workforce development system is working properly and is accountable, and to make sure the state is delivering on its promise to help the job seeker and the students to get educated and trained and ready to go into the workforce.

House Bill 1507 includes a "money back guarantee" for students coming out of a specified Florida College System (FCS) technical program. Beginning in the 2022-2023 academic year, FCS institutions and each school district will be required to refund the cost of tuition to students who are unable to find a job within six months of successfully completing select workforce related programs that prepare individuals to enter in-demand, middle-level to high-level wage occupations. Each institution is responsible for establishing student eligibility criteria for reimbursement, including student attendance, career service attendance, participation in internships or work-study, job search documentation and development of a student career plan.

House Bill 1507 also includes a "no wrong door entrance" strategy, whereby a Floridian seeking access to education and workforce training must not be required to visit multiple locations. The intent is to make sure Floridians are able to access services from any workforce partner with a common intake form and case management system.

House Bill 1507 also requires the CareerSource Florida state board to appoint a Credentials Review Committee to identify non-degree credentials and degree credentials of value for approval by the CareerSource Florida state board and inclusion in a Master Credentials List. Credentials must include registered apprenticeship programs; industry certifications; licenses; advanced technical certificates; college credit certificates; career certificates; applied technology diplomas; associate degrees; baccalaureate degrees; and graduate degrees. House Bill 1507 requires the Credentials Review Committee to define "credentials of value" and create a framework of quality which aligns with federally funded workforce accountability requirements.

> *"Manufacturing alone… I did a quick look this morning… there's about 27,000 unemployed people in Manufacturing in the state of Florida, there's 30,000 jobs. You mentioned the skills gap – there's more positions in Manufacturing available than there are unemployed folks. There are critical credentials associated with those, so our work toward implementing House Bill 1507 will help to bridge that gap and bring that talent workforce or talent development in alignment with the needs of business."*
>
> —Dan McGrew, Vice President, Strategic Policy and Performance, CareerSource Florida;

House Bill 1507 requires that federal funds reserved for the Incumbent Working Training Program be prioritized as follows:

- Priority 1—Businesses that provide employees with opportunities to acquire new or improved skills by earning a credential on the master credentials list;
- Priority 2—Hospitals operated by non-profits or local governments that provide nursing opportunities to acquire new or improved skills;

- Priority 3—Businesses whose grant proposals represent a significant upgrade in employee skills that are critical in the Manufacturing industry;
- Priority 4—Businesses with 25 employees or fewer, businesses in rural areas, and businesses in distressed inner-city areas; and
- Priority 5—Businesses in a qualified targeted industry (QTI) or businesses whose grant proposals represent a significant layoff avoidance strategy.

Alignment to credentials at every level for all workforce programs is reflected in this priority order.

The 2021 legislature also passed Senate Bill 72 in response to lawsuits filed against cruise industry, big box stores, nursing homes, adult living facilities, restaurants, and manufacturers on the theory that they were negligent with respect to their employees or their customers, causing them to contract the COVID-19 virus. As the impacts of the COVID-19 pandemic continued to be felt by Florida's businesses, non-profits, schools, colleges and universities, and healthcare providers, employers of all types were fearful of keeping their business open or reopening their business because of the threat of opportunistic, predatory, and expensive litigation resulting from alleged exposure to COVID-19 by customers and employees.

Senate Bill 72 established safeguards to protect businesses and their agents and individuals, who are acting responsibly to minimize exposure to COVID-19, from liability against specific types of COVID-19-related claims so they can remain open. These safeguards, which include the following, will also ensure that those who contract COVID-19 because of the gross negligence or intent to harm by others can recover for their injuries:

- A heightened culpability standard for COVID-19 cases;
- A shortened statute of limitations;
- A heightened evidentiary standard; An affidavit process; and
- An evidentiary hearing conducted by a judge.

> *"We were, I think, very fortunate that we had the leadership in the House with our Speaker Chris Sprowls, Representative Yarborough played a big role in that as well, our Senate President Wilton Simpson, and of course our governor, Governor Ron DeSantis. They all came together to listen to the business community and said 'yes, we hear you. We need to open without repercussions of voluminous litigation on this subject'. I think the product was outstanding."*
>
> —William Large, President, Florida Justice Reform Institute

Ensuring that students coming out of their educational programs have the credentials and skills to get a good job and be successful is critical. When local manufacturers partner with workforce boards or local educational institutions, the result is great synergy. It is critical to go out into the community to find out what jobs are available today and work with those companies to make sure they are offering the credentials or degree programs to make workers more prosperous.

It is important to shorten the distance between the classroom and the industry. Manufacturers need to make sure the credentials and apprenticeship programs are leading to positions in today's Manufacturing industry. New accreditation programs have been able to get into the classrooms and provide not just the educational training to the teachers but also to make sure they provide the material to the teachers and therefore to the students. Through digital and distance learning, manufacturers were better able to facilitate these kinds of conversations.

New courses and accreditation organizations will better align what is currently being taught and what will be taught in the future to our current and projected needs over the next 5-10 years. The approach must be holistic—we want to

get these kids as they are going through traditional classrooms, but we also want to make sure the current workforce is receiving the tools to upskill as much as possible.

Looking ahead to the 2022 legislative session (which begins January 11, 2022), panelists emphasized the need for a continued investment in infrastructure (e.g., roads, airports, seaports, etc.) to better move goods and services throughout the state and to other states and countries. Increasing our exports (filling empty and half-empty shipping containers and trucks will help to bring more Manufacturing jobs to the state.

To keep Florida open for business and bring in more Manufacturing jobs to Florida, the legislature should continue its efforts to keep taxes low and minimize regulations that stifle Manufacturing job creation. For example, Florida is the only state that subjects commercial leases to state and local sales taxes. Reducing and eventually repealing what is known as the business rent tax has long been a priority of Florida TaxWatch and the business community.

> *"What makes the Florida economy work is like a three-legged stool. One is regulation. Next is taxation. The final leg is litigation. If we can keep all legs of that stool strong, then there will be a vibrant and strong Florida economy."*
>
> —William Large, President, Florida Justice Reform Institute

VIRTUAL SESSION 3

TECHNOLOGY

AUGUST 24-25, 2021

The theme of the third and final virtual event, held on August 24 and 25, 2021, was Technology. The third session focused on making sure a company's workforce is skilled to keep pace with Manufacturing's technology acceleration. Speakers discussed the benefits of advanced technology, such as Industry 4.0, its impacts on the workforce, and the important role innovation plays in Manufacturing.

SETTING THE STAGE:

INDUSTRY 4.0 DEFINED

Dave Dragon, Business Advisor, FloridaMakes

The growing demand for integrated devices requiring advanced technology is rapidly multiplying, powering a new era known as "Industry 4.0," the fourth major upheaval on modern Manufacturing and industrial practices. Industry 4.0 originated in 2011 from a project in the high-tech strategy of the German government which promotes the computerization of Manufacturing (e.g., advanced manufacturing/smart factories). Industry 4.0 technology is evolutionary, not revolutionary. Every five to ten years or so, there is a quantum leap in technology when the hardware, software, data and knowledge catch up with the vision. We have seen this in "in-memory" computing as computers have evolved from hard drives to chips. Speed has changed the way we go to market with these high-speed technologies.

It is important to look at why industries are implementing Industry 4.0 technologies, as well as the consequences of inaction. Industry 4.0 technologies help to address the chronic labor shortage in Manufacturing. This shortage is not going away any time soon, and implementing automation helps to address this shortage in the short-term. Industry 4.0 technologies will be instrumental in attracting the next generation of Manufacturing employees. Today's younger employees are already accustomed to using hand-held technology devices (e.g., cell phones, computer tablets, etc.).

Industry 4.0 technologies help to improve a factory's operating efficiency. Robotic Manufacturing processes can operate easily and efficiently. Robots are designed to work without breaks and with minimal down time. This translates into substantially greater production and operating efficiencies when compared to human labor. Increased production efficiency (and speed) translates to more products to sell.

Beating the competition is critical to increasing a company's or industry's market share. Industry 4.0 technologies promote competitiveness by constantly "raising the bar." This translates to opportunities for Manufacturing to better compete with other sectors of Florida's economy and achieve a greater percentage of Florida's Gross State Product (GSP). It also provides opportunities for Florida manufacturers to recruit (poach) workers from other states.

Industry 4.0 technologies foster innovation and advance connectivity with customers, suppliers, and employees. It helps to ensure that Florida manufacturers are connected in a connected world. Excel spreadsheets have been replaced with high-quality analytics. Companies at all stages (downstream) of the supply chain need to be part of this connected world.

"One of the things that Industry 4.0 does is foster innovation… these technologies do foster innovation and make people think differently about how they operate."

—Dave Dragon, Business Advisor, FloridaMakes

The nine foundational elements of Industry 4.0 are shown in Figure 16. **Big data and analytics** refers to the use of statistics, graphs, and analysis to measure performance and optimize performance. "Big data" is a term that describes the large volume of data that inundates a business on a day-to-day basis. "Big data analytics" is the use of advanced analytic techniques against very large, diverse data sets.

Figure 16. What is Industry 4.0?

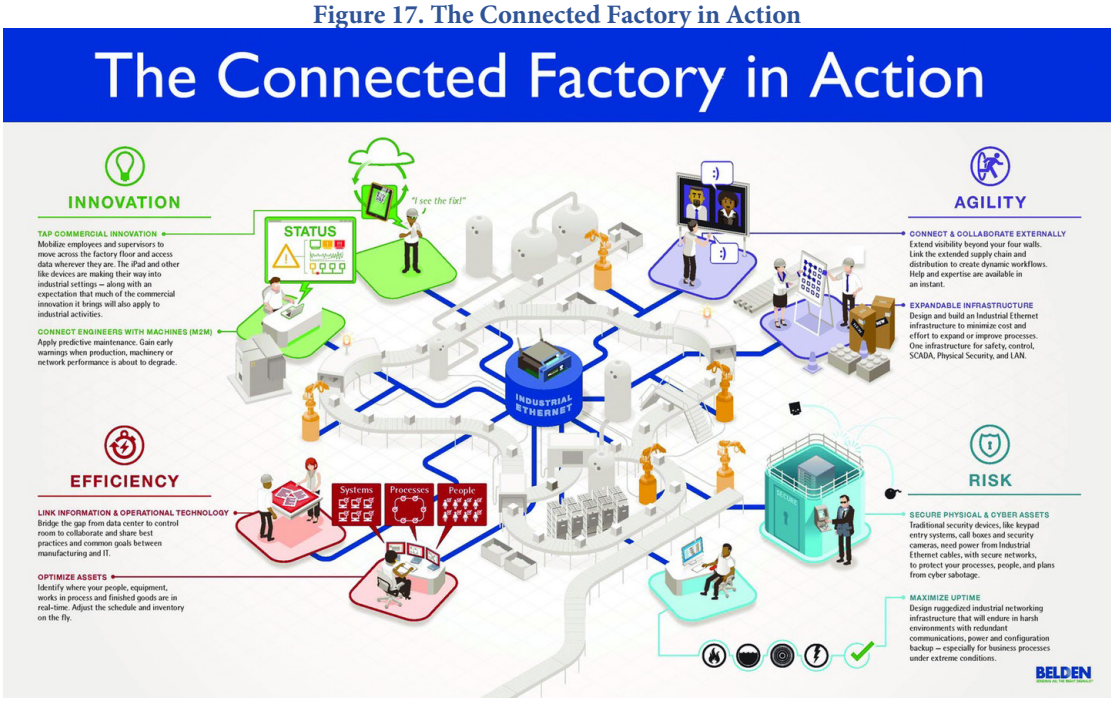
Source: www.pdsol.com

Autonomous robots generate substantially greater production and operating efficiencies when compared to human labor. Autonomous robots are designed and engineered to deal with their own environment on their own, and work for extended periods of time without human intervention. A cobot (collaborative robot) is a robot intended for direct human robot interaction within a shared space, or where humans and robots are in close proximity. Robotic process automation (RPA) refers to technology where a digital "robot" will capture and interpret applications to execute a business process or processes with one or more digital technology systems (usually a back-office process like human resources and accounts receivable).

Simulation refers to an approximate imitation of the operation of a process or system that represents its operation over time. A digital twin refers to a digital replica of potential or actual physical assets, processes, people, places, systems, and devices. Simulations permit the operator to run the process through its paces to see how it will operate in reality.

Horizontal and vertical system integration refers to full digitization (digital thread) of a company's operations that is integrated into every function internal to the organization (vertical) and linking the suppliers, partners, and distributors (horizontal) in the value chain and transferring data among them seamlessly. It connects all of the smart devices (see Figure 17).

Figure 17. The Connected Factory in Action



Source: www.pinterest.es

The **Industrial Internet of Things (IIoT)** provides visibility and insight into a business' operations and assets through the integration of machine sensors, middleware, software, and backend cloud/edge compute and storage systems. This is where all the devices are connected – both inside and outside your plant. The IIoT creates a lot of data so it is critical to give thought to how the data that from these systems will be managed.

Augmented reality provides visibility and insight into a business' operations and assets through the integration of machine sensors, middleware, software, and backend cloud/edge compute and storage systems. This is where all the devices are connected – both inside and outside the plant. The IIoT creates a lot of data, so considerable thought must be given to how the data that comes from these systems will be managed.

Additive manufacturing, also known as 3-D printing, is a printing process where a three-dimensional object is constructed from a computer-aided design (CAD) model. Materials are added layer by layer (i.e., additive manufacturing). Resulting products offer construction advantages such as complex, lightweight designs. Additive manufacturing is a critical part of some companies' research and development process for developing prototypes. Other companies use additive manufacturing in the actual manufacture of their products, while some companies use additive manufacturing to "print" their repair parts on site.

The cloud provides visibility and insight into a business' operations and assets through the integration of machine sensors, middleware, software, and backend cloud/edge computing and storage systems. Just about any software used by manufacturers these days is cloud based. "Edge" computing is a part of a technology architecture in which information processing is located close to the edge (i.e., manufacturing plant) where devices and people produce or consume information. Manufacturers who cannot use real-time effectively when it is moved to the cloud, so placing an edge device on the plant floor to run real time analytics allows the manufacturer to send it up to the cloud for the longer-term analytics.

Cybersecurity protects corporate infrastructure, computer systems, and Manufacturing systems from the theft of or damage to their hardware, software, or electronic data, as well as from disruption or misdirection of the services

they provide from cybersecurity threats. Customers will expect a cybersecurity plan and program and cybersecurity insurance. Manufacturing is one of the top targets for cybercriminals.

FloridaMakes is available to help manufacturers do an assessment of the current state of the organization and help develop an Industry 4.0 strategy and roadmap.

"The consequences are great if you don't do anything relative to Industry 4.0."
—Dave Dragon, Business Advisor, FloridaMakes

SESSION 1:
TECHNOLOGY EXPERTS HIGHLIGHT

A panel of distinguished thought leaders was convened to discuss the state of three-dimensional printing, and other solutions for future automation, including robotic process automation (RPA) and artificial intelligence (AI) and machine learning analytics. Distinguished speakers and panelists for the Technology Experts Highlight session include:

- Roberto Valdez, Director of Cybersecurity, Kaufman Rossin;
- Walter Merkas, Withum; and
- Mindy Beegle, Co-founder and Owner, Dimension Works

The COVID-19 pandemic took a toll on U.S. Manufacturing. Production and order levels are still below 2019 levels. Industrial production is down 16.5 percent year over year and total factory orders are down 22.7 percent year over year. Low value, routine manual processes reduce efficiency and increase chance of errors. Participants cited a recent Bloomberg survey in which 28 percent of respondents said they made manual data entry errors; 17 percent said they deleted customized excel formulas; and 13 percent said they override system data with external calculations.

Through process automation—where software performs functions normally done by people—many of these errors can be eliminated. Robotic process automation can take care of things like opening and closing programs and performing online and database searches. Artificial intelligence is more complex as it involves reading and interpreting data. The benefits of process automation include:

- Reduced costs;
- Reduced time required to complete tasks;
- Reduced errors;
- Increased output (machines work all the time);
- Increased employee time for analysis and judgment;
- Improved audit trail; and
- Improved analytics.

Consider the following example. A clerk opens a pdf file of an invoice and enters details from the pdf into required screens. The clerk then submits the invoice for payment. This manual process takes a lot of time and costs the business a lot of money. Using an automated process, a "bot" can extract details directly from the pdf, enter the details into a database, and submit the invoice for approval. This saves time and money, is more reliable, and reduces errors. This allows people to spend more time on activities that are truly more valuable (e.g., critical thinking, judgment, etc.)

Panelists discussed a case study where a manufacturer was struggling to reconcile inventory between two systems. An automated solution was designed to perform reconciliations and identify differences at the push of a button.

Automating this process reduced costs by 80 percent; reduced errors by 99 percent; and reduced the amount of time required to reconcile inventory by 72 percent.

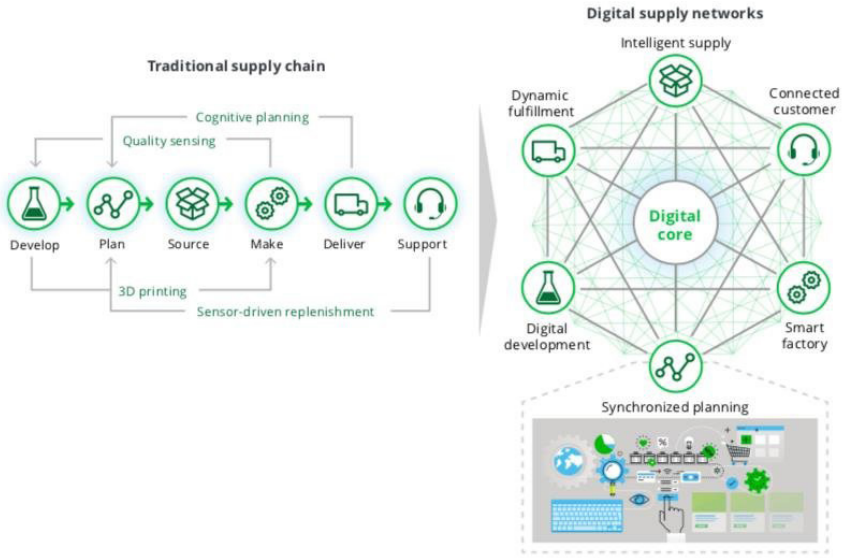
> *"It's a tough decision for a business, especially right now, to make the trade-off between spending a lot of time having a person doing it or spending money to have special software."*
>
> —Roberto Valdez, Director of Cybersecurity, Kaufman Rossin

The COVID-19 pandemic demonstrated the need for resilient supply chains—interactive, dynamic, networks of people, processes, and technologies. Now, more than ever, companies are looking to leverage their supply chain by modernizing systems and tools; reducing complexity by consolidating and simplifying technologies; and by re-thinking how supply chain success should be measured.

Digital supply networks move away from linear supply chain models and one discreet process to an integrated network, which is where the future of supply chain models appears to be heading (see Figure 18). Digital supply networks offer several opportunities for improvement:

- The ability to drive resilience and move quickly, which will be a key to the future;
- Providing additional value through the hypervisibility of real time information;
- The sensors, machine learning, IIoT and other technologies are getting better;
- Fostering digital relationships (instead of people relationships) will be a key going forward; and
- True partnering with your digital network is a key.

Figure 18. Supply Chain and Digital Supply Networks



Source: www.researchgate.net

The successful transition from a traditional supply chain model to supply chain 4.0 would be evidenced by the following characteristics:

- "Always on" agility;
- Connected community;
- Intelligent optimization;
- End-to-end transparency; and
- Holistic decision making.

To overcome the challenges in moving from a physical supply chain to a digital supply chain, the panelists recommended the following approach:

- Establish a digital record—capture information from the physical world to create a digital record of the physical operation and supply network;
- Analyze and visualize—machines talk to each other to share information allowing for advanced analytics and visualizations of real-time data from multiple sources; and
- Generate movement—apply algorithms and automation to translate decisions and actions from the digital world into movements in the physical world.

Panelists discussed a case study involving the manufacturer 3M. Due to the unprecedented need for facial masks and protection during the COVID-19 pandemic, 3M utilized a digital approach using omnichannel order fulfillment, intelligent supply, and synchronized planning. The biggest driver for this new network was the need to align capacity with demand. 3M created a new bimodal model centered around customers' needs, efficiency, and innovation. 3M began using three different software platforms:

- An enterprise resource planning (ERP) system—an integrated suite of business applications that can store and process large amounts of transactional data (e.g., inventory, budget, etc.);
- An integrated business planning (IBP) system that translates the transactional data and collaborative intelligence from all functional departments into key predictions and recommendations; and
- A shared demand planning system that allows 3M to plan more proactively and eliminate future problems.

As a result, 3M was able to double its production of N95 protective masks and plans to produce two billion masks per year by the end of 2021.

The most basic, differentiating principle behind three-dimensional (3-D) printing is that it is an additive manufacturing process. It builds up parts, additively, in layers at the sub-millimeter (one-half the thickness of a sheet of paper) scale. The process starts with a 3-D computer-aided design (CAD) file either by creating the 3-D model or scanning with a 3-D scanner. Layer by layer, the printer will create the predetermined shape. Three media are used in 3-D printing: liquid materials that use ultraviolet (UV) light to cure; filaments (strands) that use temperature and pressure to extrude; and powders that use lasers and temperature.

The 3-D printing market in 2020 was $12.6 billion, a 21 percent increase year over year. This market is projected to double in size over the next five years, with use by engineering firms being the biggest driver. Companies use 3-D printing primarily for:

- Prototyping and product development (e.g., testing form, fit, and function);
- Manufacturing support (e.g., printing tools); and
- End-use parts (e.g., hearing aids, dental uses, etc.) produced in small batch quantities.

The COVID-19 pandemic has accelerated trends that were already underway. Software and post-process (driven by hardware) improvements have improved automation. Digitization—getting all of a company's files and work captured digitally—helps to meet the growing need for maintaining lifecycle inventory, which can be simplified using advanced scanning and 3-D printed parts. On-demand short batch production allows companies to pivot quickly to produce needed parts. Finally, re-localization—creating a digital warehouse for on-demand manufacturing—saves time and inventory compared to ordering parts from a centralized warehouse.

SESSION 2:
INDUSTRY 4.0 TECHNOLOGY AT WORK: WHAT IS YOUR STRATEGY?

A panel of distinguished thought leaders was convened to discuss how they implemented Industry 4.0 technology and how it has impacted their businesses and workforce. Distinguished speakers and panelists for the Technology at Work session include:

- Rear Adm. Paul Sohl (USN Ret.), CEO, Florida High Tech Corridor Council (Moderator);
- Ray Aguerrevere, Vice President & General Manager, Custom Metal Designs;
- Luis Gonzalez-Menendez, Executive Director, Trividia Health; and
- Charles Murray, CEO & Chairman, PPi Technologies Group.

Panelists discussed the stigma that only big companies can use Industry 4.0 technology. Small companies can also take advantage of these emerging Industry 4.0 technologies.

> *"The use of that technology was what allowed us to continue to grow and become a better organization for our customers and partners."*
>
> —Ray Aguerrevere, Vice President & General Manager, Custom Metal Designs

Industry 4.0 technologies permit companies to partner with vendors that look to work remotely. When there's an issue with a machine on the factory floor, the manufacturer can literally put on Google plans and interface directly with the manufacturer of the machine. The factory technicians with technicians on the other line can resolve an issue in 80 to 90 percent of the time, without the expense or delay of having their technician coming to the facility.

Automation is critical for companies. Engineers can connect to machines using laptops from their houses and repair the machines remotely. The result is minimal downtime. In addition, the workforce is from COVID-19. Automation has changed the nature of the workforce. Now there is so much more interaction with the systems than there was before. Welders, for example, can scan and bar code their welds and work orders. Drawings and welds can then be reviewed on screen.

> *"What is missing is the technical skills marrying to the old-line blue-collar skills."*
>
> —Luis Gonzalez-Menendez, Executive Director, Trividia Health

> *"Our whole aim is to train a new group of engineers running from an office, running the machine wherever the machine is placed… that is going to be the future… we are running 2,500 plants with ten technicians who hardly travel."*
>
> —Charles Murray, CEO & Chairman, PPi Technologies Group

SESSION 3:

INDUSTRY 4.0 AT THE NATIONAL LEVEL

David C. Stieren, Division Chief, Extension Services, NIST Manufacturing Extension Partnership

Multiple U.S. national and economic security and public health priorities have been established in multiple industries, involving a diverse array of technologies and products. The aim of these priorities is to increase domestic sourcing for a handful of products—semiconductors, critical materials, pharmaceuticals, high-capacitance batteries, defense, food, medical equipment/supplies. This requires needed technologies and a skilled workforce.

There is also a recognition that the technical sophistication of small and medium manufacturers (SMMs) lags behind that of large companies. Since nearly 99 percent of all U.S. manufacturing establishments are SMMs, this creates multiple challenges and constraints for SMMs and U.S. manufacturing supply chains. SMMs need assistance to bridge the gaps between their own state of practice and state of the art available in key product, technology, industry areas. Decreasing the risk in deploying advanced technology is critical to SMM adoption of Industry 4.0 technologies.

Managed federally by the National Institute of Standards and Technology (NIST), the Manufacturing Extension Partnership (MEP) Program operates an extension-based nationwide network of non-federal centers in every U.S. state and Puerto Rico. The MEP Program, the objective of which is "to enhance competitiveness, productivity, and technological performance in United States Manufacturing," has about 1,500 experts who are available to help SMMs. Last year, MEP Centers interacted with 27,574 manufacturers, leading to $13.0 billion in sales, $2.7 billion in cost savings, $4.9 billion in new client investments, and 105,748 new or retained jobs.[40]

The main advantage for an SMM to invest in and implement Industry 4.0 technology is optimization. Optimization means enabling new capabilities for factories and for enterprises overall to be smart factories.

> *"It's really about the fact that these technologies, they optimize factory operations… at the end of the day this is about increasing productivity and competitiveness."*
>
> —David C. Stieren, Division Chief, Extension Services, NIST Manufacturing Extension Partnership

SMMs have demonstrated significant benefits in digital manufacturing implementation, showing 3-5 percent increases in resource/process productivity; 45-55 percent increase in labor (engineer) productivity; 20-50 percent reduction in time to market; 10-40 percent reduction in maintenance costs; 10-20 percent reduction in quality costs reduction; 20-50 percent reduction in inventory carrying costs; and 30-50 percent reduction in machine downtime.[41]

Seeing these benefits, manufacturers choosing to invest in and implement Industry 4.0 technologies will encounter numerous challenges. Selecting the right software platform and determining the proper initial investment are critical first steps. The lack of digital training/culture is acute within SMMs, whose technical sophistication lags behind that of larger manufacturers. Cybersecurity to protect proprietary information, processes, and operational technologies is a critical decision. Defining the ownership of intellectual property in a collaborative product development environment and being able to fully integrate data analytics are critical as well. Finally, there is the lack of coordination among departments and divisions that must be addressed.

40 NIST, "Manufacturing Extension Partnership (MEP), retrieved from https://www.nist.gov/mep, August 26, 2021.

41 McKinsey Digital, "Industry 4.0: How to Navigate Digitization of the Manufacturing Sector, 2015.

For those SMMs who pursue adoption of advanced manufacturing technologies, the following advice was offered:

- Take a measured approach – "don't try to eat the elephant all at once." Set specific and measurable milestones to achieve before going on to the next step.
- Start with a subsystem implementation to learn—if it works, expand to other aspects of your operation. If it doesn't work, learn from it.
- Target specific problems with measurable impact.

The MEP can help SSMs by helping them assess their company's situation—taking a holistic look at every aspect of a company's operation. MEP will make recommendations for opportunities where technology solves problems or generates the greatest benefit. MEP will help an SMM develop a business case for the investment in and implementation of Industry 4.0 technologies and develop metrics to rigorously measure results.

KEYNOTE ADDRESS:

INNOVATION AS A BUSINESS GROWTH IMPERATIVE

Michael Strong, Sr., Director, Innovative Scaling, Johnson & Johnson

Since 2018, the World Economic Forum (WEF) has scanned thousands of factories to identify those that are making the most out of Industry 4.0 technologies. These are the "Lighthouses," guiding the way for others. As of June 17, 2020, there were 54 lighthouse network sites, only five of which were located in the U.S. There are two types of Lighthouses: the four-wall factory Lighthouses and the end-to-end value chain Lighthouses (J&J has four of these). Johnson & Johnson's vision care facility in Jacksonville has been designated as an advanced Lighthouse.

Lighthouses are manufacturing operations or supply chains that have developed, deployed, and operationalized multiple technologies from Industry 4.0 (e.g., robotics, IoT, advanced sensors, data analytics, etc.). The objectives of the Lighthouse Project are:

- To prevent gentrification and the concentration of wealth and capability;
- To ensure sustainability (e.g., environmental, workforce capability, etc.);
- To ensure sustainable supply;
- To reverse Manufacturing's carbon footprint; and
- To create digitally integrated customers, suppliers, and value chains.

> *"The broad deployment of these capabilities has enabled stronger customer connectivity through digitization, more agile manufacturing and supply systems, and advanced analytics to deeply understand demand signals, process opportunities, and our network designs."*
>
> —Michael Strong, Sr., Director, Innovative Scaling, Johnson & Johnson

Coming out of the COVID-19 pandemic, there was a shift in supply chain needs to more agility driven by customer demand, improved resilience, speed and efficiency, and a much smaller ecological footprint. Johnson & Johnson's vision care facility in Jacksonville reflects the company's investment into the fully digital integration of its production lines, order fulfillment processes, and key connections with customers. The ability to partner with global technology suppliers to drive capital costs down and improve troubleshooting systems has created a manufacturing process that has very few human touches, from raw materials to packaging of orders and distribution. There are no designed human contact points within the manufacturing process. Partnerships with local high schools and colleges have helped to create a sustainable pipeline of technicians.

The world is changing. The COVID-19 pandemic has punished those who have not adapted and rewarded those who have. To illustrate, consider the demand for consumer staples (e.g., toilet paper and cleaning/disinfectant supplies) at the onset of COVID-19 last year.

> *"Even with the investments we made to our supply chain we have never had to pivot so quickly."*
>
> —Michael Strong, Sr., Director, Innovative Scaling, Johnson & Johnson

Innovation is critical. Innovators have the ability to set aspirational goals and choose resources that make a difference. Innovators can recruit top talent and accelerate growth. Most top companies have "carve outs" in their budget for innovation—to make sure that investments are directed at the greatest opportunities and not redirected to daily "firefighting." The more broadly innovation is deployed across the value chain, the greater the financial returns. Companies with broad footprints of innovation deployment show a return of 2.5 times the return of companies that don't.

There are currently more job openings in the U.S. (10 million) than there are workers to fill them (8.7 million). Innovation creates jobs through accelerated business growth. It is critical to ensure that growth is not constrained due to resourcing, and to prepare a diverse and equitable pool of candidates to ensure resource availability.

Technology can be an effective way to address staff shortages. In mature stagnant businesses, technology can drive efficiencies through labor reduction. Opportunities through product and process innovation drive the need for staff increases not decreases. Companies cannot drive this alone. The surrounding ecosystem for innovation must include nearby colleges & universities, government and non-government organizations, and investment and funding.

> *"The path to success in a future founded in Industry 4.0 is a joint journey between users, suppliers, government investment, and academic systems... successful results for a business equates to successful results for citizens, communities, and customers."*
>
> —Michael Strong, Sr., Director, Innovative Scaling, Johnson & Johnson

BUSINESS CLIMATE FOR TECHNOLOGY ACCELERATION

A panel of distinguished thought leaders was convened to attendees on recent policy changes that will affect the ability of Florida's Manufacturing industry to accelerate Industry 4.0 technologies. Distinguished speakers and panelists for the Business Climate session include:

- Bayne Beecher, Senior Manager Supply Chain, PGT (Moderator);
- The Honorable Jeff Brandes, Florida Senate (R-24);
- Tom Feeney, CEO, Associated Industries of Florida; and
- Dale Ketcham, Vice President, Government & External Relations, Space Florida.

Panelists discussed what they perceive as a huge mismatch between the needs of a high-skilled workforce that does Manufacturing, technical skills, and Science, Technology, Engineering, and Mathematics (STEM). Florida is now losing hospital workers and it's going to be harder to recruit their replacements.

Panelists praised Florida's massive Grade K-12 reform that began with then-Governor Jeb Bush. *U.S. News and World Report* consistently ranks Florida's college and university system as the best in the country. But we have a long way to go.

> *"The skills mismatch and the lack of technically skilled and high skilled workers is national – not just a Florida problem… there is an extraordinary gap in Florida between where we want to be in terms of technology and skills-based students coming out and preparing them for the workforce."*
>
> —Tom Feeney, CEO, Associated Industries of Florida

There are two things that companies wanting to expand in Florida or relocate to Florida need in the Manufacturing area. Number one is workforce; number two is supply chain. Florida's primary competitors in the domestic commercial space marketplace (Alabama, Texas, and Colorado) have a better history of Manufacturing. This is particularly true for Alabama.

Florida is distinct and unique in that we are growing rapidly our Manufacturing capability. Manufacturing has long been something that Floridians would want to cultivate. Now, however, Florida is aggressively cultivating its Manufacturing capabilities.

> *"We realized it's not dirty, it's clean, it's high wage, it's high skill, and it's very much what the economic destiny of this country is going to be founded on… so if we're going to compete globally, we need to invest in that."*
>
> —Dale Ketcham, Vice President, Government & External Relations, Space Florida

Panelists discussed helping to meet the demand for high-skill, high-wage workers by leveraging underutilized workers (i.e., prison inmates). Workforce shortage is a globally acute problem, particularly in the prison system. One Florida prison currently has 135 staff vacancies; however, only three applications were received. Many Florida restaurants are limiting the number of patrons not because of the COVID-19 protocols, but because they cannot hire enough staff to serve the customers.

The question debated by the panelists was "how do we create a better ecosystem in Florida to attract workers to Manufacturing?" Today's Manufacturing is not like yesterday's, as the jobs coming back to Manufacturing are highly technical. The lower technical jobs are largely being done overseas and the components are coming here, requiring more technical expertise.

The panelists agreed that the Legislature needs to allow people to maximize the work they can do. Advanced Registered Nurse Practitioners (ARNPs), for example, aren't permitted to work to their maximum. The same is true for prison inmates—there are currently 84,000 inmates in Florida's prison system, with thousands released every year. How are we training them during their incarceration so, when they get out, they have the skills needed to go to work? Almost one-half of Florida's prison inmates cannot read at the sixth-grade level. Florida has its work cut out for it in the prison system.

For Manufacturing, the focus has to be on the high schools. The need is to construct a pathway from high school directly to Manufacturing. There is the need to show people what their earnings will be when get their high school diploma and go into a Manufacturing career. There needs to be one or more incentives to get high school students to start thinking about Manufacturing careers.

The opportunity for Florida Manufacturing is "multi-fold:" first, Florida has 15 ports from which to export goods manufactured in Florida. Second, jobs are high tech high wage. Third, internships like those modeled after the Toyota program (where high school students get real experience and training) are available. It is critical to get teachers excited about teaching STEM and mathematics at an early age, and it is critical to get parents to understand that today's Manufacturing jobs are not yesterday's Manufacturing jobs.

One major challenge facing the school systems is the lack of equipment that is needed to provide the necessary "hands-on" training. Participants suggested that the CONNEX Florida database could be used to get manufacturers to get equipment into the schools rather than reselling it. Another challenge involves the lack of sufficient numbers of trainers to train and educate new workers to work. Building the types of communities that people will want to live in will require establishment of a more robust talent pipeline.

> *"… But as we're getting to be more successful, those other communities are realizing 'hey, there's a lot of talent in Florida' and they're coming here to poach, so we've got to start playing defense as well as offense."*
>
> —Dale Ketcham, Vice President, Government & External Relations, Space Florida

Unless we fill that robust talent pipeline early on, we simply will not be able to compete with much larger populated countries

> *"We need to make sure that that which is essential is built and designed close to home, and that means a highly skilled technical workforce."*
>
> —Tom Feeney, CEO, Associated Industries of Florida

CLOSING REMARKS

Kevin Carr, Chief Executive Officer, FloridaMakes

In his closing remarks, FloridaMakes CEO Kevin Carr emphasized productivity[42] and its three main drivers: business growth, particularly the growth of higher-value businesses; the need to "upskill" our Manufacturing workforce; and adopting more advanced technology (Industry 4.0).

> *"Our challenge is to help those businesses accelerate through the process of adopting those technologies..."[W]e have those assets. How we apply them, how we organize and apply them to advance our businesses, is really going to define how successful we are."*
>
> —Kevin Carr, Chief Executive Officer, FloridaMakes

42 Productivity is defined as gross revenue per employee and tells us how well Florida is performing relative to other states.

OUTLOOK 2022

OCTOBER 26, 2021

The fourth and final session of the 2021 MakeMore Manufacturing Summit was an in-person event, held on October 26, 2021. The final session focused on what lies ahead for the Manufacturing sector in the year 2022. The COVID-19 pandemic affirmed Manufacturing's role in providing critical equipment and materials and exposed the vulnerability of global supply chains to shocks and disruptions. All this occurred during a period when new technology process innovation and demand growth are reshaping the Manufacturing industry worldwide. This session emphasized the need to focus on what's next—the outlook for 2022 and what each of us do can do within the next 12 months to take action and prioritize Manufacturing in Florida.

SESSION 1:

STATE OF THE MANUFACTURING ECONOMY

A panel of distinguished thought leaders was convened to brief attendees on the state of the Florida's Manufacturing economy. Distinguished speakers and panelists for this session include:

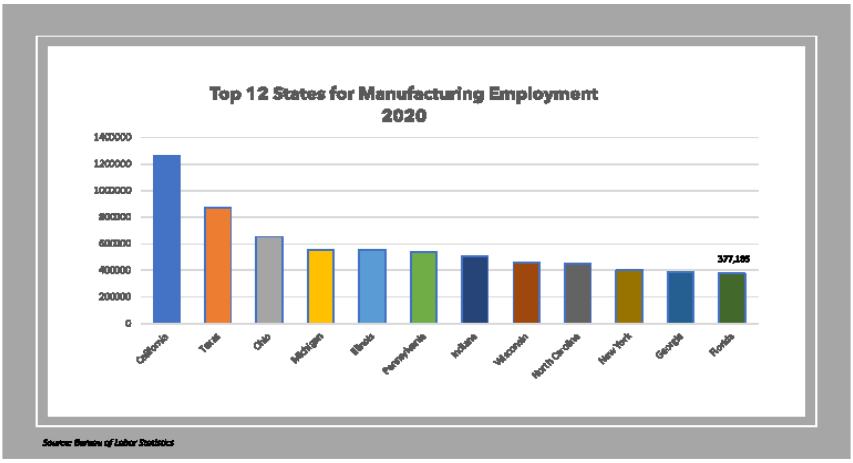
- Maria Alfano, Chief Operating Officer, FloridaMakes;
- Ken Voytek, Principal, Mountain View Economics; and
- Dr. Jerry Parrish, Chief Economist and Director of Research, Florida Chamber Foundation.

Florida has worked hard over the past few years to become the 12th ranked state in terms of Manufacturing employment, with 377,185 jobs (see Figure 19). Not satisfied with this ranking, Florida has set a goal to become one of the top five states for Manufacturing jobs. Currently, the state of Illinois holds the number five spot, but Florida has been closing the gap. In 2018, the employment gap between Florida and Illinois was 215,265 jobs. In 2019, Florida closed the gap to 201,775 jobs and, in 2020, with a net gain of 23,687Manufacturing jobs, Florida closed the gap to 178,088 jobs.

It is important to look at Florida's economic competitiveness compared to the 11 states ranked ahead of Florida:

- Florida had the highest growth rate pre-COVID and lowest Manufacturing job loss among the 12 states because of COVID;
- Florida had the highest Manufacturing employment growth rate (%) from 2014-2020;
- Florida had lowest 2020 Manufacturing GDP among the 12 states ($58.9 billion);
- Florida's 2019-20 Manufacturing GDP growth rate was 0.05%. Although miniscule, all of the other 11 states had negative growth during this period; and
- Florida had the highest 2014-20 Manufacturing employment GDP growth rate (%) among the top 12 states.

`Figure 19. Source for Manufacturing Employment (2020)



In terms of 2020 GDP per employee, Florida ($156,178) lagged below the national average ($187,428), ranking 31st among all states. If Florida Manufacturing performed at the national average, the economic impact would be an additional $11.8 billion.

Nationally, although Manufacturing productivity and employment have not returned to pre-COVID levels, Manufacturing productivity and employment have turned up as quickly as they turned down. A recent client survey by the National Institute of Standards and Technology's Manufacturing Extension Partnership identified the following three challenges facing U.S. manufacturers: employee recruitment; technology needs; and supply chain management.

The Florida Chamber Foundation has established a goal of moving Florida's economy, currently the 15th largest in the world,[43] into the top ten. Florida's current GDP is $1.5 trillion, and Florida's GDP per capita is higher than Germany's. In addition, one out of every 11 jobs created in the U.S. from 2015 to February 2020 was created in Florida. About 60 percent of the new jobs are in small businesses (99 or fewer employees). Creating Manufacturing jobs, with average annual salaries of $66,698, helps to diversify Florida's economy. Last year, more than $25.1 billion in wages were paid to Florida Manufacturing employees.

"Florida's poised to win the game…"

—Dr. Jerry Parrish, Chief Economist and Director of Research, Florida Chamber Foundation

43 Florida's economy has moved ahead of Mexico and Indonesia.

SESSION 2:
BUSINESS GROWTH

A panel of distinguished thought leaders was convened to discuss how to grow Manufacturing companies to the next level. Distinguished speakers and panelists for the Business Growth session include:

- Mark Wilson, President & CEO, Florida Chamber of Commerce (Moderator);
- Greg Britton, CEO, The Small Business Development Center (SBDC) Network;
- David Carrier, CEO/Founder, Quantum Flo;
- Destin Wells, Senior Vice President, Enterprise Florida; and
- Adam Callaway, Assistant Secretary for Strategic Business Development, Florida Department of Economic Opportunity.

Panelists acknowledged that we will not be able to move Florida's economy into the top ten in next ten years without significantly growing the Manufacturing sector. The discussion focused on how to grow the 200,000 Manufacturing jobs needed to move ahead of Illinois and how to become a global center for Manufacturing.

Florida's Small Business Development Center (SBDC) network offers "no cost" high quality, individualized business advising and technical assistance to help existing small businesses prosper. SBDCs provide problem-solving assistance to help small businesses access capital, develop and exchange new technologies, and improve business planning and operations.[44]

Enterprise Florida (EFI) is a public–private partnership between Florida's business and government leaders and is the principal economic development organization for Florida. EFI's mission is to expand and diversify the state's economy through job creation. EFI works to attract industry to the state. This not only creates job opportunities for Floridians but also stimulates capital investment and provides significant economic and fiscal impacts on our communities.

> *"One of the challenges is the definition of Manufacturing… you make stuff. So, aviation and aerospace… in the state of Florida a very strong sector for us… they make stuff…"*
>
> —Destin Wells, Senior Vice President, Enterprise Florida, Inc.

The Florida Department of Economic Opportunity (DEO) is the state's economic development agency. The DEO offers job growth grant funds to promote public infrastructure and workforce training across the state. This includes workforce training grants to support programs offered at state colleges and state technical centers. The DEO's Rural Community Development Revolving Loan (RCDRL) Program was established to create jobs for the residents of rural Florida and to increase the economic vitality and diversification of Florida's rural areas. This loan program provides local governments and economic development organizations substantially underwritten by a unit of local government with access to financial assistance (loans) to further promote the economic viability of rural communities. Involving DEO at the early stages is key to getting economic development and job creation projects to the finish line.

GrowFL is the only statewide organization focused exclusively on second-stage and emerging second-stage growth companies.[45] GrowFL works closely with those second-stage companies that have the best potential to contribute to Florida's economy and provides access to resources, analysts and tools typically only available and affordable to

44 U.S. Small Business Administration, "Small Business Development Centers (SBDC)," retrieved from https://www.sba.gov/local-assistance/resource-partners/small-business-development-centers-sbdc, November 7, 2021.

45 Second stage companies are those companies that have moved beyond startup and have the aptitude and appetite to continue growing. From a numbers perspective, they typically have 10-99 employees and generate $1 million to $50 million in annual revenue.

Fortune 500 companies. Focusing its efforts on these companies means strengthening the economy of the region and supporting the entrepreneurs who live there. On average, GrowFL assisted businesses increase their annual revenue and employment by more than 20 percent and grow three times faster than their competition.[46]

Panelists discussed the Florida Chamber's 2030 Blueprint goal of doubling the export of goods and tripling the export of services. EFI's Export Marketing Plan Program provides pre-qualified companies and applicants with a strategic plan for exporting that is customized to their specific needs and capabilities. These plans help companies effectively execute their export development strategies by targeting the most suitable overseas markets, developing successful country launch strategies, and providing overseas promotion campaign options. The plans are completed by a network of Certified Global Business Professionals (CGBPs) located in SBDCs throughout the state.[47] To date, 250 export plans have been prepared, which has generated $77 million in sales revenue, $151 million in capital generated, and created 32,458 jobs.

Through its billboard campaign, EFI is sharing stories and experiences about what operating in the state of Florida brings—access to a climate where businesses are supported and given the tools to thrive.

> *"… it's not just a phenomenal tax climate, it's not access to a massive market, it's not just access to a growing population and growing labor force, it's access to a climate in which businesses are encouraged, are supported, and are given the tools to thrive."*
>
> —Destin Wells, Senior Vice President, Enterprise Florida, Inc.

When asked what they would do to make Florida the best destination for Manufacturing, panelists said they would:

- Have all those ships waiting off the east and west coast of the U.S. come into Florida ports to unload and reload;
- Work closely together in the same sandbox to help the businesses that are currently located here in the state survive, succeed, and get into the next technology world;
- Create programs around Industry 4.0, around talent, and around how people buy equipment;
- Better align Manufacturing partners, assets, and resources;
- Turn Science, Technology, Engineering, and Mathematics (STEM) from an activity into a pathway;
- Develop a better funding mechanism for technical programs;
- Continue investments in infrastructure and workforce training (they go hand in hand): and
- Establish clearly defined channels to guide access to capital.

46 GrowFL, "Manufacturers Business Growth Program," retrieved from https://growfl.com/floridamakes/, November 7, 2021.

47 Enterprise Florida, Inc., retrieved from https://www.enterpriseflorida.com/wp-content/uploads/EFI-Contract-244-UWF-FY2021-Export-Marketing-Plans.pdf, November 7, 2021.

SESSION 3

TALENT DEVELOPMENT

A panel of distinguished thought leaders was convened to discuss how to grow Manufacturing companies and their talent pipeline. Distinguished speakers and panelists for the Talent Development session include:

- Tina Berger, Senior Advisor, Manufacturing Talent Development, FloridaMakes (Moderator);
- NiñaFe Awong, Career & Technical Education Director, Florida Department of Education;
- Mimi Coenen, Chief Operating Officer, CareerSource Central Florida;
- Marilyn Barger, Executive Director, FLATE; and
- Marcelo Dossantos, Director of Talent Development, FloridaMakes.

Panelists acknowledged that Florida Manufacturing is going through a time of unprecedented change and acknowledged the need to focus on skills that are needed and on transitioning workers who lost their jobs to positions in Manufacturing. Florida colleges provide courses that lead to credentials necessary to help meet skills needs and close skills gap.

CareerSource Florida invests in skill building and connections to get workers on the manufacturers' floors and works closely with area colleges to be able to provide the skills needed by manufacturers. CareerSource Florida has formed a Credentials Review Committee to define "credentials of value," create a framework of quality, and identify non-degree and degree credentials of value to make sure instructional programs prepare Floridians for in-demand occupations.[48] The Florida Department of Education (FLDOE) goes through a curriculum revision every three years. This includes teachers, internal stakeholders, and external stakeholders to make sure curriculum is relevant and up-to-date.

Panelists discussed the need to train people for the digital transformation that is coming. An Industry 4.0 survey shows that much of the Industry 4.0 technology is too advanced for entry-level technicians. They will have to grow into these jobs.

> *"We've been revamping our curriculum framework to include more employability skills pertaining to IT, cybersecurity, engineering, just to name a few."*
>
> —NiñaFe Awong, Career & Technical Education Director, Florida Department of Education

Another recent innovation, integrated education and training (IET), focuses on those without a high school diploma or equivalent and those with marginal reading skills and integrates core content (e.g., science, math, etc.) with workforce training and credentialing. The goal of this initiative is to increase the number and percentage of adult education students who enter postsecondary education and earn a degree, certificate and/or industry credential. This helps to "break down the silos" so participants can see how the core content aligns with the workforce skills. At the end of the IET, participants can get their General Education Development (GED) degree and work (CTE) credentials.

Advance manufacturing curriculum framework reviews are coming up in 2022, and panelists encouraged attendees to contact their local state college about participating in the process. Framework review is essentially "the Bible" and manufacturers need to let the local colleges know what certifications, credentials, and employability skills you are looking for.

In September 2020, FLDOE launched its "Get There" initiative to raise awareness and rebrand CTE) as a modern approach to higher education and training. Get There highlights the 17 career pathways offered at Florida's 28 state

48 CareerSource Florida, "Florida Credentials Review Committee," retrieved from https://careersourceflorida.com/boardroom/florida-credentials-review-committee/, November 7, 2021.

colleges and 48 technical colleges, positioning these programs as an exciting alternative to the traditional university pathway that gets students to work faster and affordably.[49]

To help workers transition from one sector to Manufacturing, CareerSource Florida works with high school students during the summer months to get students on a post-secondary campus (e.g., career and technical schools) to "demystify" it. CareerSource Florida also offers intense advanced manufacturing programs whereby students earn money during the five-week course and learn what advanced manufacturing careers are all about. Panelists acknowledged the need for CareerSource Florida and FLDOE to partner during the school year to reach those youth who are not in school and are not working (opportunity youth).

FloridaMakes offers an "adopt a school" program that connects students and their schools with local manufacturers. This program helps to give students an in-depth look at the world of Manufacturing and provide manufacturers that join the program an opportunity to give back to their community while helping local students expand their career options.

The Florida Advanced Technological Education (FLATE) Center helps to change students' perception of Manufacturing through its Manufacturing Month program. Over the past six years, FLATE has helped more than 25,000 students to visit about 100 manufacturers.

To help provide workers the skills necessary to master the new and emerging technologies, FloridaMakes launched its Industrial Manufacturing Technician Apprentice program. This is a competency-based program focused on advancing entry-level skills for new and existing employees. Participants must complete 200 non-working hours of online curriculum and 2,000-hours of on-the-job training. The courses are interactive and feature state-of-the-art e-learning simulation and technologies and the curriculum is nationally recognized as an industry standard for entry level training.[50]

When asked what they would do to make Florida the best destination for Manufacturing, panelists said they would:

- Pay middle- and high-school teachers to go through an "externship" to see and better understand what is going on in Manufacturing. The teachers can then better explain to students what they are missing;
- Start tapping into elementary schools to reach youth at an earlier age; and
- Offer a more integrated curriculum and robotics summer camps.

SESSION 4:
BUSINESS CLIMATE

A panel of distinguished thought leaders was convened to discuss how to improve Florida's business climate for manufacturers. Distinguished speakers and panelists for the Business Climate session in`clude:

- Joe Mayer, Director, Government Relations, Lockheed Martin (Moderator);
- The Honorable Tom A. Wright, Florida Senate;
- Tom Feeney, CEO, Associated Industries of Florida;
- Tony Carvajal, Executive Vice President, Florida TaxWatch; and
- The Honorable Elizabeth Fetterhoff, Florida House of Representatives

Panelists discussed the establishment and role of the Manufacturing and Supply Chain Caucus (Caucus), established during the 2021 legislative session and led by Senator Wright and Representative Gregory. The 16-member Caucus promotes the economic and social benefits of Florida's manufacturers and serves as a resource to other lawmakers

49 Henry Mack, Statewide Email to District Career and Technical Education Directors District Technical Center Directors District Adult Education Directors Florida College System Workforce Administrators, September 23, 2020.

50 FloridaMakes, "Bridging the Skills Gap: Training Florida's Future Manufacturing Workforce," retrieved from https://www.floridamakes.com/featured-programs/imt-apprenticeship-program, November 8, 2021.

about supply chain and Manufacturing issues. It important for the Caucus to bring information about careers in Manufacturing and the need for reliable and resilient supply chains to the schools, to the people, and to community leaders.

> *"The Manufacturing caucus needs to work on ways that we can help our educators … to produce these people that can work in our facilities."*
>
> —The Honorable Tom Wright, Florida Senate

Panelists discussed the need for the Legislature to reauthorize the Qualified Targeted Industry (QTI) tax refund program and other economic development incentives to encourage the creation of high-skill jobs and encourage the growth of corporate headquarters and other targeted industries. Florida has a great talent base. There are currently about 520,000 open jobs and about 517,000 unemployed Floridians who are eligible to go to work. Hundreds of thousands of people quit their jobs last August with no job to go. It is important to figure out how to provide value to those workers.

> *"QTI worked. QTI is probably one of the best programs out there."*
>
> —The Honorable Elizabeth Fetterhoff, Florida House of Representatives

The Advanced Technology College (ATC) at Daytona State College was singled out as a "state of the art" program for people who want to be working while earning a degree. The ATC offers a wide variety of technological training in engineering, computer science, robotics and simulation, automotive, heating and air conditioning, emergency medical services, paramedic training and criminal justice programs.[51] Participants work three days a week and take classes two days a week.

Manufacturing has evolved from low-wage, long-hour jobs to high-value, high pay jobs. The development of Florida's high-tech aerospace industry was touted as a "sexy" way to get people interested Manufacturing as a career choice. Florida's growth and infrastructure are new, clean, and environmentally friendly.

Recent supply chain shock and disruption underscore the need for supplier redundancy and to reduce our dependency on equipment and parts made outside the U.S. Connex Florida, a supply chain database tool made possible through a partnership between the Associated Industries of Florida, Space Florida, and FloridaMakes, contains in-depth information on a broad range of Florida manufacturers, along with detailed search functions to highlight specific production capabilities, certifications, equipment, material types and more. Connex Florida helps Florida manufacturers better connect with each other, be discovered, and increase business opportunities.[52]

The 2021 Legislature passed HB 435, which directs Veterans Florida to serve as the state's principal assistance organization under the Department of Defense's SkillBridge program. SkillBridge helps to meet Manufacturing's workforce needs by allowing service members to gain workforce training at private businesses while on active duty as they are transitioning out of the military.

Florida's Manufacturing workforce is "aging out" and there are not currently enough younger workers to replace them. Current Florida law permits the state to accept workers compensation liability for high school students who are doing construction apprenticeships. It was suggested that the Legislature consider a similar exemption from workers compensation liability for students doing Manufacturing apprenticeships.

51 Daytona State College, "Advanced Technology College," retrieved from https://www.daytonastate.edu/campus-information/advanced-techology-college.html, November 8, 2021.

52 Connex Florida, retrieved from https://florida.mfgconnex.com/#/search-tools, November 8, 2021.

APPENDIX A

2021 STERLING MANUFACTURING BUSINESS EXCELLENCE AWARDS

Each year, the Florida Sterling Council and FloridaMakes recognize the state's high-performing manufacturers. This year's 140 nominated companies were judged in six categories, including leadership, strategic planning, customer and market focus, measurement, analysis and knowledge management, workforce and operations. FloridaMakes is proud to recognize the following winners of the 2021 Florida Sterling Manufacturing Business Excellence Awards:

Gold Winners

- Fleet Readiness Center Southeast
- Slice Engineering
- CAE Healthcare
- Lockheed Martin
- Pierce Manufacturing

Silver Winners

- Trane Lynn Haven
- Team Solutions Dental
- Easy Foods, Inc.
- RND Automation
- MAG Aerospace
- Commercial Metals Company
- BAE Systems
- Q'Straint

Bronze Winners

- Made in Space, Inc.
- Veethree Electronics
- Kiralabs Beauty Innovation
- Stellar Energy, Inc.
- Cavaform International

2021 Florida Advanced Technology Education (FLATE) Awards

The Fourteenth annual FLATE Awards recognize those who advocate on behalf of Manufacturing education. This year's winners are:

- Distinguished Manufacturing Secondary Educator of the Year—Selena S. Lewis, Young Middle Magnet School, Tampa
- Distinguished Manufacturing Post-Secondary Educator of the Year—Michael D. Cannon, Pensacola State College, Pensacola
- Distinguished Manufacturing Partner Service Award—Peter M. Cirak, Seal Dynamics, Tampa
- Distinguished Manufacturing Organizational Partner Service Award—Thomas A. Mudano, American Manufacturing Skills Initiative (AmSkills), Inc., Greater Tampa Bay

Bob Provitola Manufacturing Leadership Award

- Abe Alangadan, Johnson & Johnson Vision, Inc.

APPENDIX B

THE FLORIDAMAKES NETWORK ADVOCACY COUNCIL 2022 ADVOCACY PRIORITIES

The FloridaMakes Network Advocacy Council, comprised of 14 Regional Manufacturers Associations across the state of Florida, has agreed to support and collaborate on the below advocacy priorities for the 2022 Session that elevate the issues that are most important to their manufacturing stakeholders across the state.

1. **Manufacturing & Supply Chain Caucus**—Support their efforts through the following initiatives.
   a) To promote and broaden awareness of the societal, educational, and economic benefits made possible through Florida's manufacturing sector and its attendant supply chain.
   b) Establish better awareness and understanding of the underlying policy and regulatory issues facing Florida's advanced manufacturing sector, public and private interests impacted by Florida manufacturing, and to serve as an on-going information resource for members of the Legislature and their staff.
   c) To exchange ideas and information with manufacturers, state and federal agencies, universities and research institutions, the State's career and technical training infrastructure, professional and institutional societies and organizations, and the Administration.

2. **Strengthen Economic Development Initiatives**—Specifically those at the Department of Economic Opportunity, Enterprise Florida, Space Florida, FloridaMakes, CareerSource Florida, Veterans Florida, and local economic development organizations -- that promote the development, retention, and expansion of Florida's 21st century manufacturing economy, including defense, aviation and aerospace, life sciences including medical technology, and electronics and computer equipment, as examples.
   a) Reestablish recurring state matching funds for Florida's Manufacturing Extension Partnership (MEP) program, FloridaMakes, to secure the federal investment by the National Institute of Standards and Technology (an agency of the U.S. Department of Commerce). The MEP program is the industrial extension equivalent to the agricultural extension investment from USDA and the State for the Institute Food and Agricultural Sciences Extension based at the University of Florida.
   b) Reestablish the Qualified Target Industry (QTI) Tax Refund Program which creates a state grant equal to the amount paid for certain state and local taxes to eligible businesses creating jobs in certain target industries, including advanced manufacturing.
   c) Redouble investments in programs directed toward increasing Florida's exports of high-value, high-demand manufactured goods. Expand the number and intensity of Florida's export businesses.
   d) Enable a local county option to use "Bed Tax" funds for economic development programs, which are for expanding high-wage business jobs in Florida (Florida Statues Title XI Chapter 125.0104).

3. **Invest in Training and Jobs Programs**—Customized training and earn-to-learn models should be an investment priority as well as, training infrastructure that targets 21st century skills and career paths while target filling high-wage, high-skill career vacancies in advanced manufacturing.
   a) Career and Technical Education: Support funding for programs like those developed by the Florida Advanced Technological Education Center which:
      - Support policies that encourage and establish vocational education at the earliest possible grade levels leading to career and technical education.
      - Establish long range viability for the manufacturing workforce and emphasize the link between education and the jobs available today as well as the future.
      - Engage students and parents early, exploring ways to provide exposure to robotics, automation, and computer programming to primary and secondary school students.

- Build awareness and promote careers in advanced manufacturing as a high-wage, high-skill career pathway.

b) Apprenticeship Programs: Supporting the establishment of a steady pipeline through apprenticeships will contribute to the attraction of advanced manufacturing companies. Apprenticeships are a proven training method benefitting both job seekers and businesses, leading to high-pay/high-skill careers. Support programs like:
   - Employer Apprentice Matching Fund: Quick Response OJT (On the Job Training) Fund via CareerSource Florida or Enterprise Florida.
   - Apprentice Scholarship Fund via Bright Futures to support apprentices attending state and technical colleges.
   - Funding to State and Technical Colleges to support registered apprenticeship programs with industry qualified instructors and technologically advanced training equipment and lab space.
   - Apprenticeship/Internship Tax Credit Programs benefiting businesses who hire apprentices/ interns.

c) Workforce development: Support increased investment in the new and incumbent worker training initiatives at CareerSource Florida essential to the development and maintenance of that workforce. Continuous training and upskilling the incumbent workforce are critical to staying abreast, if not ahead, of the technology demands of the 21st century.

4. **Support Florida Supply Chain Initiatives**—Promote initiatives that encourage use and development of local suppliers and one that contributes to developing a more robust and resilient system of supply for the state.
   a) Establish a "Buy Florida Act." The Federal Government operates under the "Buy America Act" which requires Federal Agencies to procure products from American based companies whenever possible. States like Ohio have successfully established a similar policy to incentivize local growth. Florida has no such policy and seeks out low prices regardless of where the item is made. This initiative will promote the growth of our local companies allowing for a healthy and diverse economy.
   b) Develop a supplier tax credit. Incentives should be created for manufacturers that use Florida suppliers versus sourcing outside the state. A tax credit could be taken against corporate income taxes or as a sales tax refund and based on a percentage of purchases from Florida suppliers or the annual growth in such purchases.
   c) Support maximizing the utilization of Florida's transportation systems including, seaports, railroads, and highways. Support initiatives to attract truck drivers and support services for movement of goods across our interstate and Highway systems. Evaluate restrictions on tractor trailers, allowing for double trailers.

5. **Strengthen the Resilience of Florida's Manufacturing Sector—**Investing in initiatives focused on accelerating the adoption and use of advanced digital technologies (Industry 4.0) – artificial intelligence, cybersecurity, data analytics, supply chain integration, as examples – and direct those investment at increasing the productivity and technological performance of Florida's manufacturing industry.
   a) Increase investment in university and institutional research initiatives and infrastructure, including a state-wide expansion of Florida's High Tech Corridor-like programs directed at the advancement and application of Industry 4.0 technologies including autonomous robots, simulation, horizontal and vertical simulation, the Internet of Things (IoT), cybersecurity, cloud computing, additive manufacturing, augmented reality, and big data analytics.
   b) Increase investment in K-12, Career Academy, and Career and Technical Education (CTE) curriculum development in these advanced Industry 4.0 technologies as they relate to advancing the skills needed for 21st century manufacturing as well as the digital transformation and interconnectedness of all Florida businesses.

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As an independent, nonpartisan, nonprofit taxpayer research institute and government watchdog, it is the mission of Florida TaxWatch to provide the citizens of Florida and public officials with high quality, independent research and analysis of issues related to state and local government taxation, expenditures, policies, and programs. Florida TaxWatch works to improve the productivity and accountability of Florida government. Its research recommends productivity enhancements and explains the statewide impact of fiscal and economic policies and practices on citizens and businesses.

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