

A Manufacturing Marshall Plan

Revitalizing the post-pandemic economy by bringing manufacturing capabilities and jobs back to North America

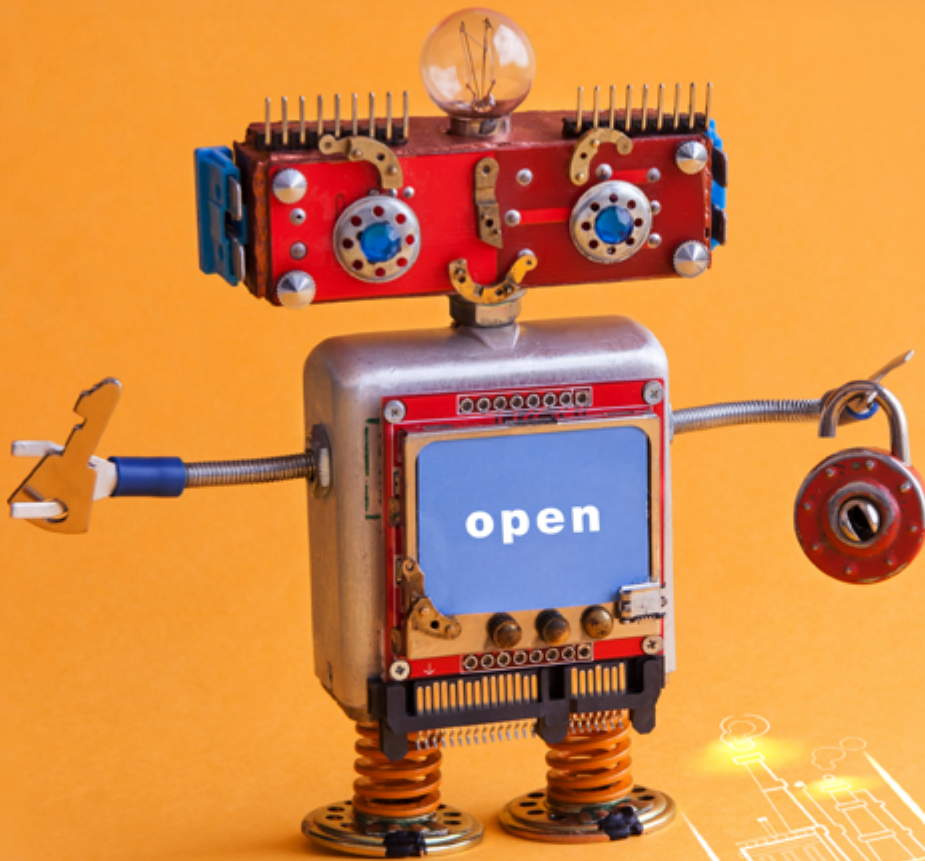


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Executive Summary

The United States and its North American neighbors are battling a global war on the COVID-19 pandemic that has affected every element of the economy. From manufacturing to health care, education to finance, and service to entertainment, there have been no industries that have been left untouched by the coronavirus pandemic.

For manufacturing, this abrupt change to the economy has revealed the negative impact of decades of offshoring, the opportunity for new manufacturing innovations, and the need for an industry 4.0-ready workforce.

In 2015, China unveiled “Made in China 2025,” a national plan to make it the world’s leader in 10 high-tech manufacturing sectors, including biomedicine by 2025. The worldwide coronavirus pandemic has sent us a wakeup call about North America’s lack of manufacturing capabilities for producing critical medical supplies, drugs, and some defense-related items locally on this continent.

During World War II, automakers converted their factories to make tanks and planes to defeat the Axis powers and preserve freedom. Now in response to the COVID-19 pandemic, General Motors, Ford, and other companies have mobilized to manufacture essential medical supplies and devices to defeat the virus. In the span of a few weeks, manufacturers have repurposed some of their factories to produce medical face shields, masks, respirators and ventilators in collaboration with health care companies.

While the repurposing of companies may be a short-term solution to deal with the medical supply chain demands, a long-term approach must be adopted and quickly deployed to bring other critical manufacturing capabilities and jobs back to North America. To accomplish this requires that businesses, educators, and policymakers focus on closing the North American skills gap. We can do this by producing more career-ready citizens with the right technical and social skills to actively rebuild the current workforce, so it is oriented for the future and aligned with the latest industry 4.0 and Digital Revolution technologies.

As we see it, we need to initiate a new style North American “**Marshall Plan**” for the revitalization of a post-pandemic economy. To protect against future disruptions and shortages, we must rebuild home-based supply chains capable of producing critical items and sectors as we did for Europe after World War II.



This new plan – a commitment to North American industry that is, frankly, overdue – must:

- **Advocate for reshoring, nearshoring and LeanShoring™**
- **Increase our focus on industry 4.0 innovations**
- **Enhance educational and training offerings to create a stronger workforce.**

These three actions will provide companies and their communities with a distinct competitive advantage. Together we can boost productivity and improve sustainable resilience in this fast-changing competitive world. Let us think big. Right now, with this “burning platform,” the time is right for us to come together in public-private partnerships to competitively win the global economic and environmental marathon.



This is not just a call-to-arms for policymakers. It is a rallying cry for North American manufacturers. It is the primary responsibility of industry to reinvent processes, supply chains and products to bring cost-competitive solutions to customers – to use lean methodology to more efficiently delivery on the promise of this new Manufacturing Marshall Plan. While government support is necessary, industry must mobilize to make this a success, just as business sectors mobilized in Europe after World War II to make the Marshall Plan a success.

With a sharp focus on retooling the educational and industrial infrastructure and growing and reshoring advanced manufacturing capabilities and good paying jobs, we can advance our domestic economy and secure our social, environmental and economic future.

Together We Can Do It!

STEP 1

The Manufacturing Issues Revealed by COVID-19

The coronavirus pandemic has created new pressure to weigh the efficiency and cost benefits of a globalized supply chain system against the robustness of a domestic-based supply chain. Switching to a more robust domestic supply chain and advanced manufacturing base could reduce dependence on an increasingly fractured global supply system.

In a 1998 Harvard Business Review article, Michael Porter, Bishop William Lawrence University Professor at the Harvard Business School explains, “The enduring competitive advantage in the global economy lies increasingly in local things – knowledge, relationships, and motivation – that distant rivals cannot match.” Now, some two decades later, the COVID-19 pandemic has shined a new spotlight on the need to increase local sourcing. [1]

**Clusters
and the New
Economics of
Competition**

The pandemic is a wakeup call to U.S. and North American manufacturers and policymakers who must reevaluate their supply chain strategies and take a closer look at the benefits of reshoring, nearshoring or LeanShoring™.

While the United States remains a global leader in the creation of new products, drugs, and medical supplies, much of the manufacturing capabilities have moved offshore. The coronavirus outbreak has exposed **the United States’ dangerous dependence on China for pharmaceutical and medical supplies, including an estimated 97 percent of all antibiotics and 80 percent of the active pharmaceutical ingredients** needed to produce drugs at home. [2]

The time has come to launch a strategic repurposing of the industrial base along with the need to reconstitute a skilled workforce to revitalize the economy and grow the middle class like what was achieved following World War II.

[1] Porter, Michael E. (1998, Nov.-Dec.). Clusters and the new economics of competition. *Harvard Business Review*. <https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition>

[2] Exploring the Growing U.S. Reliance on China’s Biotech and Pharmaceutical Products : Testimony before the U.S.-China Economic and Security Review Commission (2019, July 31) (testimony of Rosemary Gibson). <https://www.uscc.gov/sites/default/files/RosemaryGibsonTestimonyUSCCJuly152019.pdf>

STEP 2

Reevaluating Total Cost of Ownership to Prevent Post-Pandemic Supply Chain Disruptions

Offshored supply chains – remote supply chains with key component manufacturing that happens on distant soil – cause long-distance transportation, increased communications obstacles, unpredictable delivery times resulting in the loss of manufacturing capacities, and increased environmental pollution. Consequently, a trend known as reshoring or nearshoring – moving supply chain production to domestic or nearly domestic facilities – is gaining acceptance. LeanShoring™ is doing this in a manner that eliminates waste and anything that does not provide value to the end customer while not adding additional cost to the process.

In response to 21st century demands, and to avoid future supply chain disruptions and takeovers from global competitors, companies must consider undergoing a supply chain renaissance. To do this, they will have to implement new operational strategies and technologies.

“The likelihood of a costly production interruption increases greatly with distance,” said Kim Humphrey, Association for Manufacturing Excellence’s (AME) president and CEO. “As a strategy, more companies are considering shortening their supply chain, which reduces cost and risk. By working together with AME and its alliance partners, these companies are reducing operational waste and supply chain disruptions in order to compete on the world stage.”

As companies deal with global supply chain disruptions, they need to analyze the real cost of offshoring through total cost of ownership (TCO) analysis versus just price or landed cost, the main criteria in the past. Total cost of ownership includes the direct and indirect costs of a product or system. Manufacturers are reevaluating their production and sourcing locations by taking a closer look at the hidden costs of offshoring and the benefits of bringing production closer through reshoring.

Most companies make sourcing decisions based solely on price, oftentimes resulting in a 20 to 30 percent miscalculation of actual offshoring costs. **The Total Cost of Ownership Estimator is a free online tool from Reshoring Initiative** that helps companies account for all relevant factors — overhead, balance sheet, risks, corporate strategy and other external and internal business considerations — to determine the true total cost of ownership.



Reevaluating Total Cost of Ownership to Prevent Post-Pandemic Supply Chain Disruptions

By using the Reshoring Initiative TCO analysis, manufacturers can factor in sustainability objectives and minimize environmental impacts. TCO enables companies to identify products for which reshoring will provide major environmental benefits such as reducing carbon dioxide levels while maximizing shareholder returns.

The Reshoring Initiative also developed the Corporate Social Responsibility Estimator (CSRE), a tool to help companies quantify the environmental impact of offshore versus domestic sourcing. In a first test, CSRE showed that shifting production of an aluminum diecasting from China to the U.S. cut the environmental impact by close to 50 percent. To learn more visit: <https://reshorennow.org/blog/corporate-social-responsibility-estimator-csre-project/>

Moser and the Reshoring Initiative are collaborating with AME to promote LeanShoring™ as part of AME's manufacturing renaissance initiative.

“With the CSRE and TCO tools, we’re empowering companies to change the paradigm from ‘offshored is cheaper’ to ‘local reduces the total cost of ownership’,” said Moser.

To help companies that have identified the cost variances using the TCO Estimator for reshoring, nearshoring or LeanShoring™, the AME Lean Sensei™ is a free tool that helps improve and maximize lean thinking results. This innovative tool helps a company identify the performance gaps in their business's performance improvement capabilities. As organizations consider changes to their supply chain relationships, the AME Lean Sensei™ can also help identify improvement opportunities that might facilitate sustaining or bring back manufacturing jobs that have been offshored to China or other developing countries.



Effective supply chain management (SCM) is an essential strategy for success in the global and e-markets. Companies can build an agile, connected and resilient supply chain with Dynamics 365 Supply Chain Management. Systems designed by Microsoft and others streamline planning, production, inventory, warehouse and transportation to maximize operational efficiency, product quality and profitability using predictive insights from artificial intelligence (AI) and the Internet of Things (IoT).

The Council of Supply Chain Management Professionals (CSCMP) is another organization that helps companies and their leaders learn how to use tools and technology for developing agile supply chains to get their products to market faster at a minimum total cost, including considering the harm to the environment and risks and costs of offshoring while preventing supply chain disruptions.

Reevaluating Total Cost of Ownership to Prevent Post-Pandemic Supply Chain Disruptions

“Supply chain professionals will play a significant role in this reshoring, nearshoring or leanshoring initiative. They must sharpen their skills in logistics network design and manufacturing design. By calculating total landed cost, we can solidify the hypothesis that the global supply chain falls short from a competitive point of view,” asserts Robert Martichenko, founder and CEO of LeanCor Supply Chain Group.

“It’s safe to say that a ‘new normal’ will be an outcome of the pandemic crisis, which will include how we think, plan, execute and improve our supply chains,” said Martichenko. “To prepare for that new normal, we must assess our supply chain risk relative to sensing, receiving and fulfilling a customer order in the event of planned and/or unplanned changes in demand or other supply chain dynamics. This is about driving visibility, capability and resilience.”

In times of war, public-private partnerships proved to be indispensable in helping to win wars. As U.S. hospitals are in search of the medical supplies needed to fight the war on the COVID-19 pandemic, the federal government is working with private companies to bring massive amounts of medical supplies from other countries to the United States.

As an example, “Project Airbridge” is an unprecedented, historic public-private partnership program and an innovative way to help overcome logistical hurdles to supply the nation’s 4,700 hospitals and other front-line responders with needed critical supplies. FEMA and the U.S. State Department coordinated commercial flights to bring supplies to the U.S. in two to three days, rather than shipping them by sea, which would take 20-40 days.

The repurposing of facilities, mobilization of public-private partnerships, and the need to research alternative sourcing strategies to identify different supply chain scenarios and evaluate operational impacts are critical given the expanding nature of supply chain disruptions during the pandemic. The new United States-Mexico-Canada Agreement (USMCA) is a mutually beneficial win for North American workers and businesses. When finalized and implemented, the agreement will create more balanced, reciprocal trade that supports high-paying jobs and grows the North American economy.

Although the USMCA is a win for several key industries and workers, an agreement – as proposed by Reshoring Initiative, as an example – is necessary and would have a larger impact with longer-term value. For example, this agreement would implement a strategy that builds upon the massive U.S. and Canadian markets, Mexico’s proximity to those markets and low-labor costs, and the collective trade deficit in the coming reshoring and nearshoring era.

Reevaluating Total Cost of Ownership to Prevent Post-Pandemic Supply Chain Disruptions

AME is aligned with the National Association of Manufacturers (NAM) and Canadian Manufacturers & Exporters (CME), whose members will be key to enabling the success of the USMCA trade agreement in the post-pandemic economic recovery.

NAM president and CEO, Jay Timmons, released the following statement on NAM being included in the Great American Economic Revival Industry Groups. [3]

Throughout this crisis, manufacturers have been leading the way. Much of the sector has been fully operational, making critical personal protective equipment, medical supplies, and ventilators, in addition to producing food and household essentials. Manufacturers have many examples of safe and healthy practices to share.

The Canadian Manufacturers & Exporters have been advocating for and representing member interests to strengthen their competitive advantage by building knowledge and capacity and by actively working to influence and recommend effective policies that will allow manufacturers to compete at home and abroad while preventing supply chain disruptions in the future.

“Innovation Canada quickly created a new COVID-19 funding stream within its Strategic Innovation Fund program to support COVID-19-related vaccine candidates and clinical trials led by the private sector, as well as Canadian bio-manufacturing opportunities,” said Andrea Johnston, assistant deputy minister and head of Innovation Canada (a sector within Innovation, Science and Economic Development Canada) in an interview with Research Money. Innovation Canada was able to “quickly pivot its entire portfolio to the COVID-19 crisis and doing so in a tele-working environment, ‘has seen the procurement process become agile as well,’” according to Johnston. [4]

Public-private partnerships are dealing with the contraction of economic activity worldwide caused by plummeting demand and the reduction in production capacity in the wake of COVID-19. Consequently, this is forcing companies to rethink their supply chain strategies. Shortages of critical health care products, exacerbated by export restrictions imposed by some national governments, have also highlighted for policymakers the importance of building up greater domestic manufacturing capacity. While there is unlikely to be a wholesale reshoring of production or supply chains to domestic operations, local sourcing is likely to play a larger role for companies in the future.

[3] National Association of Manufacturers. (2020, April 14). *NAM's Timmons named to COVID-19 Great American Economic Revival Industry Group* [Press release]. <https://www.nam.org/nams-timmons-named-to-covid-19-great-american-economic-revival-manufacturing-industry-group-7962>

[4] Lowey, Mark. (2020, May 6). Innovation Canada shifts “entire portfolio” to COVID-19 response. *Research Money*. <https://researchmoney-inc.com/articles/innovation-canada-shifts-entire-portfolio-to-covid-19-response/>

Reevaluating Total Cost of Ownership to Prevent Post-Pandemic Supply Chain Disruptions

Now is the time for North American business leaders and policymakers to work together to eliminate the collective trade deficits with China. By reshoring, nearshoring or LeanShoring™ production capabilities, we can strengthen North American manufacturing and bring back millions of manufacturing jobs while minimizing the risk of future supply chain disruptions.

Beyond public-private partnerships, it is incumbent on industry to consider lean methods and LeanShoring™ to ensure North American manufacturing is globally competitive. Using proven tools and processes – AME's bread and butter offerings – will allow organizations and their employees to pursue enterprise excellence that allows for sustainable, long-term manufacturing on this continent.

STEP 3

Advanced Manufacturing for a More Productive and Efficient Post-Pandemic World

We live in an information-intense world. Data-driven decision-making is prevalent in everything from manufacturing to baseball. Industry 4.0 and smart manufacturing practices leverage this data-rich environment to further transform manufacturing and related industries. By pairing a connected environment of data, people, processes, services, systems and IoT-enabled industrial assets with the generation and utilization of actionable data, we can realize smart industries and ecosystems that foster innovation and collaboration.

“Advanced technologies have played an important role in enabling North American manufacturers respond quickly to COVID-19,” said Jayson Myers, CEO of Next Generation Manufacturing Canada, an organization dedicated to building world-leading manufacturing capabilities by strengthening collaboration among researchers, technology companies and manufacturers. “The benefits of a speedier, more agile business response, greater flexibility in production, the ability to track and trace throughout supply chains and of course the entire development, production and life cycle management stages of innovative products being used today by front-line health care workers are enabled by the use of digital and advanced materials and production technologies.”



Smart manufacturing is on the forefront of the Fourth Industrial Revolution. Automation is being followed by the digitalization of production. **The goal: increased productivity, efficiency, speed and quality, resulting in higher competitiveness for companies on their way to the future of industry.** In order to enable companies to make the most out of digitalization, Siemens, for example, developed the Digital Enterprise — a holistic portfolio of software and automation solutions. It supports discrete and process industries to become faster, more flexible and more efficient.

This Fourth Industrial Revolution takes computing to an entirely new level, toward a “cyber-physical” world where data-driven decision making, augmented reality, artificial intelligence, autonomous systems and the cloud are changing the fundamental manufacturing industry paradigm. Edge computing was developed due to the exponential growth of IoT devices, which connect to the internet for either receiving information from the cloud or delivering data back to the cloud.

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Faster networking technologies, such as [5G](#) wireless, are allowing for edge computing systems to accelerate the creation or support of real-time applications, such as video processing and analytics, self-driving cars, artificial intelligence and robotics, to name a few. Thanks to sensors and other design features such as lightweight materials and rounded edges, collaborative robots (cobots) can interact directly and safely with humans. Cobots can have many roles.

Carroll Thomas, director of the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP), runs a national network of centers helping U.S. manufacturers adopt advanced technology. “Cobots are huge now,” Thomas told Redshift in early 2020. “A lot of Tier 2 and Tier 3 suppliers are going into automation in a more thoughtful, strategic way, using sensors and AI with IoT connectivity. They’re digitalizing their whole operation. This integration is now becoming mainstream.” [\[5\]](#)

Collaborative industrial robots can be used to automate repetitive, unergonomic tasks — such as gathering and carrying heavy parts, machine feeding and final assembly. The predicted impact is higher-skilled employees working collaboratively with robots and the horizontal organization becoming a reality.

Industry 4.0 brings opportunities to infuse AI into advanced manufacturing. In a recent IBM survey, 34 percent of companies said they are adopting AI technology, up from 14 percent a year ago. AI-powered manufacturing can drive up to 30 percent yield improvements and 15 percent waste reduction, and 5-10 percent reduction in operating costs to accelerate a company’s enterprise excellence journey. IBM is offering the essential combination of software, services, and industry expertise to build intelligent workflows that respond to rapidly changing conditions of the next generation of advanced manufacturing.

Simpler, an IBM company, deploys different levels of digital expertise and continuous improvement applications to allow companies to reach their fullest potential. By leveraging technology while engaging their workforce, companies are becoming more competitive in the global marketplace. Simpler works with organizations to implement systemic changes that facilitate long-term performance and sustainable growth in the manufacturing, health care, and government sectors.

Smart manufacturing is driving a sustainable, “green” approach for a renewed focus on leaning production processes. The results include using fewer natural resources, reducing pollution and waste, recycling and reusing materials, and moderating emissions in processes and products. [\[6\]](#)

[\[5\]](#) Rovito, Markkus. (2020, January 2). 3 trends that will drive industry 4.0 manufacturing in 2020 - and beyond. *Autodesk*. <https://www.autodesk.com/redshift/industry-4-0-trends/>

[\[6\]](#) Marshall, Glenn. (2020, January 23). Building lean’s sustainable future – today! Target Online. <https://ame.org/target/articles/2020/building-leans-sustainable-future-today>

STEP 4

Reskilling the Workforce

The World Economic Forum Reskilling Revolution Platform predicts 133 million new roles may be created by the Fourth Industrial Revolution, while 75 million jobs may be displaced by new technologies at the same time. If current trends continue, even those with schooling will continue to lack the skills necessary for the future of work. By 2022, on average, workers will need 101 days of additional learning and training to prepare for the future needs of their job in the Fourth Industrial Revolution.

The industry 4.0 and Digital Revolution is creating additional demands for millions of new skilled jobs. As America reached near full employment prior to the pandemic, employers continued to search for skilled workers with the number of job openings standing at 6.8 million as reported by the U.S. Bureau of Labor Statistics in February 2020.



Most of these new jobs were entry-level, requiring a high school diploma, a foundation of math and science, along with some additional training offered by an apprenticeship and other workforce development programs. **Job seekers who possessed the required technical and leadership skills and some work experience were well positioned to take advantage of these opportunities, and they remain so positioned for the bounce back.**

The U.S. educational system is designed to graduate college- and career-ready citizens with the needed employable skills and knowledge to obtain the first job or to continue with a post-secondary education and or credentialing for success in work and life. To achieve this goal, educators in public-private partnerships with employers and organizations like the Association for Manufacturing Excellence and other leading learning organizations are becoming even more engaged in the post-pandemic educational requirements for career-ready citizens.

The Learning First Alliance is a partnership of leading educational organizations representing more than 10 million members dedicated to improving student learning in America's public schools. They share examples of success, encourage collaboration, and work toward the continual and long-term improvement of public education based on solid research. They have a significant impact on the 50.8 million students in traditional U.S. public schools within 14,000 school districts, comprised of many communities and families with diverse needs for the Fourth Industrial Revolution.

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Meanwhile, nonprofit organizations like Project Lead the Way and Virtual Enterprises International have partnered with school districts across North America to provide students with authentic pre-engineering and pre-business experiences. High school students who complete these programs have a solid foundation for understanding manufacturing through STEM (science, technology, engineering and mathematics) and business lenses.

To obtain work experience beyond traditional education, however, there must be job opportunities for younger workers who are just starting out. The truth is that the “first job” has always been designed for younger workers seeking a new skillset. While they are often low-pay, entry-level employment opportunities, they are vitally important for our younger workforce because they allow people to establish a track record, learn skills and advance over time to better-paying jobs.

The Job Creators Network launched a campaign, the “Fight for \$50,” aimed at protecting and increasing the number of “first jobs” so young people can obtain the skills and experience leading to \$50,000 per year or more jobs — including employment in manufacturing, construction, energy, retail management and other career fields.

To help young people prepare for their futures, virtual learning networks can help students identify and take advantage of remote learning opportunities. To make the transition to distance learning easier, Microsoft has created resources, training and how-to guides that will help schools, educators, students and their families. New strategies, resources and technology are creating online classrooms that help students and faculty find new ways to connect and learn to keep students energized, engaged and on the path to learning as they navigate the “new normal.”



As the workforce undergoes generational changes precipitated by retiring baby boomers, factories are evolving from the pre-automation plants of the past to the smart factories of the future. Workers in smart factories require digital fluency, technological savviness, and data analytics know-how — skills that previous generations just didn’t need, and future generations may not possess. For example, companies are using Google Glass to help reskill and retool the current workforce along with onboarding new employees by delivering digital work instructions to the operators on the line to quickly adapt to new tasks using new skills.

Reskilling the Workforce

New-collar Jobs

As the economy evolves, technology advances and the workforce changes, individuals need to have the relevant skills, intellectual curiosity and willingness to learn and adapt for new-collar careers. IBM executive chairman Ginni Rometty has been calling for government and business leaders not to think in terms of white-collar or blue-collar jobs, but new-collar jobs instead.

Rometty said she believed that these were jobs that may not require a traditional college degree. New-collar workers may have degrees, or they may have gained the necessary skills through vocational training while in high school. New-collar is about skills, not degrees.

While some of these new-collar jobs require a college education, most are “middle skill” jobs requiring a high school diploma, a foundation of math and science along with some additional training offered by an apprenticeship and/or a credentialing program. Industry must invest in multigenerational employee retention and retraining programs to strengthen and elevate in-house teams.

The next generation of digital workers is Generation Z. These digital natives were born after 1996 and represent approximately 25 percent of the U.S. population. They are now beginning to stream into the workplace. As soon as this year, 40 percent of consumers will be part of Generation Z. Businesses are aware of this surge, and companies are already planning for this onslaught of digital natives.

Generation Z are tech wizards; however, they may lack some of the social skills that are still critically needed in business, especially in dealing with a global supply chain. **The equilibrium point between humans and machines is in flux, and it is important to offset the digital native behavior with some education in effective communication, negotiation skills and, of course, empathy.**

To consider how to on-board Generation Z and reskill the existing workforce, companies must consider redeploying training within industry (TWI) a U.S. program used during World War II. This 80-year-old idea is still very relevant. According to TWI experts, while technology has changed a lot since 1945, people have not.

The TWI program was born out of the need to rapidly train unskilled workers entering the production workforce as many skilled laborers went off to war. TWI techniques were used to on-board workers by developing the technical and interpersonal skills needed to be successful in the workplace.

Today, organizations including Lean Frontiers, an AME alliance partner, have brought TWI to the modern era. They help business leaders and practitioners understand how to apply lean principles to be prepared for the workplace of the future, address

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some of the most common challenges in organizations and demonstrate how these programs can be applied successfully in current and future work environments.

The Generation Z influence is coming to the workplace. The use of mobile devices, artificial intelligence and automation is rapidly replacing traditional factory procedures. Young professionals who essentially grew up with a device in their hands are driving these new-collar jobs. All those pervasive mobile applications that can frustrate even the most technology-oriented millennial are essentially geared to Gen Z. They get it, and so will your customers and suppliers.

Apprenticeships and Work-Based Learning

Eighty-four percent of manufacturing executives agree the nation is now facing a “skills gap” crisis. Development of a skilled workforce begins with motivating a higher quantity and quality of recruits. The demise of vocational education at the high school level has bred a skills shortage in manufacturing today.

To close the growing skills gap, groups of employers, community colleges, workforce agencies, intermediaries, youth programs, labor organizations, policy experts, and others across the country are advancing apprenticeship and work-based learning strategies as workforce development and talent solutions for American businesses. The Center for Apprenticeship and Work-Based Learning provides expert guidance on how to identify and share effective approaches that work for companies, students, and workers. Business leaders and educators believe in the power of apprenticeship and work-based learning to drive the improvement of people’s lives, strengthen the American workforce, and provide American businesses with the skilled workers they need to grow and prosper.

In fact, workforce development may provide the perfect rallying point for policymakers across the political spectrum. Politicians on both sides of the aisle continue to work together to close the skills gap and strengthen American manufacturing. For his part, President Trump has asked companies to commit to expanding programs that educate, train and reskill American workers of all ages by signing the Pledge to America’s Workers. The White House workforce development program focuses on vocational job training and apprenticeships as a positive alternative to the almost-default setting of a four-year college degree approach.

One of the nation’s premier apprenticeship programs was founded in 1919 at Newport News Shipbuilding (NNS), a division of Huntington Ingalls Industries, in Newport News, Va. NNS is an Association for Manufacturing Excellence corporate member. The Apprentice School program is an industry-driven, hands-on apprenticeship college for individuals interested in pursuing a career in advanced shipbuilding.

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Apprenticeship at NNS is a formal training program that provides workers both theoretical and practical on-the-job training and instruction in the shipbuilding trades. Today's apprentices are well-paid men and women requiring high-performance skills and abilities that will serve them throughout their shipbuilding careers.

Newport News Shipbuilding Apprentice School, in partnership New Horizons Regional Education Centers (NHREC), the largest of the nine regional centers in Virginia, has launched Youth Builders (YB), a pre-apprenticeship program designed to improve the job readiness of high school students to enter and succeed in NNS registered apprenticeship program.

In addition to the YB's high-tech, hybrid courses, the program provides face-to-face mentoring and coaching. YB students are exposed to a variety of enriching workplace-learning activities. Courses are coordinated within the students' block scheduling at New Horizons. Upon completion of the pre-apprenticeship, students apply for the paid apprenticeship.

Apprenticeships are the new gold standard, stated the Reshoring Initiative's Moser, "All countries, even Germany, are having problems attracting and training skilled workforces. The U.S. will bring back from offshore millions of manufacturing jobs when its apprenticeship system goes from being a laggard to a world leader."

STEP 5

Moving Forward in Post-Pandemic Economy

The COVID-19 coronavirus pandemic has altered everyone's way of life and is sending a wakeup call depicting what the "new normal" will look like moving forward. The digital age has already changed the way we think, learn and work, and will continue to do so. The pandemic crisis has presented opportunities for more sophisticated and flexible use of technology. Moving forward, people, their devices and organizations will have a powerful COVID-19 legacy.

Failure to reshore, nearshore or leanshore manufacturing jobs, enhance industrial innovation and reskill the North American workforce leaves the continent susceptible to future supply chain disruptions and economic uncertainty. We are in the midst of an economic crisis, brought on by the pandemic, and if we don't collectively institute a plan to strengthen our local supply chains, we will see these issues reemerge in the future due to a similar pandemic, armed conflict or other disruptive event. **Just as scientists seek a vaccine for COVID-19, the three steps outlined in this white paper are the vaccine to prevent supply chain disruptions in the future.**

To avoid this fate and capitalize on the opportunity to retool North American industry for a post-pandemic world, we must tighten our supply chains through reshoring, nearshoring or LeanShoring™, enhance our industry 4.0 capabilities and build a workforce that is able to use the latest manufacturing technologies. To accomplish this, businesses, educators and policymakers must work toward the greater good both individually and in public-private partnerships.

These actions, when implemented, will provide companies and their communities with a distinct competitive advantage, boosting their productivity and improving agility and resilience in a fast-changing world. This new-style Marshall Plan is needed to revitalize the post-pandemic economy, spark a manufacturing renaissance and avoid future catastrophic supply chain disruptions. The public-private partnerships must focus on retooling both the educational and industrial infrastructures to competitively win the global economic marathon.

To connect these three elements and ensure the successful implementation of this plan – broadly across North America and at the organizational level – a common



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thread is necessary: lean. To be globally competitive and avoid future disruptions, organizations must use lean methods to create a manufacturing ecosystem as laid out in this paper – a systems with optimized processes that values the workforce. This respect for workers will manifest itself through reskilling programs, while process excellence will pave the way for more efficient supply chains and manufacturing methods.

Join AME and its alliance partners to help propel the North American manufacturing renaissance forward during this unprecedented time. For more information, please contact **Kim Humphrey**, AME president and CEO, at khumphrey@ame.org.

About AME

Since its founding in 1985, the Association for Manufacturing Excellence (AME) has grown into the premier not-for-profit organization for the exchange of enterprise excellence knowledge. The association's 4,000 members come together through practitioner-to-practitioner experiences to explore lean thinking and other operational improvement methods, exchange best practices and network. Through engaging workshops, plant tours, summits and industry-leading conferences, AME members discover and implement new continuous improvement strategies in order to share, learn and grow. For more information, visit www.ame.org.

AME's Vision

A manufacturing renaissance driven by people-centric leadership coupled with enterprise excellence.

AME's Mission

To inspire a commitment to enterprise excellence through experiential learning by bringing people together to share, learn and grow.

WWW.AME.ORG



Share • Learn • Grow.