Companies Bringing Manufacturing Jobs Back to US

written by Lauri Moon | August 30, 2016

(IW – Adrienne Selko: 8-25-16) From January 2010 until July 2016 the Reshoring Initiative estimates that 265,000 jobs have come back to the United States from abroad.

The Reshoring Initiative's 2015 Reshoring Report found that the reasons companies gave for coming back to the U.S. included:

- Government incentives
- Ecosystems/localization
- Proximity to customers
- Skilled workforce

At the same time, companies cited lower quality, supply interruption (this category had the largest increase from last year), high freight costs and delivery as leading problems offshore. Cumulatively, rising wages and total cost have been major drivers in reshoring decisions.

Regionally, the trend remained strongest in the Southeast and Texas, but in 2015 the West displaced the Midwest to hold second place for most jobs shifted from offshore.

See below the list of some of the companies that have brought jobs back. The list was compiled by the Reshoring Initiative for 24/7 Wall St. and is based on company announcements.

Ford – 3200 jobs that went to Georgia

Boeing – 2200 jobs that went to Missouri

General Electric – 2656 jobs that went to Kentucky, New York and Ohio

General Motors – 2345 jobs that went to Tennessee and Michigan

Caterpillar – 2100 jobs that went to Georgia and Texas

Flextronics – 1700 jobs that went to Texas

Farouk Systems – 1200 jobs that went to Texas

Mars – 1000 jobs that went to Kansas

Why Manufacturing Will Make or Break the Future of Energy

written by Lauri Moon | August 30, 2016

Increasingly efficient manufacturing processes are poised to accelerate commercialization of clean technologies.

(GreenBiz – Lauren Hepler: 8-23-16) From solar panels a decade ago to energy storage today, the history of clean tech is littered with capital-intensive concepts poised to radically alter the relationship between industrialized society and the environment.

But why do these widely heralded breakthroughs always seem to limp along so slowly when it comes to actually hitting the market? The dreaded valley of death between conception and commercialization is one increasingly recognized explanation, dooming novel technologies to relegation in never-ending pilot projects as follow-on investment lags.

For Mark Johnson, the Department of Energy's resident innovation expert, the real problem often boils down to production. That is, not just inventing a new energy-centric technologies, but making sure those new tools can be reliably made in a cost-effective manner.

"We can do a lot to invent new technologies relevant to energy," Johnson, director of the DOE's Advanced Manufacturing Office, told GreenBiz. "But where you get those real breakthrough adoption moments is when the technology drives to the point where it reaches cost parity because of manufacturing innovation."

The "maker" craze has gripped consumer imagination in the form of 3D-printed plastic trinkets. Meanwhile, government labs and corporate innovation clusters at automakers, electronics giants and all manner of other companies are focused on advanced manufacturing at scale.

It's a field that encompasses everything from additive manufacturing to high-tech materials to Internet of Things sensors to a range of robotics possibilities, with the latter poised to crack open a Pandora's box of labor automation anxiety.

Johnson's agency aims to help make sense of it all, particularly as the world grapples with fallout from fossil fuel-powered manufacturing and a shift toward renewable energy.

The Advanced Manufacturing Institute has embarked on a number of efforts aimed at not just inventing and patenting new technologies related to energy generation, grid integration and related areas, but also building better infrastructure for advanced manufacturing techniques that they hope will wring waste — and costs — out of the production process.

Those efforts include a network of 15 new U.S. "manufacturing innovation institutes" promised by President Barack Obama in his last State of the Union address. A separate Smart Manufacturing Institute based at the University of California, Los Angeles is one of multiple public-private efforts aimed at advancing nascent energy technologies with a potential manufacturing efficiency upside, such as applying Internet of Things connectivity and data analytics to factories.

The promise of advanced manufacturing doesn't stop with products explicitly associated with clean energy, though. The overall goal of the Clean Energy Manufacturing Initiative at the DOE is "to increase U.S. competitiveness in manufacturing clean energy technologies and increase U.S. manufacturing competitiveness across the board by boosting energy productivity and leveraging low-cost domestic energy resources and feedstocks."

Where you get those real breakthrough adoption moments is when the technology drives to the point where it reaches cost parity because of manufacturing innovation.

That could mean finding ways to economically produce lighter-weight consumer vehicles, or, as the energy agency's new REMADE program hopes to do, encouraging more aggressive recycling or circular economy approaches to production.

Still, increasingly fragmented global supply chains complicate the production puzzle. It's not just businesses, but also their many suppliers wrestling with the financial and technical feasibility of major manufacturing upgrades.

"We don't have vertically integrated companies anymore," Johnson said. "Ford controlled everything from iron mines to dealerships they could get the value out of everything in that supply chain. Now they have tier 1, tier 2, tier 3 suppliers."

The challenge now is getting all those moving parts working together, particularly as the DOE and a range of consortia partners such as federal laboratories and universities blaze the trail on nascent clean technologies.

Moving the needle on manufacturing

Manufacturing is by no means a monolithic category. From small-scale upcycled products to massive factories churning out cars, textiles or smartphones, the scope and environmental impact of manufacturing operations varies dramatically by scale and geography.

At a high level, however, federal data from recent years does show that the way we power production systems is beginning to change. As global energy intensity falls, the U.S. Energy Information Agency also documented a 17 percent decline in

manufacturing energy consumption from 2002 to 2010, with the coal, oil and petrochemical industries remaining the biggest users in production.

“If you look at the use of energy in the manufacturing sector, over half of that energy goes to just a limited set of energy-intensive industries,” Johnson said.

Producing the ethylene that serves as the foundation of the myriad plastics used in different products is one of the most energy-intensive industrial processes, along with production of ammonia for use in fertilizer, he said. Pulp and paper and primary metals manufacturing are also both energy- and resource-intensive.

Advanced materials such as carbon fiber and graphene represent one field that could start changing the way a range of products are made — if it makes sense to make them in the first place.

“The challenge is that the cost is about three to four times higher than the cost of competing materials,” Johnson said, noting that the process of making carbon fiber is both time- and capital-intensive.

Going in circles — in a good way

In addition to the emissions and ecological impacts that can result from heavy manufacturing, there’s also the issue of waste to contend with.

“Up to 50 percent of the materials we produce wind up in a landfill within 12 months of their production,” Johnson said. “The embodied energy — in other words, all the energy it took to make those things — is essentially being put into a landfill.”

That’s where he hopes some circular logic can come in handy.

Rather than trashing used products, their packaging and other manufacturing scraps, Johnson hopes to use them as “feedstocks” for new things — a core tenet of the circular economy push among sustainability advocates for production built on reuse rather than non-renewable virgin materials.

“Can you use those wasted materials, whether it’s at the end of life or used as some mid-stream product, and wind up actually using it again?” he said. “The limiting

factors are cost and energy."

A range of companies are already experimenting in the space, although what's really a variation on recycling and what represents a truly circular model varies depending on who you ask.

Tech companies such as Apple are focused on cutting e-waste by investing in reverse logistics, in this case iPhone-dismantling robots, to break down — and ideally, to find and repurpose — electronics components. In an example from the world of weird materials, Ford is partnering with Jose Cuervo to evaluate ways to use agave left over from tequila production in bioplastic car parts.

While the possibilities are vast, Johnson said the breakthroughs for clean energy manufacturing ultimately will have to come from the supply chain.

"A lot of OEMs have sustainability programs, whether its automotive, aviation, textiles," he said. "*What they need is a supply chain that can wind up applying those processes.*"

Why Manufacturing Education Needs to Advance, Just Like You Have

written by Lauri Moon | August 30, 2016

Stuck in the Industrial Age, skills training doesn't place enough emphasis on smart, connected product manufacturing, advanced material development and digital design integration.

(IW – Randy Swearer: 8-23-16) If you've read the Manufacturing Institute report, you've heard the statistics: 84% of manufacturing executives believe there is a talent shortage in the U.S. and worry that they won't find the workforce they need to keep up with the increasingly

more advanced and sophisticated demands of the industry.

And talent is the number one driver of global manufacturing competitiveness.

So why can’t manufacturers find and attract skilled talent?

One reason is that our manufacturing education system is stuck in the old Industrial Age of metalworking and welding. It doesn’t place enough emphasis on smart, connected product manufacturing, advanced material development and digital design integration.

Due to this gap, students—your next potential employees—may not be aware of exciting developments like 3-D prototyping and printing taking place within the industry or the multitude of careers available to them.

With the world economy placing a higher value on advanced manufacturing, we need to place a higher value on advancing manufacturing education.

Here are some ways we can build a more advanced and dynamic workforce:

Create Hands-on Opportunities Within Education Systems

As with most disciplines at the university level, manufacturing curricula in fields like engineering, software development and IT are still taught from a textbook. The setting and structure take away the hands-on, real-world learning that students could be experiencing. They miss out on the exciting part, and don’t really understand what manufacturing is like on a day-to-day basis.

Businesses and educational institutions need to work together to develop new curricula that provide hands-on, learning-through-making opportunities.

We are beginning to see the success of these collaborative learning environments at several universities, such as *Rochester Institute of Technology’s Studio 9.30*, a multidisciplinary studio focused on the development of health-technology products that benefit community partners. *Penn State Behrend’s new Advancing Manufacturing and Innovation Center* provides a space for academic and industry partners to collaborate on research and manufacturing projects.

Not only will these students have real-world experience, but they will also understand the vast changes and advancements that are taking place within our industry.

Focus on Real-world Application of Skills

As long as traditional grades continue to be the marker for success at higher institutes of learning, students won't gain the critical hands-on education to prepare them for their future careers.

According to the 2014 U.S. Department of Labor report, 65% of careers that students will be taking on in the future don't exist today. Therefore, the chasm between what students learn in their current classroom environment and the expectation for skills in the real world is wide and difficult to breach.

This gap will only close if universities take a bold approach and redefine what success means and how students get there. For example, an influx of teachers is utilizing online platforms to help students publish work done outside of the classroom, so it can be accounted for as part of the curriculum. Through learning platforms, employers are able to look for and assess design and engineering candidates beyond a letter grade by viewing an individual's e-portfolio.

Georgia Institute of Technology student Israel Del Toro's e-portfolio consists of hypothetical as well as real-world design projects he completed in and outside the classroom, such as a new hand-held power tool, an electric razor and an innovative light fixture.

If you haven't done so already, encourage your hiring managers to place value on applicants who have pursued external opportunities outside the classroom, and have something to show for it.

Develop and Elevate Micro-credentialing Programs for Students and Employees

With school curricula slow to change, students are increasingly going across disciplines and outside of the classroom to learn new things and pursue their interests.

With the proliferation of organizations like *General Assembly*, *Codecademy* and even public makerspaces like *TechShop*, students not only want to learn new skills; they also want to be recognized for their accomplishments outside of school. *With micro-credentialing and digital badges, they can highlight their new competencies to potential employers*.

More than a hundred educational institutions, private companies and employment groups have banded together in a recent initiative called *Connecting Credentials* to make it easier for

candidates and employers to build the skill sets they need. In addition, *Certiport* works with software companies to develop and administer certifications in specialized industry competencies, such as 3D design skills through AutoCAD and Autodesk Fusion 360 certifications.

Both the talent gap and education divide are not going to be solved overnight. However, a good starting point is a collective conversation around advancing the education system to better fit this ever-changing industry. Ultimately, working together will lead us to a better-equipped advanced manufacturing workforce.

(Randy Swearer is the vice president of global education experiences for the design and engineering software company Autodesk.)

‘Smart Operations’ New Key to Manufacturing Excellence

written by Lauri Moon | August 30, 2016

Smart operations use pervasive data collection, advanced analytics, technology investments and deeper collaboration with partners to prepare their value streams for the next industrial revolution.

(MH&L – Staff: 8-15-16) Over the next three years, a growing number of successful manufacturers will enhance their manufacturing processes with smart operations, a broader supply chain strategy that extends beyond the factory walls, according a UPS report, The Rise of Smart Operations: Reaching New Levels of Operational Excellence.

Smart operations use pervasive data collection, advanced analytics, technology investments and deeper collaboration with partners.

Lean and Six Sigma methods remain the standard for manufacturers, but continuous

improvement has a downside, according to the report. Overly optimized processes can become inflexible, leaving the business unable to adjust rapidly to disruptions in the supply chain and changing customer demand.

However smart operations are better positioned than others to compete and in today's fluctuating markets because increased visibility of inventory location and transportation allow companies to better analyze and quickly manage changes to their supply chain both upstream and downstream of the factory, the report says.

"Smart operations are crucial to the long-term success of manufacturing companies," said Derrick Johnson, vice president of marketing at UPS. "The strategy enables manufacturers with limited resources to serve their increasingly demanding customers more flexibly."

The report, which was done with IDC research firm, assessed how far along companies are in implementing smart operations. The report showed that 53% of companies were at a relatively low level of overall maturity. Still, 47% of the survey respondents said their company's progress toward smart operations exceeded that of their peers.

There are five areas essential to smart operations:

- Connected products: Increasingly, industrial manufacturers sell products that are connected in the cloud. This connectivity allows companies to offer better maintenance service, which sometimes even generates new revenue streams.
- Connected assets: Manufacturers with connected assets are better able to monitor their operations to anticipate and even correct problems before they occur.
- Supply chain decision making: The data and analytic tools used in smart operations help manufacturers resolve issues in the supply chain faster.
- Buy-side value chain: Smart operations allow manufacturers to automate purchasing with their vendors and manage the inbound transportation of those supplies.
- Sell-side value chain: Smart operations allow manufacturers to change transportation modes and speeds as well as destinations based on shifting

customer demand.

IMC Clients Make “Inc. 5000 2016” List

written by Lauri Moon | August 30, 2016
Congratulations to DiamondBack Truck Covers and Advanced Powder Products for making the Inc. 5000 2016 List.

This is Inc.’s annual ranking of the fastest-growing private companies in America.
Click here for Advanced Powder Products listing.
Click here for DiamondBack Truck Covers listing.

U.S. Expected to Lead as the Top Manufacturing Nation by 2020

written by Lauri Moon | August 30, 2016
WASHINGTON, Dec. 4, 2015 /PRNewswire/ –The United States is expected to become the most competitive manufacturing nation over the next five years, with the current leader China sliding into second position, according to the upcoming 2016 Global Manufacturing Competitiveness Index report from Deloitte Touche Tohmatsu Limited’s (Deloitte Global) Global Consumer & Industrial Products Industry group and the US Council on Competitiveness (Council). Read from PR Newswire [more]

The Reshoring Challenge: Why and How CEOs are Moving Jobs Back to America

written by Lauri Moon | August 30, 2016

Don Rongione had an ally in his effort to shift hat production of the Bollman company from China to Pennsylvania — actor Samuel L. Jackson, who was a fan of the company's Kangol 504 woolen knit cap.

(Chief Executive – William J. Holstein: 8-2-16) For his reshoring initiative with the Bollman company, Don Rongione paid to move unique knitting equipment from China to Pennsylvania in part by using a YouTube video of Jackson to appeal to investors on Kickstarter, the crowdsourcing website.

Bollman, which says it is America's oldest hat company, with more than $10 million in annual sales, bought the Kangol brand in 2001 from a British company. That company had previously sent all of its custom-made machines dating back to the 1930s and 1940s to southern China, where it made the beret-like Kangol hats. So Bollman, in effect, inherited a factory in China, containing the special machines that performed at much lower costs than any new machine might.

Bollman struggled to manage the factory profitably and ultimately sold it to a Chinese hat maker, but that arrangement fell apart and the idea to simply move the equipment to central Pennsylvania was born. Rongione set aside some of the employee-owned company's funds, raised some from the state of Pennsylvania and then launched the Kickstarter campaign. Jackson, wearing a t-shirt that reads "Motherfunder," a slight variation of a word he's known for uttering on screen, appealed to viewers to support the move. They did, ponying up more than $100,000.

The company recently moved 10 of the knitting machines, is preparing to move dozens more,

and is hiring workers at a starting hourly wage of $10.30 an hour. But it is finding that its workers, both new and old, have a big learning curve ahead of them in absorbing how to master the knitting process, which is new to the company.

“Hiring people with the specific knowledge has been virtually impossible,” Rongione says. “No one has the knowledge on this type of equipment.” So the company has brought in experts from Britain who are familiar with the equipment and worked with a local community college in Reading, Pennsylvania, to train students to become apprentices. The final outcome remains uncertain. “We still have a mountain to climb,” Rongione says.

Homeward bound

More American CEOs are, in fact, deciding to bring home jobs from China and elsewhere. After going only in one direction for many years, the Reshoring Initiative, based in Kildeer, Illinois, reports that the total number of manufacturing jobs that were created in the U.S. in 2015 slightly exceeded the number of jobs shipped to other countries. It estimates that the combination of reshoring and foreign direct investment brought about 67,000 jobs back to the U.S. in 2015 versus 60,000 that went out, for a small net margin of 7,000 jobs.

About 60% of the jobs returning come from China. The auto industry is the most significant in terms of jobs repatriated, suggesting that large companies are the prime movers. But the Reshoring Initiative says companies of less than $1 billion in annual sales account for about half the jobs being created in the U.S.

Read on…

The Effectiveness of R&D Tax Credits

written by Lauri Moon | August 30, 2016

(SSTI – Jonathan Dworin: 7-28-16) When the U.S. government made their R&D tax credit *permanent* in December 2015, it made a long-term commitment to using incentives to entice

private firms to invest in research and development, joining many countries around the world. Although most studies find that R&D tax incentives promote R&D, there is little consensus on the extent of this effect. A recent firm-level analysis from the United Kingdom finds some of the strongest evidence to date on the effectiveness of R&D tax credits in incentivizing innovation. At the same time, however, other studies suggest other elements of a national economy such as education and infrastructure may be more important.

In *Do Tax Incentives for Research Increase Firm Innovation? An RD Design for R&D*, Antoine Dechezleprêtre, Elias Einiö, Ralf Martin, Kieu-Trang Nguyen, and John Van Reenen – four researchers from the London School of Economics – analyze a 2008 policy that changed the threshold for what size businesses counted as a small and medium-enterprise (SME) for the UK R&D Tax Credit system. Although the United Kingdom has had an R&D tax credit in place since the year 2000, firms with assets above €43 million (47.6 million USD) but below €86 million (95.2 million USD) were not counted as SME's prior to 2008; after the policy change, however, they were. Overall, the authors find that UK business R&D would be 10 percent lower in the absence of the tax breaks.

The authors utilize a "regression discontinuity design" to best view the impacts of the new tax threshold. Using confidential access to firm tax records and accounts from more than two million businesses, the authors are able to assess how firms changed their approach to R&D before and after the change went into place. *They find that expenditures on R&D roughly doubled and patenting increased by approximately 60 percent.* Additionally, the authors find that firms receiving a larger incentive to perform R&D through the policy change grew in both sales revenue and in number of jobs.

No other policies were implemented around the threshold analyzed, the authors argue, so the large jumps in both R&D expenditures and in patenting were likely due to the new policy. While increases in R&D expenditures are noteworthy, the authors consider the impact on innovation and patenting particularly important. One concern with R&D tax credits, as mentioned by the authors, is that some firms may re-label other activities that were not previously considered R&D as a means to take advantage of the credits. While this would, perhaps, explain some of the variation in R&D expenditures, there is no incentive to do this for patenting. Furthermore, the authors find evidence that the quality of patents were not negatively impacted; firms increased the rate at which they applied for both EU-wide patents and UK-only patents, while the citation rate per patent did not decline.

The authors find that a 10 percent fall in the price of R&D generates an approximately 26 percent increase in the volume of R&D, an amount that is larger than that found in previous studies. The authors suggest that one potential reason for this is that most studies focus on large firms or on aggregate amounts that are heavily influenced by large firms, while the UK policy analyzed by the authors focuses explicitly on SMEs. Given that smaller firms are more likely to face cash constraints to fund their innovative endeavors, they were more responsive to the policy that effectively made these activities more affordable.

In the newly released book, *Rethinking Investment Incentives: Trends and Policy Options*, the fourth chapter entitled *Use of Investment Incentives: The Cases of R&D Related Incentives and International Investment Agreements* and written by Christian Bellak and Markus Leibrecht, highlights the economic case for investment incentives, especially around topics such as research and development.

In the chapter, the authors suggest that the most important justification for public R&D investment incentives is rooted in an apparent positive discrepancy between private and social returns from R&D, which could lead to an underinvestment in R&D by profit-maximizing firms.

In categorizing R&D incentives, the authors distinguish between *direct incentives* and *fiscal incentives* and find considerable variation across nations. While all OECD countries offer direct incentives for R&D through subsidies, loans, and government procurement, not all countries grant fiscal incentives, which measure revenues foregone through programs such as R&D tax credits, R&D allowances, and other indirect government support.

The authors present varying degrees of empirical evidence on the effectiveness of R&D investment incentives, but ultimately conclude by noting that these incentives are of second-order importance for promoting R&D intensiveness, especially in developing countries. Instead, the authors posit, countries should focus more on continuously improving the institutions needed to conduct intensive R&D, such as education systems that develop human capital, telecommunication infrastructure to support connectivity, responsible governance, and a transparent approach to patents.

Coupled together, these two pieces shed light on the impacts of research and development tax credits. One potential issue in measuring the effectiveness of R&D tax credits is that most empirical analyses take the perspective of the state or nation offering the credit and evaluate the aggregate, rather than assessing the impact on the firm.

At the aggregate level, Bellak and Leibrecht note that effectiveness of these policies is mixed; although many nations offer incentives for R&D, many factors could be considered more important to boosting innovation. For firms in an already developed economy, the Dechezleprêtre et al study, however, shows that *R&D tax credit policies could be particularly meaningful to SMEs*.

The findings of Bellak and Leibrecht's chapter largely echo a 2013 *Digest* article that examined the effectiveness of tax credits at the state level. That article found R&D tax credits "can be an effective tool in a state's economic development strategy, but only when designed with a particular state's economy in mind. *R&D incentives are most effective in states that already have a significant level of research activity, and a substantial high-tech business community.*" In other words, R&D tax credits may help to incentivize innovative activities, but they are hardly the only force at play.

Advancing Information Transformation in the Manufacturing Sector

written by Lauri Moon | August 30, 2016

Treat data and information as you would any critical business asset: measure, document and manage essential attributes such as value, risk and cost.

(IW — Kimberly Knickle: 7-6-16) Manufacturers depend on information and analytics to help them deal with the complexity caused by global operations, value chains and market. Most recognize that there is tremendous opportunity to use, analyze and apply information all across the business. However, they need to do a better job capitalizing on the information that is and will become available to them and to embed intelligence in how they manage their operations and deliver products and services.

Manufacturers must evolve from a classic data management approach to one that leverages information and knowledge as critical business assets. Existing quality, data governance and data management practices are still essential. But these practices must evolve to meet the requirements both of the legacy environment and of the digital business under construction.

Information transformation is a huge and critical challenge for many. IDC estimates that by 2020, the digital universe will reach 44ZB, or 44 trillion gigabytes, of data—a tenfold increase over that in 2013, with 40% growth per year. To make matters worse, IDC estimates that 22% of the information in the digital universe was usable for analysis in 2013; however, less than 5% of that usable information was analyzed. These numbers need to change for manufacturers.

Although most manufacturers have aggregated and analyzed much of their transactional data, many see value in other data types and sources, such as machine- or sensor-generated data, GPS data, text, rich media (image, voice and video), and consumer sentiment from e-commerce sites and social networks.

The Rise of the Knowledge Worker

Manufacturers need their employees to do their jobs more efficiently and productively—as they manage operations, design products and develop new intellectual property (IP)—from anywhere in the world. Knowledge is the basis for augmenting and automating work throughout the company and from the experienced to the new generation worker to yield further productivity benefits.

Knowledge workers—those employees who primarily rely on data and information to do their work—currently represent about 40% of the manufacturing workforce. And in large or geographically dispersed manufacturers, information is often the glue that keeps the company working as one. Yet manufacturers often struggle to provide unified information access systems with a “single point of access” to heterogeneous data sources or achieve what we call “truth in data.”

Data-Driven Manufacturing—In Processes and Products

Despite all of the localized information analysis that takes place today within various

lines of business or applications, manufacturers are still not achieving the success they would like to in applying that information, whether because of data quality problems, data disconnects, the age or timeliness of the data, or even the availability of data.

Some of the use cases that are currently receiving the most interest leverage sensor data, create new products and services, and change how manufacturers interact with their customers and their customers' customers. But most of these new use cases require the integration of enterprise data sources and external data sources (such as weather and traffic). This is especially true for two use cases that are of high interest to many manufacturers:

- *Predictive asset maintenance* uses sensor data on production equipment, integrated with enterprise asset management systems to drive maintenance and with inventory data to ensure an adequate supply of necessary service parts.
- *New service delivery via connected products* uses sensor data in products in use by customers to monitor real-time product performance data for maintenance, to confirm products are under warranty, or to deliver consumables. Integration bridges sensor data, warranty systems, CRM, ERP and supply chain applications.

Eventually, we will also find manufacturers selling their data as a product, and although we don't fully know how this market will develop, it builds on the fact that "knowledge is power." 3-D printing and robotics will also contribute to data-driven manufacturing as well, both requiring a significant amount of data to fine-tune their performance and generating large volumes as they operate.

Changing Technology—Business Process Platforms and Advanced Analytics

Other factors are driving the need for information transformation, such as the need to support business processes and interdepartmental collaboration that crosses application boundaries. For example, the global product innovation platform, which serves as a way to increase access to and sharing of product-related documents and data for distributed engineering organizations and well beyond engineering. Data integration and analytics are absolutely essential to the successful implementation of

the innovation platform and other process platforms.

The availability and demand for more advanced analytics are also accelerating, as manufacturers look to the promise of prescriptive analytics, machine learning and cognitive computing to provide guidance or even automation.

Information Transformation

Manufacturers must do more than just invest in tools and technologies; they need an information transformation. Such a strategy can help manufacturers advance and draw maximum benefit from the extraordinary power of information. In each stage of this transformation, leaders should focus on the following dimensions:

- **Data discovery**: including acquisition and preparation, exploration, visualization and datafication.
- **Value development**: through analytics, algorithms, program management and quality.
- **Value realization**: through monetization, productization, real-time orchestration and service innovation.
- **Knowledge and collaboration**: including work virtualization, knowledge and integration, governance, and risk.
- **Information architecture**: including data management and enterprise information model, integration and synchronization, information architecture services, and security.

At the highest level of maturity—the optimized stage—organizations will be able to drive continuous improvement in how data value is developed and realized throughout the value chain. They will rely on an information platform that ensures the security of the company's IP and clearly establishes information as an essential corporate asset. They also will value their data and even monetize it.

Information and embedded intelligence drive continuous innovation in processes, products and services; enable revenue streams; and fuel enhanced customer engagement and experiences.

Our guidance for manufacturers over the next year includes:

- Assess your enterprise capability in each of the dimensions of an information transformation.
- Adopt a balanced scorecard approach to coordinating initiatives and interdependencies across the dimensions. Our research indicates that imbalance across the maturity levels impedes success.
- Lead by example and champion collaboration. Allow both top-down and bottom-up actions to positively interact. Educate all the stakeholders.
- Treat data and information as you would any critical business asset. This means measuring, documenting and managing essential attributes such as value, risk and cost.
- Focus on meaningful but limited initial initiatives before investing in larger ventures. Agree on maturity targets and create the roadmap of your information digital transformation.

The most advanced companies can accelerate the pace of sophisticated analysis, the mix of data and data types, and the ability to optimize and predict business decisions. Leaders in information transformation will treat data and information as they would any critical business asset—with investments in people, processes and technologies that acknowledge information's strategic importance and with a roadmap to maximize information's contribution to business success.

(Kimberly Knickle is research vice president with analyst firm IDC Manufacturing Insights.)

ISM Reports Manufacturing Finishes 1st Half 2016 in Good

Shape

written by Lauri Moon | August 30, 2016

(Modern Materials & Handling — Jeff German: 7-1-16) Manufacturing finished the first half of 2016 in strong shape, based on the June edition of the Manufacturing Report on Business from the Institute for Supply Management (ISM).

The PMI, the index used by the ISM to measure growth, was 53.2 (a reading of 50 or higher indicates growth), which topped May by 1.9% and is the fourth straight month of growth, too. What's more, the PMI is now at its highest level going back to February 2015, when it was at 53.3. From October through February, the PMI had seen sub-50 readings, with October marking the first month that the PMI was below 50 since November 2012. June's PMI is 2.9% above the 12-month average of 50.3. ISM noted the overall economy has seen growth for 85 consecutive months.

Each of the report's core four metrics, including the PMI, saw growth in June. New orders, which are often cited as the engine that drives manufacturing, saw a 1.3% increase to 57.0 and reached its highest level since coming in at 57.4 in December 2014. Production was up 2.1% at 54.7 and at its highest level since July 2015's 55.0. Employment rose 1.2% to 50.4.

ISM said that of the 18 manufacturing sectors contributing to the report, 13 reported growth in June, including: Printing & Related Support Activities; Textile Mills; Petroleum & Coal Products; Food, Beverage & Tobacco Products; Fabricated Metal Products; Apparel, Leather & Allied Products; Paper Products; Miscellaneous Manufacturing; Computer & Electronic Products; Chemical Products; Primary Metals; Machinery; and Nonmetallic Mineral Products. *The three industries reporting contraction in June are*: Electrical Equipment, Appliances & Components; Transportation Equipment; and Plastics & Rubber Products.

ISM member respondents cited in this month's report were encouraging. A food, beverage, and tobacco respondent said his company is gaining new customers through better sales management, and a machinery respondent said business is steady with some signs of increase. A plastics and rubber products respondent said demand continues to be robust. A primary metals respondent observed that orders are slowing from China, and American consumers are still steady.

“I really like this whole report,” said Brad Holcomb, chair of the ISM Manufacturing Survey Business Committee, in an interview. “It’s been building and increasing in momentum for the last four-to-six months, and we are finishing the first half of the year on a high note.”

Backlog of orders in June saw a 5.5% jump to 52.5, which Holcomb said is a bodes well for future production growth, and supplier deliveries slowed at a faster rate, with a 1.3% difference to 55.4 (a reading above 50 for this metric indicates slowing).

Exports and imports were up 1.0% and 2.0% to 53.5 and 52.0, respectively.

“These metrics all show that things are solidifying and continuing a positive trend after some sluggishness,” he said. “But now things are going the other way. And if you look at some other related news, consumer confidence and spending is up, too, with all things starting and ending with consumers.”

The report’s section on buying policy also paints a positive picture for the current state of manufacturing, with capital expenditures in June average days for commitment lead time went from 127 days in May to 131 days in June. This reflects companies placing more orders for capital equipment.

And with the first half of the year being relatively solid, Holcomb said that this shows manufacturers’ CFO’s are opening up the purse strings to approve projects.

“Things are set up well to align with our forecast we made in May,” he said.

Brexit impact: In a separate report issued today on Britain’s decision to leave to the European Union last week (Brexit), ISM respondents’ feedback indicated that while most procurement executives don’t foresee major disruptions, many are cautiously watching the situation closely and believe Brexit will hamper growth to varying degrees.

Nearly 60% (58%) of manufacturing respondents cited a negligible net financial impact, with 7% saying it was negative, 31% saying it was slightly negative, 4% saying it is slightly positive, and 0% saying it is positive.

“My response to Brexit is ‘who knows?’” said Holcomb. “One scenario is that Europe becomes more competitive, as each nation hunkers down and fights for its share of the marketplace and competes more strongly. In the short-term, there is going to be concerns about the price of

currency, currency fluctuations, and other things. The stock market is already completely recovered after the fall, and I am willing to stick with our forecast…and that estimated adjusted increase in our manufacturing revenues of 2.8% appears to remain on track."

(Jeff Berman is Group News Editor for Logistics Management, Modern Materials Handling, and Supply Chain Management Review. Jeff joined the Supply Chain Group in 2005 and leads online and print news operations for these publications.)