



2019

CONNECTICUT MANUFACTURING REPORT



CONNECTICUT MANUFACTURING'S ECONOMIC POWER

EMPLOYEES



160,900

Manufacturing employees
in Connecticut

MANUFACTURERS



4,011

Manufacturing companies

WAGES



\$14.9
BILLION

Total manufacturing
wages

\$96,279

Average manufacturing
compensation in
Connecticut

TAXES



\$123
MILLION

Connecticut corporate
taxes paid in 2016

\$201.7
MILLION

Connecticut sales &
use taxes paid in 2018

MULTIPLIERS



1.5 to 4
ADDITIONAL JOBS

What each
manufacturing job
creates in other parts
of the state's economy

\$1.48
BILLION

Amount
manufacturers spend
annually in capital
expenditures

\$30.8
BILLION

Amount
manufacturing adds
to Connecticut's
GSP (2018)

\$1.35

Amount generated
in additional
economic activity
for every \$1 spent in
manufacturing

EXPORTS



\$17
BILLION

What Connecticut
manufacturers export
annually in products

DEFENSE



\$12.6
BILLION

What Connecticut
manufacturers bring in
defense contracts (2017)

Sources: National Association of Manufacturers; U.S. Bureau of Economic Analysis; U.S. Census; Connecticut Department of Labor; Connecticut Department of Revenue Services; Connecticut Department of Economic and Community Development.



INTRODUCTION

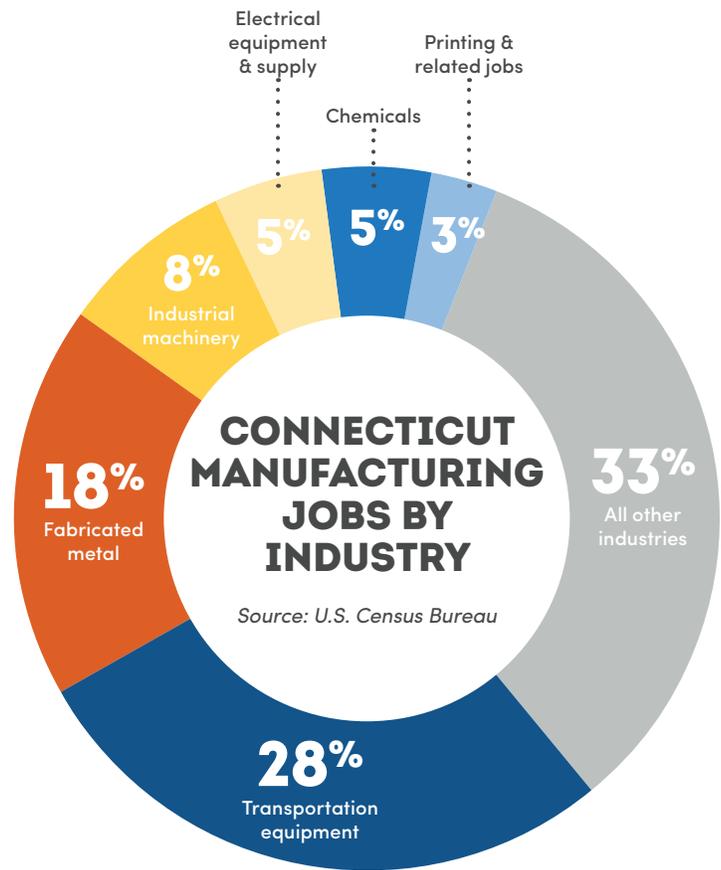
CBIA and CONNSTEP introduce this first annual Connecticut Manufacturing Report as a comprehensive resource for manufacturers, economic development professionals, government officials, educators, parents, students, and state residents.

Connecticut is home to world-class manufacturing companies and an unmatched workforce—they are the reason the state is a global leader in innovation, research and development, and productivity.

Manufacturing has a rich legacy in Connecticut, one marked by ingenuity and innovation. This is where Eli Whitney invented the cotton gin, Charles Goodyear rolled out the first rubber tire, and Igor Sikorsky gave flight to the helicopter.

While many of the challenges have changed, that spirit remains today.

The report reviews the current state of manufacturing in Connecticut, exploring the outlook for the next year, growth factors, key initiatives, hiring and investment trends, and the impact of state and federal government policies.



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The findings are drawn from several surveys of almost 1,000 Connecticut manufacturing leaders—conducted in January/February, June/July, and September of this year—by CBIA and the Connecticut Manufacturers’ Collaborative.

This report integrates those survey results, with additional research data and interviews with key manufacturing leaders conducted in August and September of this year.

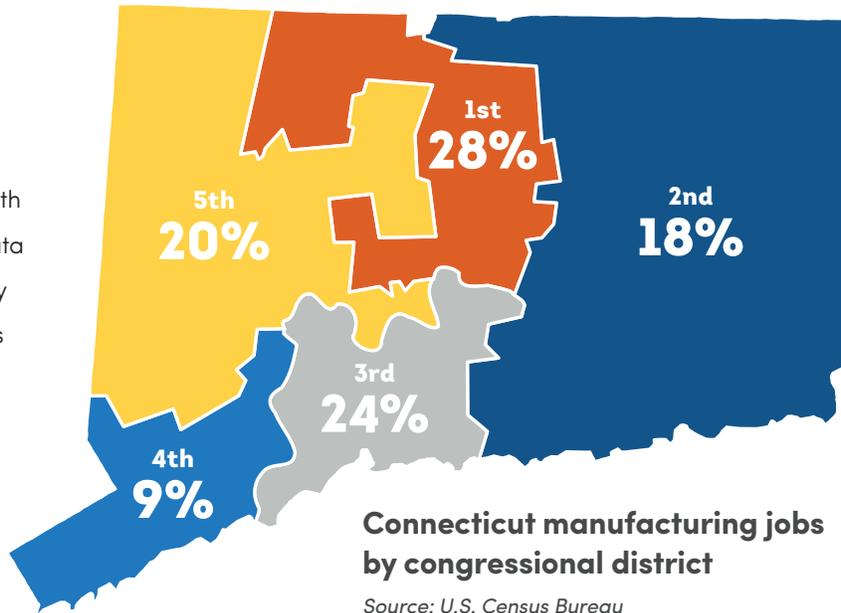
The 2019 Connecticut Manufacturing Report provides

valuable insights for policymakers and all stakeholders working toward building a stronger, more sustainable manufacturing sector.

Manufacturing accounts for approximately 11% of Connecticut’s annual \$282 billion gross domestic product, including \$17 billion in exports, \$12.6 billion in defense

contracts, and \$14.9 billion in wages and compensation.

Manufacturers pay more than \$320 million annually in state corporate and sales and use taxes and invest almost \$1.5 billion in capital expenditures each year.



Most critically, the sector drives other parts of the state’s economy, creating up to four additional jobs for every manufacturing job and generating \$1.35 in additional economic activity for every dollar spent.

AN ECONOMIC FORCE

Connecticut manufacturing is a powerful economic force, employing over 160,000 workers, paying more than \$14.9 billion in wages each year, and adding \$30.8 billion to the state’s annual economic output.

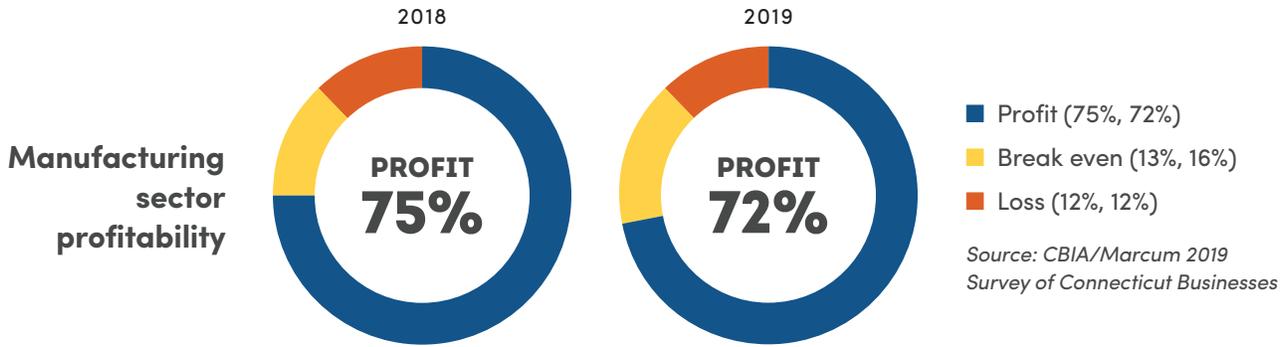
Manufacturing employs about 10% of Connecticut’s workforce—highly skilled, highly productive workers earning an average \$96,279 annually, well above the state’s \$74,561 yearly per capita income.



Is your company...

- Growing (35%)
- Holding steady (48%)
- Contracting (17%)

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses



STATE OF MANUFACTURING

Manufacturing is one of the state economy’s primary growth sectors. In 2018, Connecticut’s gross state product grew 1%, expanding for just the second time in the past decade, with manufacturing making a key contribution.

The state’s aerospace and defense sectors continue to drive durable goods manufacturing, which saw 0.33% growth in 2018—second among all industry sectors—while nondurable goods manufacturing rose 0.2%.

Over one-third (35%) of Connecticut manufacturers reported sales growth in 2018, with 48% holding steady and 17% posting sales declines. That compares with

43% of all businesses that posted growth, 44% with no change, and 13% with declining sales.

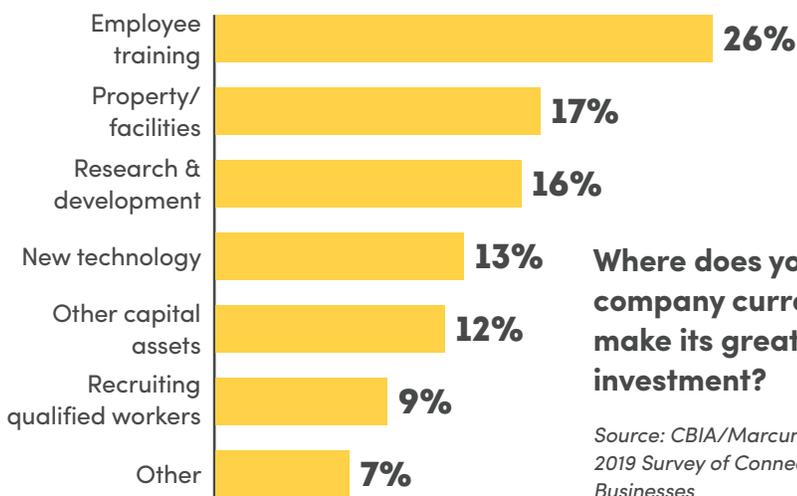
A significant majority are operating profitably, with the percentage of companies reporting profits last year at a post-recession high. Seventy-five percent were profitable in 2018 (compared with 70% of all businesses), 13% broke even (versus 10%), and 12% posted losses (17%).

Most manufacturers also have a positive outlook for this year, with 72% expecting to return a profit, 16% saying they will break even, and 12% forecasting losses.

What’s driving profitability? Connecticut manufacturers are benefiting from a strong national economy and global

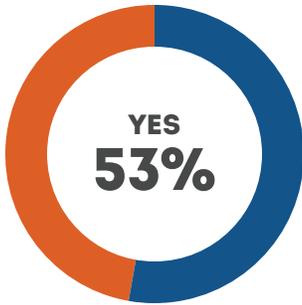
demand for aerospace products, with increased productivity gains (through technology and efficiency), tight cost controls, and greater workforce retention also listed as major factors.

Shrinking Connecticut markets and growing costs—particularly state taxes, labor, and energy—were the most significant loss factors. Trade tariffs also factored into losses for both exporters and companies that import raw materials.



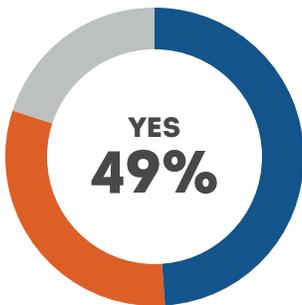
Where does your company currently make its greatest investment?

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses



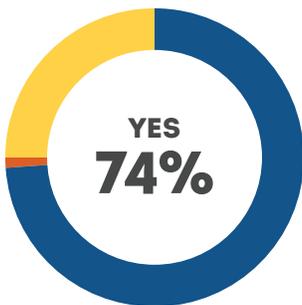
Did your company introduce a new product in the past 12 months?

- Yes (53%)
- No (47%)



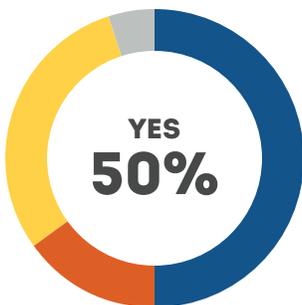
Will you introduce a new product in the next 12 months?

- Yes (49%)
- No (31%)
- Unsure (20%)



Are your products manufactured in Connecticut?

- Yes (74%)
- No (1%)
- Partially (25%)



Will your new products be made in Connecticut?

- Yes (50%)
- Partially (30%)
- No (15%)
- Unsure (5%)

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses

Less than a third (29%) of Connecticut manufacturers have customers within the state, 49% ship and/or sell to other states, and 22% export goods and services to international markets.

Canada is the primary export market for 20% of Connecticut manufacturers, followed by Great Britain (13%), China (11%), Mexico (11%), Germany (7%), Saudi Arabia (5%), France (4%), and Australia (4%).

Over the next five years, 15% say Mexico has the greatest export potential, along with Canada (12%), China (11%), Australia (7%), and Germany (4%).

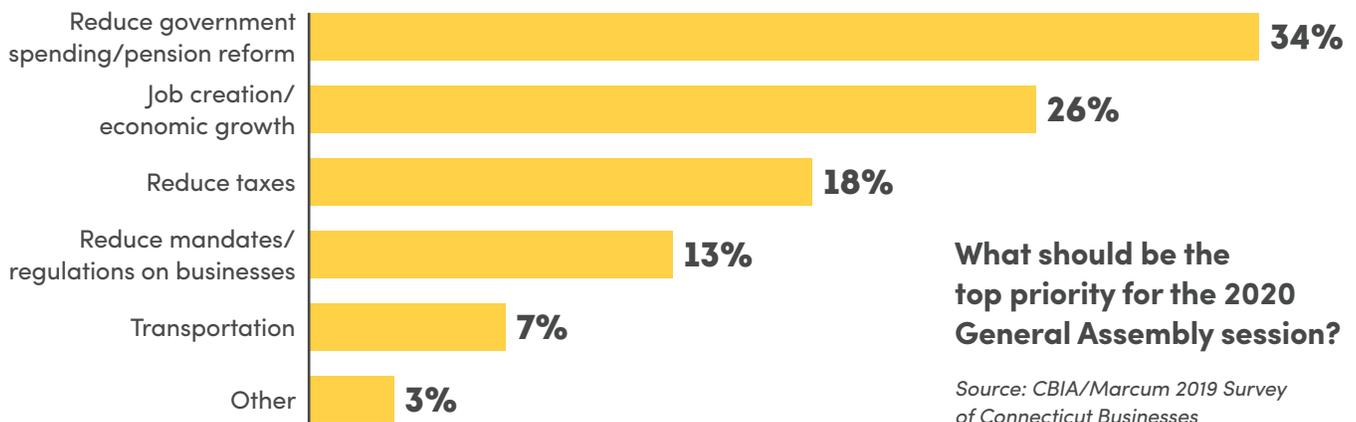
INVESTMENT, ECONOMIC OUTLOOK

Manufacturers are investing heavily in their businesses and employees, including employee training and retention (26%), property and facilities (17%) and research and development (16%).

Innovation is a dominant theme within the sector, with 53% introducing a new product over the last year. Seventy-four percent made those products in Connecticut, while 25% have partial manufacturing operations within the state.

Of the 49% of manufacturers planning on introducing a new product in the next 12 months, half plan on locating full production operations in Connecticut while 30% will partially handle production here.

Nearly a third say they need assistance making their production lines more efficient using new technologies. The technologies manufacturers are most interested in include additive manufacturing/3D printing, advanced robotics and cobots, and technology training equipment and software.



Thirty percent of manufacturers say quality of life is the greatest advantage to running a business in Connecticut, while 19% cited proximity to customers, 10% the state's skilled workforce, and 10% access to major markets.

The state's high business costs, tax burden, and workforce challenges are hindering additional growth in the manufacturing sector. Thirty-eight percent of manufacturers say business costs and taxes are the primary factors hampering growth while 16% cite the lack of skilled workers.

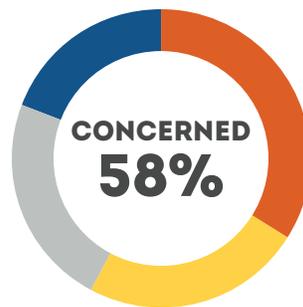
The 2019 Connecticut General Assembly session did little to improve manufacturers' confidence in state policymakers. A renewed focus on mandates and adoption of a two-year budget featuring more than \$2 billion in tax and other revenue increases runs counter to what manufacturers say they need to grow.

Over one-third (34%) of manufacturers want state policymakers to focus on government spending cuts, including reforming the state employee retirement system, as the state's fiscal instability is undermining economic growth.

Other policy priorities include job creation and economic growth (26%), cutting the state's high business and personal tax burden (18%), reducing business mandates and regulations (13%), and transportation infrastructure improvements (7%).

A majority of manufacturers are concerned about Connecticut's economy—just 6% see the state's economy expanding in the next 12 months, while 33% see no change and 60% forecast contraction.

By contrast, 72% expect the U.S. economy to grow over the next 12 months, 17% see unchanged conditions, and 11% predict a contraction.



Are you concerned about the potential negative impact of tariffs and trade disputes?

- Very concerned (34%)
- Somewhat concerned (24%)
- Neutral (23%)
- Not very concerned (19%)

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses

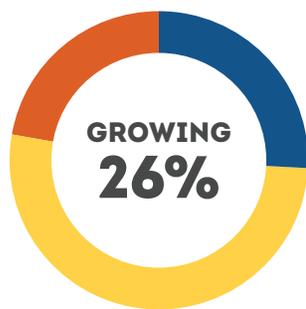
However, Connecticut manufacturers are anxious about the direction of the national economy—58% are somewhat or very concerned about the negative impacts of tariffs and trade disputes, 19% say they are unconcerned, and 23% are neutral.

WORKFORCE & HIRING TRENDS

More than a quarter (26%) of manufacturers grew their workforce in the last 12 months. Fifty-two percent maintained current employee levels while employment declined at 22% of Connecticut manufacturers.

Workforce challenges weigh heavily on manufacturers' minds. Sixty percent identified workforce (including recruitment, retention, and hiring) as their most significant immediate need, with 89% of those saying recruiting qualified workers is their primary challenge.

Connecticut continues to face a critical shortage of skilled workers, compounded by a shrinking labor force, population loss, retirements, and the state's high cost of



living. That shortage is felt most acutely in manufacturing.

Connecticut is one of the oldest states in the U.S. by average age, with 4% of the current manufacturing workforce estimated to retire this year and 4% next year. Between 2021 and 2024, another 19% of manufacturing workers expect to retire. Filling those vacancies is a major priority.

Over one-third (36%) of manufacturers say they need applicants with at least a technical high school degree. Twenty-four percent require applicants with a six-to-12 month community college certificate and 18% need

workers who have completed a five-week incumbent worker program or five-to-10 week intensive community college pipeline training.

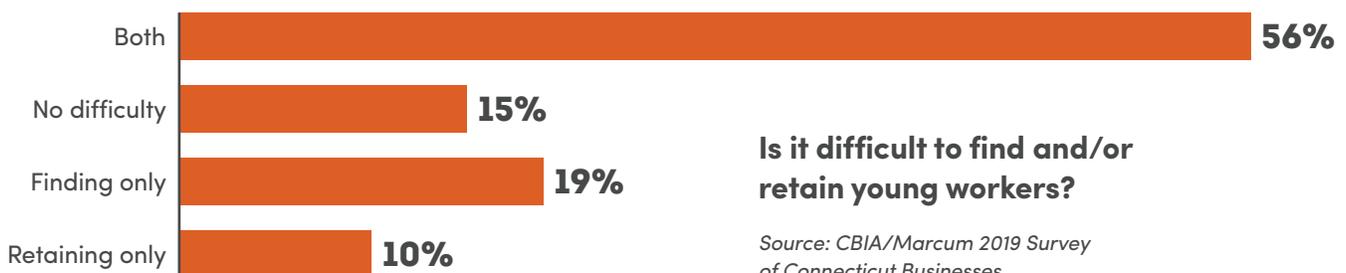
Is your workforce...

- Growing (26%)
- Staying the same (52%)
- Declining (22%)

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses

Employers say 41% of their workers are 40 years old or younger, while a quarter of managers are 40 years old or younger.

Most manufacturers, small and large, note difficulties finding and retaining young workers—those in the millennial and Gen-Z generations. Only 15% have no trouble finding and retaining young workers. Fifty-six



Is it difficult to find and/or retain young workers?

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses

percent have trouble both finding and retaining young workers, 19% just have trouble finding them, and 10% have trouble keeping them.

The primary obstacles to finding qualified young workers are lack skills or expertise (35%), proper work ethic (31%), competition from other firms offering higher pay and more expansive benefits (16%), and the state’s high cost of living (13%).

Several factors are responsible for the difficulty retaining younger workers, including the cost of living (37%), competition from other firms (33%), and a lack of opportunity for advancement (6%).

Along with prioritizing investments in training and recruitment, manufacturers are offering flexible work schedules (25%), employee engagement and recognition programs (20%), flexible paid time off policies (17%), and tuition reimbursement (15%).

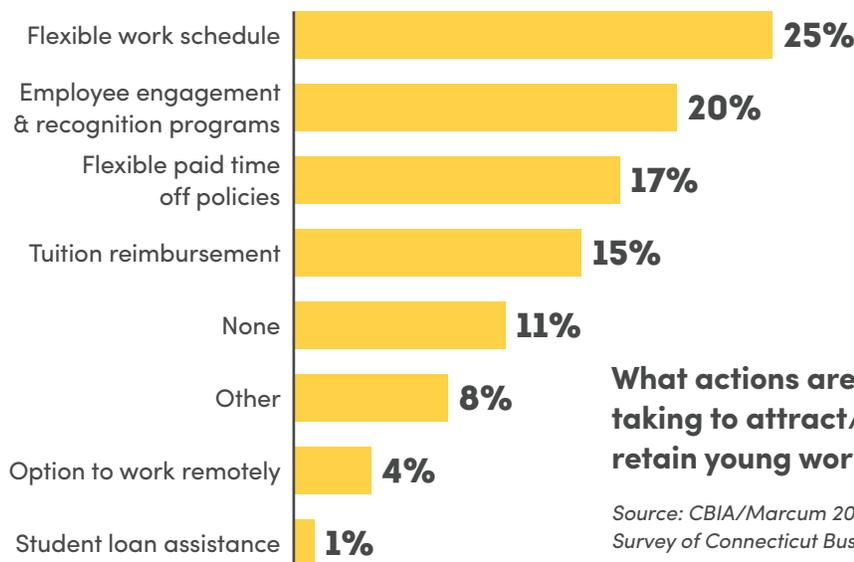
Many manufacturers are changing their workplace culture to better engage employees, including a greater

focus on training, education and safety, flexible paid time off policies, greater compensation incentives, and more team building.

MANUFACTURING LEADERS SPEAK

We interviewed 20 top manufacturing leaders and experts in August and September—posing a series of questions concerning the future of manufacturing in Connecticut. We asked:

- ▶ **Do you expect to need to introduce new products continuously for the next 10 years to stay competitive?**
- ▶ **Will an R&D tax credit be more or less important over the next 10 years?**
- ▶ **What technologies do you expect to drive change over the next 10 years?**
- ▶ **Where do you anticipate key innovations to come from over the next 10 years?**



What actions are you taking to attract/retain young workers?

Source: CBIA/Marcum 2019 Survey of Connecticut Businesses

- ▶ **What employee skills that you do not have now will you most need in five years?**
- ▶ **What employee skills that you do have now will be most important in five years?**
- ▶ **What markets will be most important in five years?**
- ▶ **Do you plan to be a manufacturing 4.0 company?**

► **Where are you in completing the transformation to manufacturing 4.0?**

► **How important is manufacturing 4.0 to your company and the industry?**

The answers we received reflect the great potential for manufacturing in Connecticut as well as the challenges facing manufacturers.

All respondents noted the vital need to continue to introduce new products or processes as well as upgrade existing products and processes to stay competitive.

A recurring theme was the need to compete with Asia and other low-cost producers.

Accordingly, R&D tax credits are likely to be more important in the future. We also heard it is vital that limited liability companies and other non-incorporated firms get access to existing R&D tax credits.

Industry 4.0 was on the minds of all respondents. For manufacturing, Industry 4.0 generally refers to the digital transformation of manufacturing system technologies, informed by data generated within that system to maximize productivity.

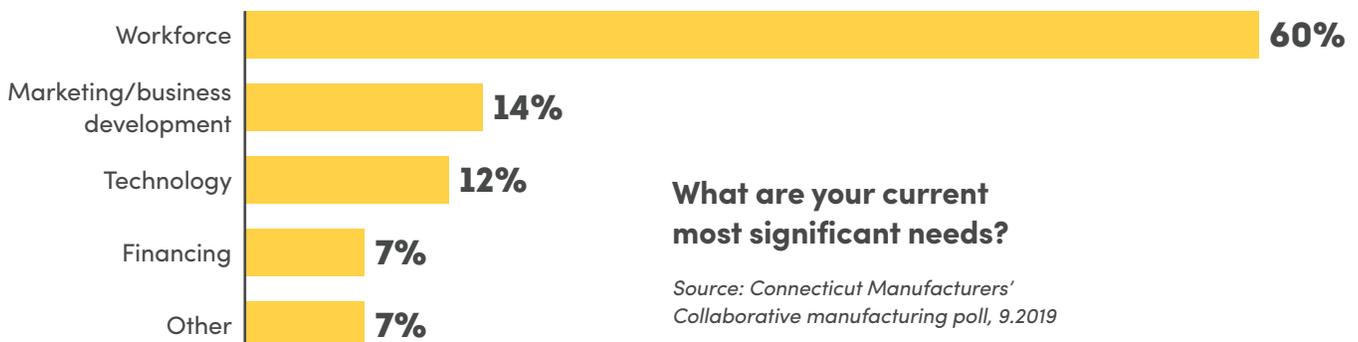
Almost all the manufacturers we spoke with are in the early stages of researching or integrating Industry 4.0. One adviser said that companies today who are embracing Industry 4.0 are most likely to survive the pressures of global competition.

The types of technologies that most interest manufacturers include additive manufacturing/3D printing; advanced robotics and cobots; and technology training equipment and software.

All respondents are concerned and somewhat hopeful regarding the workforce skills they will need in the future. Certainly, a strong work ethic for new hires remains a concern.

Key skills noted include STEM, communication skills, tool and die, critical thinking, creativity, complex problem solving, programming, automation maintenance, machine learning and programming, data analytics, and customer service.

As for important markets of the future, the United States remains number one but almost all respondents cited Asia and particularly China as the future for growth.



CONCLUSION

Manufacturers are generally doing well in Connecticut, but as this report shows, several critical warning signs require an unprecedented level of public-private collaboration and partnership to address.

A large majority of manufacturers are experiencing pain around workforce challenges. Connecticut's often siloed approaches to expanding the manufacturing workforce are not nearly sufficient enough to meet current and future demands.

A more industry-driven integration of the manufacturing and education communities is essential if these challenges are to be addressed.

Key stakeholders are moving forward with important initiatives—including the appointment of the state's first chief manufacturing officer—and the manufacturing community is optimistic those challenges can be met through partnerships and new levels of collaboration.

Many manufacturers are innovating with new products but also are recognizing the need to innovate with respect to production technologies.

These challenges will place further pressure on workforce demand.

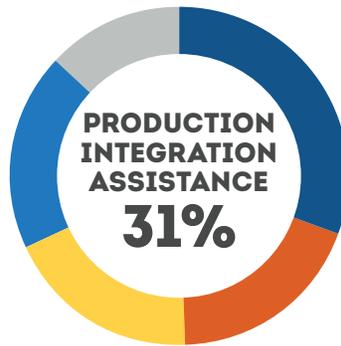
While technical high school graduates or six-to-12 month certificate level employees can meet many of the current workforce needs, pathways for producing more higher-skilled workers need developing now in anticipation of the growing integration of Industry 4.0 or digital manufacturing.

Policymakers also must understand that states across the country are consistently trying to lure manufacturers to lower-tax, more efficiently regulated business climates.

Government officials must take the concerns of manufacturers expressed in this report to heart and work proactively to increase competitiveness among counterparts in other states and across the globe.

Working collaboratively across public, private, and nonprofit institutions, we can ensure manufacturing will achieve its enormous potential for driving job growth, expanding

opportunities and prosperity, and strengthening Connecticut's economy for centuries to come. ■



What is your primary technology need?

- Production integration assistance (31%)
- Access to R&D testing (19%)
- Training staff (19%)
- Financial assistance (19%)
- Information (13%)

Source: Connecticut Manufacturers' Collaborative manufacturing poll, 9.2019

KEY 2019-2020 STATE RESOURCES & INITIATIVES

CONNECTICUT DEPARTMENT OF ECONOMIC & COMMUNITY DEVELOPMENT

Manufacturing is an important economic driver for the state of Connecticut and a key area of focus for the Department of Economic and Community Development.



DECD works closely with the sector to address challenges and opportunities facing manufacturers of all sizes. For example, DECD administers the \$75 million Manufacturing Innovation Fund that provides resources to companies looking to grow, adopt new technologies, or upskill their workforce—all with the goal of boosting their competitiveness in the global marketplace.

The department's new chief manufacturing officer will be an important advocate for the industry on matters of workforce development, business climate, and regulations and will collaborate with private, public, academia, local, state and federal government partners to develop and implement a comprehensive strategy to strengthen Connecticut's manufacturing sector.

Visit ct.gov/decad

CONNECTICUT ECONOMIC RESOURCE CENTER

The Connecticut Economic Resource Center is undergoing a transformation to be more deeply involved in statewide economic development.



Manufacturing has a long history of driving economic activity in our state, and CERC will continue to nurture this thriving sector in our transformed efforts.

With the support of the Lamont administration, CERC's repurposed mission is to spur economic development in close partnership with the public and private sectors.

CERC has recently attracted some of Connecticut's most important business leaders to its board of directors, a reflection of the private sector's sense of urgency to address Connecticut's economic and business competitiveness.

Through its close partnership with the Department of Economic and Community Development, CERC is enhancing Connecticut's ability to retain and recruit companies by taking a highly strategic approach to business development and business engagement.

CERC is collaborating with numerous stakeholders to develop a strategic plan for Connecticut's economic future, including ensuring Connecticut has a properly trained workforce, today and in the future.

Visit cerc.com

CONNECTICUT DEPARTMENT OF EDUCATION

The Connecticut State Department of Education continues to work with stakeholders to design rigorous, flexible pathways and programs of study in advanced manufacturing and STEM coursework that result in students graduating with the skills to successfully meet the demands of employers.



Per Public Act 19-58, CSDE collaborates with the Connecticut Manufacturers' Collaborative, workforce development boards, districts and postsecondary institutions to provide guidance to students, parents and counselors to raise awareness around career and technical education and explore the value of careers in manufacturing.

This year, CSDE convened a core CTE (Perkins V) leadership group with stakeholders to analyze Connecticut's workforce needs, establish program career clusters and inform the state's 2020 CTE Plan.

The state's technical high school system develops training curricula with input from regional employers like Electric Boat, supply chain manufacturers, and manufacturing trade associations to ensure students receive course credit for work-based learning opportunities and experiences that benefit them upon graduation.

[Visit ct.gov/sde](http://ct.gov/sde)

CONNECTICUT COLLEGE OF TECHNOLOGY & REGIONAL CENTER FOR NEXT GENERATION MANUFACTURING

The Connecticut College of Technology is a consortium of all 12 Connecticut



public community colleges and eight public and private universities. COT is also one of five national Regional Centers for Next Generation Manufacturing and a National Science Foundation Center of Excellence.

COT-RCNGM has a nationally recognized stackable credential model that provides credit certificates and associate's degrees that transfer to bachelor's degree programs in engineering science or technology studies.

In 2020, COT-RCNGM seeks to provide Connecticut high school teachers and community college faculty with professional development opportunities that include a smart manufacturing workshop as well as technical and/or professional skill modules that can be incorporated into participants home institutions.

COT-RCNGM will also create an online environment to share curriculum and best practice models that can be used in engineering and technology programs across the U.S. by high school and community college educators. Finally, COT-RCNGM will continue to partner with Industry to market high-tech manufacturing careers to a diverse population that includes high school students and their parents, dislocated workers, and veterans.

[Visit nextgenmfg.org](http://nextgenmfg.org)

CONNECTICUT DEPARTMENT OF LABOR

The Connecticut Department of Labor is administering \$2 million annually for funding the Eastern Connecticut Manufacturing

Pipeline. This initiative has helped manufacturing jobs in the east grow at a rate of almost four times that of the rest of the state.

In response to this extremely successful model, Governor Lamont and the State Bond Commission recently approved an appropriation for \$10 million (following \$5 million in 2018) to award funding to regional partnerships.

These partnerships create new pipeline programs throughout Connecticut in manufacturing or other industries that have experienced sustained shortages in employees. In addition, the department is entering the final fiscal year of the American Apprenticeship Initiative to support registered apprenticeships.

DOL will also dispense the final state bond funding for the Manufacturing Innovation Fund Incumbent Worker Training, which provides employers matching funds to up-skill and retain workers already employed with their company, many of which are manufacturers.

Visit ctdol.state.ct.us



CONNECTICUT TECHNICAL EDUCATION & CAREER SYSTEM

The Connecticut Technical Education and Career System is committed to supporting the workforce development needs of Connecticut manufacturers.



CTECS is expanding manufacturing programs in several technical high schools by adding additional teaching staff. The curriculum is guided by input from manufacturers participating in the Career Technical Education Advisory Committees. That feedback helps align instruction to industry trends and regional needs.

For example, CTECS trains students on CMM devices and CIMCO edit software. Through partnerships with local companies, grade 11 and 12 students gain hands-on career development experiences through a work-based learning program.

At the end of the 2019 school year, 263 manufacturing students were employed by a manufacturer participating in WBL, with an expectation of growing this number.

Working with Connecticut's community colleges, CTECS facilitates incumbent worker training by providing facilities and manufacturing teachers. CTECS also partners with the Connecticut Center for Advanced Technology's Summer Manufacturing Academy to expose youngsters to careers in manufacturing.

Visit cttech.org

CONNECTICUT MANUFACTURERS' COLLABORATIVE



Just over a year ago, under the leadership of CBIA and CONNSTEP, Connecticut's major manufacturing membership associations were brought together to provide a single, unified voice on behalf of Connecticut manufacturers.

The Connecticut Manufacturers' Collaborative developed a strategic roadmap for the Lamont administration and General Assembly and drafted four legislative priorities—three of which were adopted, including the creation of a chief manufacturing officer position within DECD.

More recently, CMC focused its attention on identifying and value-stream mapping conventional and innovative high school and community college technical education programs.

As of this writing, CMC is a named partner to a grant application before the National Institute of Standards and Technology to—among other things—assess the efficacy of technical education models being used in K-12 public schools, and make recommendations for expanding the implementation of the most effective of these programs in public school districts across the state.



