
ISSUE BRIEF:

MANUFACTURING THE INNOVATION ECONOMY

BY TIM CASTANO



In 1791, New Jersey welcomed the Society for Establishing Useful Manufactures, a unique quasi-governmental body launched to cultivate manufacturing along the Passaic River. The Society – a personal project of United States Treasury Secretary Alexander Hamilton – serves as one example of the state’s longstanding, existential-commercial relationship with manufacturing. The economy, of course, has evolved over the centuries, with industrialization transitioning to innovation and manufacturing decreasing in terms of its share of both the labor force and output, within the state and across the nation. Even so, the federal government and a number of states have recognized the consequential role played by manufacturing in the innovation economy, enacting policies to rejuvenate the sector’s mechanics, techniques and workforce.

As New Jersey pursues the generation of sustainable, rewarding employment and the development of a knowledge-based, leading-edge ecosystem, the state should examine manufacturing initiatives succeeding in such places as

Key Points

- The federal government and a number of states have recognized the consequential role played by manufacturing in the innovation economy, enacting policies to rejuvenate the sector’s mechanics, techniques and workforce.
- New Jersey would not seek to recreate a model from a previous generation, but rather would conceive of manufacturing as a critical component in fortifying the innovation economy and building an accompanying ecosystem.
- New Jersey would harness existing assets and bolster current enterprises as part of an initiative that would include intensive, coordinated planning and heightened investment.

Connecticut, which has devoted attention and resources to the field through its Manufacturing Innovation Fund.

Manufacturing in the United States has undergone prolonged contraction over several decades, due to policy decisions and market forces. The sector accounted for 27 percent of Gross Domestic Product in 1957 and less than 12 percent in 2007.¹ While manufacturing totaled 25 percent of national employment in 1950, the share fell to nine percent in 2008.² More recently, between 2000 and 2010, manufacturing lost 5.8 million jobs in the United States.³

New Jersey has followed this nationwide ebb in manufacturing. The state has shed almost 284,000 manufacturing positions since 1990, with jobs declining by 3.4 percent annually, as compared to 1.8 percent each year at the national level.⁴ While manufacturing captured 14.6 percent of all positions in New Jersey in 1990, the figure has dropped to 6.1 percent at the present.⁵ Manufacturing output totaled \$45.93 billion in 2013, down from approximately \$50 billion in 2000.⁶

The downward slope in manufacturing's prominence does not negate essential elements that recommend a renewed and vigorous commitment to the sector. Foremost, New Jersey possesses inherent and considerable advantages. Additionally, manufacturing continues to promise the realization of far-reaching benefits, particularly within the innovation economy.

The state approaches manufacturing from a position of natural strength. In combination with its own unrivaled density, New Jersey occupies an enviable location, with direct access to surrounding states and cities with sizeable populations and high commercial activity.⁷ Moreover, New Jersey houses the largest seaport on the East Coast, along with the rail, road, air and industrial infrastructure necessary to deliver goods to domestic and international markets at a pace calibrated to modern demands.⁸ The state also features a network of engaged partners, such as the New Jersey Manufacturing Extension Program and ManufactureNJ at the New Jersey Institute of Technology, operations focused on nurturing and expanding the industry.

Data and analyses answer why a state, such as New Jersey, would invest in an area that has suffered erosion. Individuals employed in manufacturing continue to earn more on average than those in other fields, resulting in a "manufacturing pay premium."⁹ The workforce also reflects desirable diversity, simultaneously drawing on a significant number of engineers and scientists,¹⁰ while also providing opportunities for citizens without bachelor's degrees.¹¹ In addition, manufacturing sparks overall economic growth, trade and productivity, as well as supports a host of ancillary industries.¹²

As New Jersey – or any state – attempts to amplify manufacturing activity, the effort should presuppose an important expectation. The McKinsey Global Institute warns, "Manufacturing cannot be expected to create mass employment in advanced economies on the scale that it did decades ago."¹³ This point reinforces not only the

reality that manufacturing has undergone adjustments, it also recasts the understanding of why a state would invest in manufacturing today. In other words, New Jersey would not seek to recreate a model from a previous generation, but rather would conceive of manufacturing as a critical component in fortifying the innovation economy and building an accompanying ecosystem.

Quite simply, manufacturing feeds the innovation economy, which relies increasingly on speed, agility and specialization. The sophistication of modern products calls for even greater and swifter collaboration among designers, engineers, scientists, technicians, managers and labor. The less distance among these various contributors, the better. Gregory Tassef of the National Institute of Standards and Technology writes, “Economic studies have shown that because much of the knowledge underlying emerging technologies is tacit in nature (i.e., requires person-to-person contact for efficient transfer), co-location synergies are critical.”¹⁴

In this respect, manufacturing has become integral in constructing an ecosystem for the innovation economy. Bruce Katz and Kelly Kline of the Brookings Institution assert, “Yes, advanced manufacturing has mastered the innovation side of the innovation district phenomenon.”¹⁵ Ultimately, a more robust manufacturing sector would serve as a persuasive feature in New Jersey’s value proposition to the R&D (research and development) and STEM (science, technology, engineering and math) community: the capacity to move ideas to actualization, production and distribution all within the same location.

Imbued with this enhanced appreciation of manufacturing’s role in comprehensive economic development, a targeted agenda in New Jersey would have to complement existing activity and resources. After all, the state begins with a manufacturing workforce of 245,600 employees and the sector still accounts for 8.5 percent of Gross State Product, placing New Jersey ahead of geographic and demographic neighbors New York (5.2 percent) and Maryland (5.8 percent), although behind Pennsylvania (12 percent), Connecticut (10.7 percent) and Massachusetts (10.1 percent).¹⁶ As previously noted, such organizations as the New Jersey Manufacturing Extension Program and ManufactureNJ lend valuable insight and guidance. Further harnessing these assets and bolstering current enterprises represent the first steps in an initiative that should include intensive, coordinated planning and heightened investment.

Foremost, New Jersey requires a statewide manufacturing strategy, an effort advocated, in general terms, by such entities as the President’s Council of Advisers on Science and Technology.¹⁷ Nisha Mistry notes, “States that leave manufacturing innovation, talent development and competitiveness to chance – without a concerted vision – are likely overlooking bright opportunities in the next economy.”¹⁸ This strategy initially should be designed by a task force and subsequently shepherded by a governing body, each populated with representatives from relevant private-sector outfits, public-sector bodies, academia and the research community. The underlying

process should assess New Jersey's manufacturing strengths, weaknesses and competitive advantages, all toward defining a clear blueprint with attendant metrics.

Secondly, New Jersey should devote to this strategy funds at a level higher than supplied through present vehicles, such as the state's Manufacturing Equipment and Employment Investment Tax Credit. McKinsey advises, "Governments will need to invest in building up their competitive advantages – or in acquiring new ones – to increase their appeal to globally competitive and productive companies."¹⁹ Connecticut certainly appears to have heeded this counsel with its 2014 Manufacturing Innovation Fund, which has authorized \$70 million in bond proceeds for grants to establish the state as a center for manufacturing innovation excellence, to improve the supply chain network and to boost the workforce.²⁰

The Connecticut Manufacturing Innovation Fund acknowledges that the modernization necessitated by competition entails risks for manufacturers and for employees, risks against which the various programmatic offerings aim to mitigate. The Manufacturing Innovation Voucher Program provides one-to-one matching grants between \$5,000 and \$50,000 for manufacturers to upgrade operations through acquiring new equipment or consulting experts.²¹ The latter piece deserves some stress, for the significance of refined machinery should not overshadow the need to adopt the new systems and methods that will propel firms into the contemporary marketplace. The Voucher Program assists manufacturers in accessing and applying the knowledge to help avoid obsolescence and ensure ongoing relevance.

For the current workforce, the Manufacturing Innovation Fund Incumbent Worker Training Program consists of matching grants of up to \$100,000 per employer to help employees augment skills according to unfolding demands. To address preemptively looming experience shortfalls as an important segment of the labor force approaches retirement, Connecticut has implemented the Manufacturing Innovation Fund Apprenticeship Program, which combines hands-on training and a school-based curriculum to prepare the incoming generation of manufacturing employees, with grants awarded for wage subsidies, credential costs and tuition. The state further has targeted rising talent at an even earlier age with the Young Manufacturers Academy, exposing students in grades seven-to-nine to the design, software and high-tech elements that define the future of the industry.²² In all respects, Connecticut's Manufacturing Innovation Fund, through its scope and scale, presents at least a template worth considering in New Jersey.

The state also could leverage dollars by creating a separate instrument for private investment in manufacturing, mirroring the federal Scale-Up Manufacturing Investment Company Act (SUMIC) of 2015, introduced by Senator Cory Booker. The SUMIC Act would enable private investors to raise capital for manufacturing businesses, with a one-to-one match from the government. Regulatory provisions likely would limit what a state could engineer as compared to a federal equivalent; however, the concept of a fund to incent the flow of private dollars toward manufacturing should prompt New Jersey to explore creative avenues.

Overall, an emphasis on manufacturing would see New Jersey reaching back into its past to pull itself into the future. In the innovation economy, the character and quantity of manufacturing jobs has changed from those of an earlier generation, but the state’s appeal as an industry hub remains just as compelling, due to location, density, mobility and intellectual capital. With a statewide commitment and thoughtful investments, New Jersey could reap the widespread rewards of manufacturing excellence in the present day.

Notes

¹ Gregory Tasse, “Rationales and mechanisms for revitalizing US manufacturing R&D strategies” (Gaithersburg, MD: National Institute of Standards and Technology, 2010).

² Richard Dobbs, James Manyika and Charles Roxburgh, *Manufacturing the future: The next era of global growth and innovation* (Washington, DC: McKinsey Global Institute, 2012).

³ Ibid.

⁴ Jason Timian, “New Jersey’s Advanced Manufacturing Cluster” (Trenton, NJ: New Jersey Department of Labor and Workforce Development, 2013).

⁵ Ibid.; National Association of Manufacturers, “New Jersey Manufacturing Facts” (Washington, DC: National Association of Manufacturers, 2016).

⁶ National Association of Manufacturers.

⁷ Nisha Mistry, “Newark’s Manufacturing Competitiveness: Findings and Strategies” (Washington, DC: Brookings Institution, 2013).

⁸ Ibid.

⁹ Jessica R. Nicholson and Regina Powers, “The Pay Premium for Manufacturing Workers as Measured by Federal Statistics” (Washington, DC: United States Department of Commerce, 2015).

¹⁰ President’s Council of Advisors on Science and Technology, “Report to the President: Accelerating U.S. Advanced Manufacturing” (Washington, DC: Executive Office of the President, 2014).

¹¹ Timian.

¹² Dobbs, Manyika and Roxburgh.

¹³ Ibid.

¹⁴ Gregory Tasse, “Rationales and mechanisms for revitalizing US manufacturing R&D strategies” (Gaithersburg, MD: National Institute of Standards and Technology, 2010).

¹⁵ Bruce Katz and Kelly Kline, “An advanced manufacturing innovation district grows in Sheffield, England” (Washington, DC: Brookings Institution, 2015).

¹⁶ National Association of Manufacturers; National Association of Manufacturers, “Manufacturing’s Share of Gross State Product” (Washington, DC: National Association of Manufacturers, 2016).

¹⁷ President's Council of Advisors on Science and Technology.

¹⁸ Mistry.

¹⁹ Dobbs, Manyika and Roxburgh.

²⁰ Connecticut Department of Economic and Community Development, "Manufacturing Innovation Fund Annual Report FY 2015" (Hartford, CT: Connecticut Department of Economic and Community Development, 2016).

²¹ Ibid.

²² Ibid.