

# Workers are the Biggest Asset in the Evolving Manufacturing Industry

written by admin | February 29, 2016

*It's not your granddad's factory job anymore.*

(Fortune – Ed Frauenheim: 2-16-16) The instruction manual for a typical CNC mill – the modern equivalent of a lathe that chisels parts from hunks of metal – is 200 pages long. The machine requires one to two years of training to operate, and those qualified to run it earn wages comparable to teachers or many others with bachelor's degrees. Manufacturing has changed. The shop floors of most American industrial facilities would be unrecognizable to someone working in them only a generation ago. So have many of their jobs, pushing companies to retool their relationships with employees as they compete for a shrinking pool of skilled workers.

“Manufacturing companies clearly understand now that, in order to be exceptional and successful, it's not just about hiring hands. It's about hiring and engaging heads and hearts,” says Anil Saxena, Partner at Great Place to Work and an expert on workplace culture.

That's certainly the case at the Best Workplaces in Manufacturing and Production, announced today by Fortune and Great Place to Work. These organizations stand apart not only for the level of trust their employees express in anonymous surveys, but also for defying outdated perceptions of working in these industries.

Take job security: 92 percent of employees at companies on the list say their leaders would lay people off only as a last resort. That's even better than the response from people at companies on the broader ranking of the Fortune 100 Best Companies to Work For, which includes organizations in healthcare and technology experiencing much faster growth. Although the recent crash in oil prices will no-doubt affect energy companies on the manufacturing list, their employees can at least face 2016 with confidence that their organizations will handle the turmoil in good faith.

People at the best employers in manufacturing and production also feel they get a fair shake during positive economic cycles, with an average of 82 percent saying they receive a fair share of profits. This is helped by innovative compensation programs like Hilcorp's practice of letting employees invest in – and collect returns from – specific company projects. The share-of-profits survey question also reveals another surprising area where companies on the manufacturing list collectively outperform their peers among the broader Fortune 100 Best Companies to Work For.

## **Retaining Talent**

It's not just generosity behind these organizations' drive to create a happy workforce. The job skills crucial to a 21st century manufacturing environment give the people who possess them leverage to expect more from employers.

"It is a small number of folks who run machines that do a lot," says Saxena. "It's not a sweat shop. Modern factories are marvels of engineering."

Among the leading manufacturing employers, the share of team members categorized as production workers punching a clock for hourly pay has decreased by more than 20 percentage points since 2006 to just 26 percent of the workforce. At the same time, salaried professional and technical positions now make up the largest share of jobs, with 34 percent of the positions at companies on the list in 2016.

Some of this change might be explained by the breadth of these companies' business interests, particularly at organizations with diverse divisions like J.M. Family Enterprises, which distributes auto parts, runs a Lexus dealership and offers finance and insurance products for the automotive industry. Regardless, the highly skilled workforce that forms the backbone of today's industrial sector brings a different set of expectations than the archetypal factory worker of days past. Notes Saxena: "This whole notion of 'the whistle blows and I'm out of here,' and that 'the job is just a place I where spend eight hours' – that's just not accurate anymore."

## **High engagement, low turnover**

In fact, pride and a sense of purpose represent further areas where the best

manufacturing and production employers outshine their peers. Ninety-three percent of employees among these companies say they're proud of what they accomplish on the job, and 94 percent say they feel good about the ways they contribute to the community.

Field Fastener, for example, engages its people through a program that helps employees at any level of the organization suggest improvements that have saved the company more than \$1 million in just two years. Likewise, medical device company Stryker connects team members to the organization's mission through a program that helps people of all job descriptions interact with patients and clinicians using their products. Stryker also takes steps to help employees develop what it describes as "best friends at work" to enhance the social and professional ties that create a trusting workplace.

"They care enough to want people to have somebody closely aligned to them who they work with," says Saxena. "It's not necessarily what you'd think of when you think manufacturing."

As a result of this employee-focused approach, companies that made the list have an average turnover rate of just 7.2 percent, much lower than the national industry average of 13 percent reported by the Bureau of Labor Statistics.

## **Skills Shortage**

Keeping that turnover low will offer a real advantage to these companies in the years ahead. As the president of the National Association of Manufacturers recently pointed out, the sector is expected to create 3.5 million new jobs in the next decade, but a lack of skilled workers is likely to leave 2 million of them unfilled. On top of the skills deficit, the industry also faces the challenges an aging U.S. workforce and rising labor costs in Asia that make it easier to "insource" many of the jobs that left the U.S. in decades past.

In this context, the Best Workplaces in Manufacturing and Production aren't just exceptional for their HR policies. They're at the forefront of an entire industry that will need to create high-trust work environments in order to stay competitive in the years ahead.

“There’s a lot of hiring in manufacturing, and there’s a lot of demand in manufacturing,” says Saxena, who points out that the perception of the sector as less-than-glamorous needn’t be a barrier to retaining valuable people. “If you treat your employees with respect and you involve them in your decision making, they’ll go the extra mile for you, regardless of their job title.”

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# Entrepreneurs                      Take                      on Manufacturing

written by admin | February 29, 2016

(HBR – Mark Muro: 2-22-16) When it comes to consumer-facing service industries like e-commerce, media, and ride- or apartment-sharing, it’s not new to suggest that “software is eating the world,” to use the phrase of venture capitalist Marc Andreessen.

However, in recent years a parallel explosion of digital tools and services has taken place in the manufacturing realm as well, drawing in computer-assisted design and 3D printing equipment to open-source operating systems, the cloud, and the Internet of Things (IoT).

Much has been made of this software-powered “hardware renaissance,” particularly as it has spawned a vibrant local “maker movement” and hardware hobbyist community. But the locus and scale of this activity is now changing. Just as with software 15 years ago, start-up manufacturing is beginning to graduate to the bigger time. New tools, resources, and intermediaries are allowing a new generation of serious entrepreneurs to begin to bridge the worlds of hacker space and industry. As a result, software-enabled manufacturing start-ups are poised to have a large economic impact.

Examples of this trend include the Pebble, a Kickstarter-funded project that has now

sold over one million smart watches (and which predated Google's Android Wear smart watch and the Apple Watch). Likewise, Nebia — a start-up water-efficient showerhead maker in San Francisco — recently scored investment money from Apple CEO Tim Cook and Google Chairman Eric Schmidt's family foundation. And then there is Drop, a startup that makes a \$100 iPad-connected kitchen scale and software app now widely available in Apple Stores and the Apple website, and the well-known Fitbit.

Hardware startups like these haven't historically been so easy to get off the ground.

"A lot of lifestyle businesses used to not be able to get started in larger-run manufacturing which was a pitfall for any small-scale renaissance," observes Mark Hatch, founder of TechShop, a chain of urban maker spaces in U.S. metros like Austin, Pittsburgh, and the Bay Area. "Now, access to tools, capital, and other supports [make] manufacturable products like the [Oru] collapsible kayak possible."

The rise of hardware startups still has the feel of an insurgency. But in my research, and in conversations with hardware entrepreneurs throughout the country, I have noticed several developments that have put manufacturing start-up activity on a faster, more commercial track.

First, Kickstarter and other crowd-funding sources have opened up new options for initial finance. Second, a number of important inputs have gotten cheaper. Open-source operating systems, accessible design tools, and 3D printing are making development and prototyping easier, and the crashing prices of microchips, sensors, and other components now make it possible for a small company to design sophisticated, commercially relevant devices at reasonable cost.

Third, hardware entrepreneurs in some cities can now access a sophisticated supporting infrastructure, including a sizable ecosystem of hardware "studios," incubators, accelerators, and service-providers that has grown up to abet start-ups in dozens of cities from Austin to Providence to Miami.

Last year, for instance, Andy Rubin, the creator of the Android mobile operating system, announced that his new company Playground Global LLC will serve as a sort of incubator "studio" where entrepreneurs and small firms can focus on building

new gadgets while Playground takes care of the physical-world challenges: engineering, manufacturing, scale-up financing, supply-chain management, and distribution.

Likewise, companies like PCH International and Dragon Innovation are now available to manage contract manufacturing and otherwise “make manufacturing feel easy” to entrepreneurs or small companies, as noted by The Wall Street Journal’s Chris Mims last year.

And hardware startups that enter Y Combinator or other accelerators can now take advantage of labs full of equipment for prototyping, provided by Bolt, a venture-capital firm associated with Dragon.

Lastly, big- and medium-sized contract manufacturers are taking an interest in this movement, and looking to work with start-ups in a way they weren’t five years ago. In 2013, the multinational contract manufacturer Flextronics — which makes products for Apple and Microsoft — began offering Lab IX, a service that connects startups with manufacturing partners. Other contractors have also begun to engage, seeing real market value. Says CEO Nat Mani of the Silicon Valley contract manufacturer Bestronics: “We are increasingly seeking to work with start-ups as a form of business development, but also to stay on top of new technologies. The new guys are frequently trying new things that we need to know about.”

The upshot: The same sorts of tools and support systems that have fostered the software boom are now becoming available in the hardware world and opening new avenues.

This opens up possibilities. For his part, Mims imagines an age in which “new products — actual, physical products — will go from idea to store shelves in a matter of months.” Surely a surge of startup ferment would be energizing for America’s manufacturing sector. Such an age could be beneficial for the U.S. given the nation’s advantages in creativity, software, and cloud-based business organization, even if much of the resulting new production winds up offshore.

Beyond that, this surge could help cities. Currently, urban startup communities remain heavily oriented to software ideas and consumer internet ventures. That

leaves urban economies narrower than they might be. By contrast, the emergence of new cloud-enabled, incubator-supported manufacturing startups could widen the aperture. New opportunities will be possible if physical-world inventors and entrepreneurs gain traction alongside virtual ones. Likewise, manufacturing enterprises could flourish without needing large exurban spaces. Ultimately, cities and their innovation districts will benefit if they can channel more of the hardware-oriented tinkering and entrepreneurship that launched Silicon Valley and other tech corridors in the first place.

In the end, it seems likely that both the national economy and U.S. metropolitan areas can benefit if their advanced industry sectors become potent meet-ups of software and hardware competency. Given U.S. digital dominance and hacker dexterity, digital entrepreneurship looks set to further energize the manufacturing industries and give them a new shot at competitiveness.

(Mark Muro is a senior fellow and director of policy for the Metropolitan Policy Program at Brookings.)

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## Two Key Innovation Questions

written by Lauri Moon | February 29, 2016

Q 1. What is an Innovative Enterprise?

Q 2. And why is innovation so directly aligned with success?

An Innovative Enterprise is probably best defined as a company that can continually improve and reinvent its products and services and its work processes – both what it brings to the marketplace and how it does that – and that has that whole “renewal process” integrated into its normal operations.

And what does that output look like?

[Click here to find out!](#)

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# Innovations in Infrastructure Will Boost Manufacturing

written by admin | February 29, 2016

(Area Development – Stephen Gray: First Quarter 2016) From innovative road repair, driverless trucks, bullet trains, and 3D bridges, advances in technology will help to bring the nation's infrastructure up to speed while creating high-skilled manufacturing jobs.

When the long-term highway bill was signed into law last December, it was a step in the right direction not only for our nation's transportation sector, but for manufacturing as well. It's common knowledge that the United States' aging infrastructure makes it harder for manufacturers to deliver products to customers on time, which in turn creates a major ripple in our country's overall competitiveness. This bill is one of the most important things that congress can act on for our country. Infrastructure's critical role in our nation's overall competitiveness cannot be ignored any longer.

## Rehabilitating Infrastructure Through Innovation

Rosabeth M. Kanter, who holds the Ernest L. Arbuckle Professorship at Harvard Business School, wrote in her book *Move: Putting America's Infrastructure Back in the Lead*, "We should be thinking not just about repair, which tends to be the conversation. We should be thinking about reinvention. I'm arguing for more technology, better connections, and understanding how to design a system in which the parts augment and enhance each other."

We should be thinking not just about repair, which tends to be the conversation. We should be thinking about reinvention. I'm arguing for more technology, better



connections, and understanding how to design a system in which the parts augment and enhance each other. Kanter is exactly right. The future of American mobility is hinged upon not only the repair of what we already have, but more so on the innovation required to bring us back on the playing field. As a key driver of global competitiveness, innovation is at the forefront of advancing every industry in the world. Just as manufacturing is seeing rapid changes in efficiency and production thanks to advanced technology, transportation infrastructure is on the cusp of this transformation as well.

Construction materials and methods used to repair and rebuild our infrastructure are being designed to be more efficient, reliable, and durable. For example, manufacturers are now producing ground tire combined with asphalt that extends the lifespan of pavement by 20 years. Three-D printers can now make reinforced structural beams for the construction of buildings and bridges. There are even gravity-defying robots being built that promise to 3D print a steel bridge in mid-air. These changes will not only revolutionize infrastructure maintenance and rehabilitation in America, they also hold the promise of creating American manufacturing jobs that will help us to better fulfill our economic potential.

### **Driverless Trucks to Transform Logistics and Transportation**

A recent Forbes article estimated that the technology enabling driverless trucks to take off would largely be in place within three to five years. The first driverless freightliner, manufactured by Daimler, hit the road in May 2015 in Nevada. Autonomous trucks could provide a host of advantages to manufacturers, particularly in the logistics space. For example, whereas human drivers are required to take mandatory rest periods resulting in lost time, autonomous trucks can move continuously, driving increased efficiency and fewer delays in delivery — not to mention the fact that the shortage of humans willing to take the wheel is only worsening. The American Trucking Association predicts that by 2022, the industry could be short some 240,000 drivers, which does not fare well for manufacturers and distributors who are being challenged with increased demands for efficiency from online shoppers.

As this promising new mode of transportation takes off, auto manufacturers will see an increased need for highly skilled workers trained to maintain the technology

required to keep these vehicles safe on the road. Likewise, if the layout and design of interstate roads are adjusted to accommodate the operation of driverless trucks, the impact on the industrial material manufacturing market could be substantial.

### **Bullet Trains to Bolster Manufacturing**

A recent issue of Gray Construction's external newsletter publication, the GrayWay, discussed how high-speed rail in the U.S. could be a major game-changer for our nation's infrastructure. In addition to alleviating congestion on the highways, waterways, and airways, high-speed rail could have powerful implications for manufacturing.

"If you get one of those lines up and running, I think it would be quite an eye-opener," says Marcia Hale, president of Building America's Future. "And just think of the jobs that could be provided in manufacturing engines and cars and rail lines and the steel that's needed."

A recent Forbes article estimated that the technology enabling driverless trucks to take off would largely be in place within three to five years. Though several delays have hindered its course thus far, California is one state that's ready to roll on high-speed rail, as evidenced through the billion-dollar bullet train contract introduced last year. And Siemens is eager to capitalize on the opportunity. Last summer, Siemens opened a 125,000-square-foot manufacturing facility on its French Road plant site in Sacramento, California, in hopes of using it for manufacturing high-speed trains. With this facility will come more highly skilled, technical manufacturing jobs for the state.

### **The Reinvention of Construction Materials**

As stated, also set to advance transportation infrastructure is 3D printing. For example, the first 3D printed bridge is set to be "built" in 2017 by 3D printing R&D firm MX3D, Autodesk, and construction and civil engineering company Heijmans. The pedestrian steel bridge will be built across a canal in Amsterdam by a multi-axis robotic 3D printer that "draws" structures in the air.

Engineers will use AutoCAD to first input the design and give directions to the robotic printers. Then, robots will heat the metal to a molten 2,700 degrees Fahrenheit and construct the bridge "drop by drop." Amazingly, the steel, which is

developed to “dry” rapidly, will be able to neutralize the effects of gravity to keep the lines straight. The autonomous robots will create their own supports and have the ability to cross the metal formations as they build a self-supporting bridge design. While this bridge, in particular, will not support vehicles, it does prompt one to wonder if similar technologies could eventually be applied on larger-scale infrastructure projects in the future.

Another advancement in transportation infrastructure that’s already made a major impact is the creation of “instant bridges” through accelerated bridge construction. These bridges can be built off-site and transported into place in a matter of days (as opposed to years), resulting in a lighter impact to traffic flow than a long-term bridge construction project.

### **Looking to the Future**

As new technologies become more widely adopted across the industry, more high-skilled jobs in manufacturing will be generated. Future jobs in the operations and maintenance of 3D printers, the management of complex and hyper-connected supply chains, and advanced manufacturing facilities will be generated, with hope that they spark the interest of industry newcomers and address the skills gap.

These innovations barely scratch the surface of what’s possible, or needed, to move our nation’s transportation infrastructure forward. But, with the National Network for Manufacturing Innovation (NNMI) advanced manufacturing hubs working hard to continually unveil new technologies to boost our competitiveness, I am hopeful that we will continue to see positive advancements. Our friends at the National Association of Manufacturers have long been rallying for a greater focus on our country’s infrastructure, as these improvements are critical for the future productivity and the global competitiveness of manufacturing as a whole. So, as we look to the future of repairing America’s transportation infrastructure, let’s not forget that our leaders must embrace the power of innovators to create the changes that will have a lasting effect on our economy.

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# Building Manufacturing Communities for the long haul

written by admin | February 29, 2016

(Brookings - Mark Muro: 2-18-16) The National Network for Manufacturing Innovation (NNMI) institutes have rightly emerged as centerpieces of the nation's push to increase the competitiveness of America's advanced manufacturing sector. Through the program the nation is slowly building a robust network of industry-university collaboration hubs. If all goes well the centers will soon solve critical manufacturing technology problems and drive necessary American gains in advanced manufacturing.

And yet, along with creating innovation hubs the nation also needs to rebuild its regional manufacturing ecosystems. Technology hubs won't help much if the nation lacks robust regional manufacturing clusters to deploy and scale up breakthrough technology.

Which is why the Obama administration created another initiative in 2013 called the Investing in Manufacturing Communities Partnership. Launched through administrative action, the partnership aimed to both call forth and reward regional manufacturing initiatives by giving winning regions priority access to the resources of multiple federal departments and agencies.

In 2014, the first 12 manufacturing communities were designated from over 70 applications and given access to funding to carry out their plans for advanced research, workforce training and retraining, supply chain development, and other initiatives. Although 12 more communities around the country were designated last year, the program's future is uncertain given the waning of the current administration.

Last week, though, a way forward became visible. Extending the notable bipartisan support for federal action on advanced manufacturing, five U.S. senators and six representatives introduced bipartisan, bicameral legislation to make the Manufacturing Communities program permanent.

In keeping with that goal, the new bill would create a standing program to competitively award regions with the “Manufacturing Community” designation and associated funding benefits. This designation would move winning communities to the front of the line when they apply for up to \$1.3 billion in currently available federal economic development funding for manufacturing.

In this manner, the legislation encourages a regionally driven approach to strengthening manufacturing. To compete for funding through the program and earn the designation, communities would need to *demonstrate the significance of manufacturing in their region* and *create supportive regional partnerships with key stakeholders* such as local and state economic development officials, local governments, manufacturers, labor organizations, and higher education or other training providers.

To prevail, the regions would need to develop strategies for employing their “Manufacturing Communities” designation in making investments in six areas: advanced research ... workforce training and retraining ... supply chain support ... export and foreign direct investment ... investment support for process upgrades, incubator activities ... and other activities.

In short, the proposed permanent program holds out a chance for the nation to get as serious about ecosystem building as it has gotten about technology development.

Complementing the nation’s manufacturing hubs with Manufacturing Communities built for the long haul will increase economic activity and jobs.

(Mark Muro is Senior Fellow and Policy Director, Metropolitan Policy Program.)

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# Commerce Secretary Submits

# Annual Report and Strategic Plan for First Manufacturing Institutes

written by admin | February 29, 2016

(Department of Commerce Press Release - Office of Public Affairs: 2-19-16) U.S. Secretary of Commerce Penny Pritzker has submitted to Congress the first legislative reports required of the National Network for Manufacturing Innovation (NNMI). The NNMI Annual Report highlights the program's initial success in spurring private-sector investment to support the development of manufacturing processes based on U.S. innovations.

Secretary Pritzker also submitted a Strategic Plan that describes the program's goals for the next three years and how its performance will be measured.

"With the support of more than 800 members - including blue chip companies, leading universities, and numerous small businesses and non-profits - the institutes are undertaking applied research in support of solutions to industry-relevant problems, strengthening the skills of America's workforce, and securing U.S. leadership in emerging manufacturing technologies," said Secretary Pritzker. "I am excited to celebrate the success of the President's vision for a National Network for Manufacturing Innovation, and the Department of Commerce's role in supporting and growing the NNMI program."

The NNMI is an interagency, public-private partnership initiative aimed at bridging the gap between invention and commercialization. Its regional manufacturing innovation institutes work individually and together to strengthen the competitiveness of United States manufacturing by supporting research and collaboration on specific topics, from next-generation electronic components to 3D printing. Each institute also serves as a workforce training leader in its technical area through collaborations with educational institutes, companies and industry associations.

The President's Council of Advisors on Science and Technology initially recommended the NNMI initiative in 2011 and a pilot institute was launched in

2012. The *Revitalize American Manufacturing and Innovation Act of 2014* authorized the NNMI, and the network now includes a total of seven institutes with more than 800 member organizations participating in nearly 150 research and development projects.

The annual report details how the first institutes are spurring not only collaboration around their topic areas, but additional investment and, in some cases, economic development in surrounding areas. The report highlights institute efforts to develop sustainable business models that engage all parts of the supply chain, from large manufacturers to their smaller suppliers. The institutes are developing individual strategic plans by analyzing their industries' needs, workforce gaps and potential.

The institutes included in the report are those launched by the end of September 2015:

- America Makes – the National Additive Manufacturing Innovation Institute (Youngstown, Ohio)  
Focus: additive manufacturing and 3D printing technologies
- Digital Manufacturing and Design Innovation Institute (Chicago)  
Focus: integrated digital design and manufacturing
- PowerAmerica – The Next Generation Power Electronics Manufacturing Innovation Institute (Raleigh, N.C.)  
Focus: wide bandgap semiconductor-based power electronics
- Lightweight Innovations for Tomorrow (Detroit, Mich.)  
Focus: lightweight metals manufacturing technology
- Institute for Advanced Composites Manufacturing Innovation (Knoxville, Tenn.)  
Focus: advanced fiber-reinforced polymer composites
- AIM Photonics – American Institute for Manufacturing Integrated Photonics (Rochester, N.Y.)  
Focus: integrated photonic circuit manufacturing
- NextFlex – America's Flexible Hybrid Electronics Manufacturing Institute (San Jose, Calif.)  
Focus: the manufacture and integration of semiconductors and flexible electronics

The NNMI Strategic Plan represents the consensus of the participating agencies and industry leaders and lays out how the network will achieve its goals to:

- Increase the competitiveness of U.S. manufacturing,
- Facilitate the transition of innovative technologies into scalable, cost-effective and high-performing domestic manufacturing capabilities,
- Accelerate the development of an advanced manufacturing workforce, and
- Support business models that help institutes to become stable and sustainable without continuing federal support.

The existing NNMI Institutes are funded by the Department of Defense and the Department of Energy. The Department of Commerce has just released a solicitation for its first open-topic institutes.

For more information, see NNMI Annual report and NNMI Strategic Plan. Additional information can be found on [www.manufacturing.gov](http://www.manufacturing.gov).

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# Majority of CEOs unwilling to share cyber-security information with outsiders

written by admin | February 29, 2016

(ZDNet - Eileen Yu: 2-17-16) Some 55 percent of CEOs acknowledge industry collaboration is necessary in fighting cyber-crime, but only 32 percent are willing to share their company's data on cyber-security incidents with others.

This reticence also conflicted with the fact that 55 percent of CEOs acknowledged industry collaboration was necessary to fight cyber-crime, according to an IBM study, which polled more than 700 CXOs in 28 countries. Some 24 percent of respondents were from the Asia-Pacific region, including Singapore, Australia,



China, and India.

“This exposes a resistance to widespread and coordinated industry collaboration, while hacking groups continue to perfect their ability to share information in near real-time on the Dark Web,” noted IBM.

The CEOs stressed the need for external parties to do more as well as stronger government oversight, increased industry collaboration, and cross-border information sharing. Asked about an external party’s role in addressing cyber-crime, 61 percent of CEOs said governments should play a stronger role, while 53 percent said cross-border information sharing was essential.

“[It’s] a dichotomy that needs to be resolved,” it said, pointing to further findings that indicated confusion among CXOs about who the real cyber-security adversary was and how to fight them effectively.

For instance, the study revealed that 70 percent of the c-level respondents believed rogue individuals posed the biggest threat to their enterprise. The reality, though, was that 80 percent of cyber-attacks originated from highly organized crime networks in which data, tools, and expertise were widely shared, IBM said, citing findings from a United Nations report.

Some 54 percent of the CXO respondents did highlight crime rings as a concern, but 50 percent also pointed to competitors as equally worrying.

IBM Security’s vice president Caleb Barlow said: “The world of cyber-crime is evolving rapidly, but many c-suite executives have not updated their understanding of the threats.

“While CISOs and the board can help provide the appropriate guidance and tools, CXOs in marketing, human resources, and finance-[encompassing] some of the most sensitive and data-heavy departments-should be more proactively involved in security decisions with the CISO,” Barlow urged.

Because these business units managed sensitive customer and employee data as well as corporate financials and had access to banking details, they were among the primary targets for cyber-criminals, IBM said.

The study further revealed that 60 percent of CFOs, chief HR officers, and CMOs admitted they were not actively engaged in their company's cyber-security strategy and execution. Only 57 percent of HR heads, for instance, had deployed employee training in cyber-security.

The level of assurance also appeared to vary between the types of c-level executives within the organization. The survey found that 65 percent of CXOs were confident their company's cyber-security plans were well established. But while 77 percent and 76 percent of chief risk officers and CIOs, respectively thought so, only 51 percent of CEOs felt likewise.

"Considering that successful cyber-criminals are known to collaborate among themselves, it stands to reason collaboration on security management and incidents among organizations would contribute to risk reduction," IBM said.

"Among cyber-criminals, that collaboration takes the form of one actor discovering a weakness and making the knowledge available for sale for others to exploit. CEOs of cyber-secured organizations are much more likely to share incident data with external parties. They are three times more likely than others to collaborate with industry competitors, and twice as likely to collaborate with third-party security services firms and vendors and partners."

Big Blue added that CXOs should recognize the value of external collaboration as a way to combat cyber-crime. As organizations shared more knowledge about cyber-criminals and their activities, including incident reports, the better prepared they would be to implement the necessary mitigation plans.

(Eileen Yu is an independent business technology journalist based in Singapore. In her *By The Way* blog, she covers industry developments in Singapore as well as other Asian markets, and enjoys pushing the line in her discussions about the impact of government regulations and policies.)

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# Manufacturing's Economic Impact: So Much Bigger Than We Think

written by admin | February 29, 2016

*New research by MAPI shows manufacturing's total value chain actually accounts for about one-third of U.S. GDP, or three times the impact that official data suggest.*

(IW - Stephen Gold: 2-17-16) Two measures commonly used by the government to measure manufacturing's overall impact on society are badly underestimating the impact of that critical sector. One is the proportion of gross domestic product for which manufacturing accounts. The other is the "multiplier effect," which measures the impact on other industries from an increase in economic activity by a specific industry.

Official national statistics state that manufacturing's proportion of GDP—its annual value-added divided by the value of all goods and services produced in the country—stands at about 11%. The U.S. Department of Commerce finds the total requirement manufacturing multiplier is around 1.4.

Both figures grossly understate manufacturing's impact. By a long shot. Intuitively, we should know this—contemporary Americans are surrounded by and completely reliant on thousands upon thousands of manufactured goods, whether we're working, eating, driving, flying, sleeping, playing, or relaxing. Judging by the sheer volume of stuff in our lives, how could manufacturing represent only a tenth of the economy?

*The manufacturing footprint is about a third of the economy, not a tenth.* Policymakers need to sit up and take notice of who's really driving our economy.

It doesn't. New research by MAPI Foundation Chief Economist Dan Meckstroth, using analysis of national input-output tables by Interindustry Forecasting (Inforum) at the University of Maryland, shows manufacturing's total value chain actually accounts for about one-third of U.S. GDP, or three times the impact that the narrow official data suggest. Moreover, manufacturing's multiplier is 3.6, also nearly three

times as high as the simplistic estimates; we find that every \$1.00 of manufacturing value-added generates \$3.60 of value-added elsewhere across the U.S. economy.

Why is the government's estimate so misleading? For one thing, there are several inaccuracies, such as including final sales of imports and some double counting of transactions in the Commerce Department calculations.

More substantively, official manufacturing statistics are based narrowly on information collected at the "establishment"—or plant—level, as opposed to the "firm" level. That means numerous manufacturing-related activities, such as corporate management, R&D, and logistics operations, are not included within the NAICS codes for manufacturing (31-33) when they are located separate from plants. For example, Commerce classifies the work of senior executives in Briggs & Stratton's headquarters as "management of companies and enterprises" (NAICS 55), Caterpillar's R&D centers as "professional, scientific, and technical services" (NAICS 54), and Stanley Black & Decker's warehouses as "wholesale trade" (NAICS 42). The MAPI Foundation's approach places the value of these firm-related activities back into the calculus of manufacturing's total economic clout.

Yet another reason the government measure is misrepresentative: it captures only the creation of upstream value, including the processing of raw materials and intermediate inputs, and the production process. The manufacturing value stream is actually much broader, encompassing the associated activities in both the upstream supply chain and the downstream sales chain of manufacturing goods sold to final demand.

Even this definition of the value stream is incomplete. Final demand goods are those destined for an end user; they are either exports or goods sold to households, businesses, and government. The data for final demand goods do not include intermediate inputs for nonmanufacturing supply chains, such as gypsum and cement bound for the construction supply chain or chemical fertilizer used in the agriculture supply chain. Adding this data provides a more holistic and accurate perspective, because but for the production of all of these manufactured goods, no value would be generated in manufacturing's upstream supply chain and downstream sales chain, or in supply chains of other sectors.

Let's take a closer look at this new, improved analysis of manufacturing's total value chain. Start with the upstream activities associated with manufactured goods for final demand: these include the value of all the intermediate inputs purchased for use in production, such as raw materials, process inputs, and services. As Meckstroth observes, car manufacturers need steel to make cars, the steel manufacturers need coal and iron ore to make steel, and all the raw materials need to be transported from place to place. The value-added of all intermediate inputs upstream of the factory that go into manufactured goods destined for final demand is \$3.1 trillion.

As the goods move downstream from the factory loading dock through the sales chain, add in the value derived in the transportation, wholesaling, and retailing of the goods. More value is generated in related services such as rental, leasing, insurance, professional services, maintenance, and repair. Combine the value of all these downstream activities with the producers' value and throw in the value derived from manufactured imports, and this makes up the manufactured goods sales chain. The MAPI Foundation estimates that downstream added value on manufacturing goods for final demand totals \$3.6 trillion.

Combined, the (up and down) value stream of manufactured goods for final demand equals \$6.7 trillion.

Again, this reflects only the value chain for goods made for end users such as households and businesses. Goods designated for nonmanufacturing supply chains provide an additional \$510 billion in value-added to manufacturing's total value chain.

*In all, manufacturing's total impact on the economy is 32% of GDP.* In other words, the manufacturing footprint is about a third of the economy, not a tenth. Policymakers need to sit up and take notice of who's really driving our economy.

(Stephen Gold is President and Chief Executive Officer, Manufacturers Alliance for Productivity and Innovation (MAPI))

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# Five Fundamental Areas that Are Key to Success for Innovative Manufacturers

written by admin | February 29, 2016

A more demanding business environment will require CEOs and their management teams to think more holistically about innovation, their operating models, and even how their products and services get at their end customers' needs.

(IW - Brian Heckler: 2-5-16) It seems everywhere one looks that technology is evolving more rapidly than at any time in history. From personal electronics devices to self-driving cars, innovation is moving forward at a swift pace. As a result, manufacturing leaders are spending an increasing amount of time asking themselves, "How can I ensure my organization keeps pace?"

The reality for leaders is that it will take more than increased capital and enthusiastic leadership to create innovative manufacturers. It will also require CEOs and their management teams to think more holistically about innovation, their operating models, and even how their products and services get at their end customers' needs.

Many manufacturers break down "innovation" into three main areas: product innovation, manufacturing innovation, and business model innovation. Most CEOs intrinsically understand the need for product innovation. If customer demand isn't driving product innovation, the need to compete for sales almost certainly is.

Numerous manufacturing CEOs are highly focused on reducing cost and achieving efficiency in their manufacturing process. It's one of the main reasons why they are streamlining plant layout, consolidating footprint, increasingly adopting advanced manufacturing techniques and piloting new manufacturing technologies (everything

from 3D printing and nanotechnology to robotics and predictive analytics) in order to gain a competitive edge through reduced costs and speed to market.

Probably the most difficult type of innovation for manufacturing CEOs, however, will be in catalyzing business model innovation. The fact is that traditional business models are coming under increasing pressure as new, more nimble competitors take advantage of their agility to create and dominate new market segments and sales channels.

## **Overcoming Challenges and Competition**

Yes, there will be challenges. And creating a sustainable approach to innovation will take time, experience and practice. But our experience working with leading manufacturers suggests that there are often five key areas that the more innovative manufacturers recognize as being fundamental to success.

### **1. Running at multiple speeds**

While most capital investment plans tend to span five-year periods, technology is evolving at a much more rapid pace. The traditional capital investment screening and payback analysis, implementation horizon, and managerial speed must accelerate to be nimble and take advantage of the much faster technology evolution cycle. Consumer electronics firms for instance have developed their entire business models to allow the flexibility to adopt, develop, and adapt new technologies as they emerge through an extended ecosystem, flexible design of physical product and other techniques.

### **2. Recognizing the inflection point**

Most innovation happens in small, incremental steps, so it is easy to miss the point where an emerging trend becomes a breakthrough technology. That is why manufacturing CEOs are now striving to figure out how to stay on top of developments—both in their immediate peer group and in other industry sectors—and how to assess and monitor threats and opportunities as they emerge. In KPMG's 2015 Global CEO study for example, 74% of respondents indicated they are concerned about new entrants disrupting their business model, and 72% said they

are troubled about keeping up with new technologies.

### **3. Creating today's innovative culture**

Innovation for manufacturers in the current environment must fundamentally evolve. Frequently, it either is restricted to a few in an isolated research lab or a small team focused on operational improvement on the plant floor. Balancing the different objectives of achieving profitable results from existing products and encouraging employees to try new things (and, if necessary, fail and try again) goes against the manufacturing DNA or operating model of many manufacturers focused on incremental "continuous improvement" techniques. Today, innovative companies need different ways to motivate and reward breakthrough innovation, and its inherent risks and targeted outcomes.

### **4. Adapting the business model**

Whether to defend against a new competitor, respond to a growing customer demand, or to take advantage of emerging trends, leading manufacturers are already adapting their existing business models and creating new ones. 44% of CEO's in a recent KPMG survey are concerned about whether their business model is adequate. Many are now focusing on overcoming the challenges related to managing, maintaining, and optimizing multiple business models simultaneously without disrupting the core business. Traditional manufacturers are looking to leverage data and analytics for new solutions like a leading global manufacturer who strives through data, analytics, software and solutions to deliver greater asset reliability, lower operating costs, reduced risk and accelerated operational performance for its customers. They also are evolving services and solutions through the internet of things (IoT) and connected, intelligent products like Joy Global's JoySmart Solutions.

### **5. Having a long term vision**

Nobody knows exactly how technology will evolve over the next 10 years. But leading manufacturers and their executive teams are, nonetheless, developing a clear vision of how their innovation investments align to their long-term business objectives. And they are clearly articulating that vision to employees, suppliers,



customers, and shareholders to drive real competitive advantage from their innovation investments.

(Brian Heckler is national sector leader of Industrial Manufacturing at KPMG LLP.)

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# **Council on Competitiveness Report Makes Recommendations for National Skills Agenda**

written by admin | February 29, 2016

(SSTI Weekly: 2-4-16) As long-term trends continue to impact the U.S. economy and its recovery from the Great Recession, more must be done to develop diversely skilled and adaptable workers, according to a new report by the U.S. Council on Competitiveness.

In addition to describing the radical changes facing the landscape for America's workforce, WORK: Thriving in a Turbulent, Technological and Transformed Global Economy provides numerous recommendations on how to best respond to these challenges. Ultimately, the WORK report views itself as a roadmap to align education and training to 21st century skills needs, effectively leverage intellectual capital, and supply businesses with the talent needed to compete globally.

Although American workers have struggled in the years following the Great Recession, the U.S. labor force is also heavily impacted by several long-term trends. Even though agriculture, mineral extraction, and manufacturing drove the U.S. economy in the 19th and 20th centuries, it is driven by knowledge, technology, and innovation (KTI) in the 21st century.

While the U.S. has the highest concentration of KTI industries among major economies, this has also led to a polarization in the labor market. Demand has grown

for both high-end workers for jobs involving non-routine cognitive tasks ... and for low-skill/high-touch workers, but has stagnated for many middle-skill workers, according to the report.

Macroeconomic trends such as globalization, trade liberalization, and the digital revolution have complicated this as skilled individuals from around the globe can now compete to perform the world's work, oftentimes for lower wages than American workers.

As the digital revolution continues to spur disruption, the rise of machines, and large-scale technological changes, skills and labor markets must be flexible to respond to changes in demand.

The report concludes with a series of recommendations to address the challenges of new workforce realities intrinsic in today's highly productive, dynamic, and knowledge-driven economy. As a complement to two strategic plans developed by the Obama administration - A Strategy for American Innovation ... and A National Strategic Plan for Advanced Manufacturing - WORK also recommends the development of a National Skills Agenda to help ensure the employability of Americans in an era of rapid change and an increasing demand for skills.

Because it is difficult to predict what the jobs of the future might be, the report recommends encouraging real-world skills and experiences that help build a foundation for success in a highly skilled knowledge and technology-driven global economy.

Pillars of technology-based economic development, such as the development of science and engineering skills through STEM education and the nurturing of the next generation of entrepreneurs, are also recommended.

Other recommendations include better communication channels for industry to communicate its needs to educators, students, and job seekers; continued engagement of the aging workforce; and, establishing pathways to transition veterans into the workforce.

The report also emphasizes the importance of a new era of sustainability and energy

innovation as an opportunity to boost U.S. employment in a variety of new, well-paying jobs for high/medium/and low-skill workers alike. To take advantage of this potential growth, the report recommends teaching and developing skills in sustainability, committing a portion of the federal government's R&D budget to energy-related fellowships, and scholarships for students who commit to serving in an energy-related career.