Digital Manufacturing is a Growth Sector

written by Lauri Moon | June 6, 2016

American manufacturers are investing heavily in digital technologies, pouring 2.6 percent of their annual revenue into digital systems, according to PwC. That investment “is expected to increase to almost 5 percent of revenue in the next five years, an estimated $350 billion,” says the consulting firm.

Venture capital firms have invested $3.6 billion since 2011 in start-ups developing digital technologies for manufacturers. This funding reflects “an increase of nearly 50 percent annually with start-up investment focused on manufacturing software, ERP and inventory software and robotics and sensor technology,” states the consultancy.

Of the manufacturing companies that PwC surveyed, adopting digital manufacturing technologies will lower operating costs by at least 11 percent, “mostly through efficiencies gained by automating processes and production.”

Why Good Marketing Photos Are So Important for Industrials

written by Lauri Moon | June 6, 2016

Customers often encounter a business through photographs. Why not make a good impression?

Good Marketing Photos Are Good Marketing

Marketing is all about communicating your value to the customer. Unfortunately, many industrial businesses don't understand the importance of good marketing photos and how the right styling and consistent imagery can help them not only convey quality, but also help them successfully tell their company story and create alignment across their brand.

Read more from *Industrial Marketer*

U.S. Manufacturing Sector Attracting Foreign Investment from Asia, Europe

written by Lauri Moon | June 6, 2016

(Forbes – Ellen Sheng: 5-27-16) The U.S. manufacturing sector, which has been on a decades-long slide, is increasingly attracting foreign capital from Asia and Europe, a recent study found.

The study, which was compiled by seven business schools, found that even though China remains a top manufacturing destination, more companies are shifting production volume to the U.S., rather than moving manufacturing out of the U.S.

Notably, the trend is being driven by foreign companies, mostly from Asia or Europe. The study surveyed senior supply chain executives at 85 of the world's largest manufacturers. The report was put together by The Global Supply Chain Benchmark Consortium, which consists of seven business schools and Avnet, a maker of electronics components.

“Companies are coming to the U.S. for proximity to the U.S. market and technological innovation,” said Shiliang Cui, assistant professor of operations and information management at Georgetown University’s McDonough School of Business

The U.S. is still the largest economy in the world and companies come for market access, he explained. The second reason is for innovation, particularly in research & development as well as manufacturing efficiency and capability.

“When people say reshoring, it means a U.S. firm bringing back manufacturing to the U.S.,” said Cui, *emphasizing that the study didn’t find much evidence of reshoring*. But “manufacturing is on the upwards trajectory here and, at least in our sample, this was brought on by non-U.S. firms,” he said.

Jiangnan Mold Plastic Technology Corp., which makes plastic mold parts for the automotive industry, invested $45 million to set up a 250,000 square foot plant in Greer South Carolina that is expected to be fully operational in the second half of next year.

“This investment in South Carolina and in Spartanburg County will further strengthen Jiangnan’s effort to expand its global leadership role in the plastic molding industry,” Robert Cao, Jiangnan Mold Plastic’s chairman and general manager said in a statement in April.

In other cases, foreign companies buy existing manufacturers. The largest such deal was Haier Group’s $5.4 billion acquisition of General Electric’s appliance business, based in Louisville, Kentucky, earlier this year.

Drawn By Research & Development, Cost Efficiencies

Proximity to the U.S. market as well as R&D, innovation, and design capabilities were key reasons foreign companies wanted to shift manufacturing to the U.S., the survey found.

Increasingly, the U.S. is also attractive from a cost standpoint. China’s rising labor cost is narrowing the difference. Wages in China have risen about 15% a year for the last decade. The low cost of oil and gas as well as high productivity, driven by technology and automation, also makes the U.S. manufacturing sector attractive.

A recent study by Princeton, N.J. consulting firm BLS & Co. and Tractus Asia, an Asia-based foreign direct investment advisory firm, found that median electricity prices for U.S. industrial

plants are one-third to half the prices in China while electricity savings in the U.S. can be as much as 70%.

China's unit labor costs are just 4% lower than in the U.S. since wage growth has outpaced productivity growth and the yuan has appreciated, according to Oxford Economics. While manufacturing output per employee in China doubled between 2003 and 2016, *the U.S. remains 80% to 90% more productive*.

U.S. manufacturing may not be in a renaissance yet, but studies are finding increasing interest and signs of a shift.

(Ellen Sheng is a Forbes contributor.)

Manufacturing Unexpectedly Accelerates Amid U.S. Growth Signs

written by Lauri Moon | June 6, 2016

Factories are using a pickup in bookings from the U.S. and abroad to help trim stockpiles, laying the ground for bigger gains in production later in the year.

(IW – Bloomberg: 6-1-16) Signs of better U.S. growth are cropping up, including in manufacturing, which has been a laggard of the economy.

Activity at factories unexpectedly expanded at a faster pace in May, helped by an increase in orders, the Institute for Supply Management reported Wednesday. The Tempe, Ariz.-based group's index climbed to 51.3 from 50.8 in April, while the median forecast in a Bloomberg survey of 81 economists called for 50.3. Readings greater than 50 indicate growth.

Factories are using a pickup in bookings from the U.S. and abroad to help trim stockpiles, laying the ground for bigger gains in production later in the year. The recent stabilization in oil prices also will probably help stem the slump among energy producers that has contributed to

weak business investment, and growth this quarter is set to get a boost from household purchases, which posted a better-than-forecast gain in April.

“Manufacturing is starting to look better,” said Scott Brown, chief economist at Raymond James Financial Inc. in St. Petersburg, Florida, who had projected an ISM factory reading of 51.2. “It’s an encouraging sign that things aren’t unraveling. Ultimately, production is going to increase because of stronger consumer demand.”

The new orders gauge was little changed at 55.7 compared with 55.8 in April. A measure of production cooled to 52.6 from 54.2.

Estimates for the manufacturing index in the Bloomberg survey ranged from 49 to 52.

Twelve of 18 industries surveyed by the purchasing managers’ group reported growth in May.

One weak spot was the factory employment measure, which held at 49.2, indicating manufacturers trimmed payrolls last month.

In other signs that the industry is turning around, the index of supplier deliveries jumped to 54.1, the highest level since December 2014, from 49.1. A reading greater than 50 means shipments slowed, which often happens when suppliers have trouble keeping up with demand.

The ISM’s gauge of factory inventories fell to 45 from 45.5. The index has been lower than 50 for almost a year as producers trim the amount of goods on hand.

Right Direction

“Things, for me, are pointing in the right direction,” Bradley Holcomb, chairman of the ISM factory survey, said on a conference call with reporters. With businesses having pared stockpiles and orders picking up, “there’s a bit of an inventory shortage” and “suppliers are now having a harder time catching up so they’re slower.”

The overall tone of the comments from manufacturers in the survey was “cautiously optimistic,” he said.

The report also showed the headwinds from sluggish overseas markets may be dissipating. The index of export orders held at 52.5 in May, marking the third straight month demand from abroad has grown.

Manufacturers also are seeing a pickup in price pressures. The index of prices paid jumped to 63.5, the highest level since June 2011, from the previous month's 59.

The factory survey data follows a report on Tuesday that showed the American consumer came back with a vengeance in April after a sluggish start to the year. *Households increased spending during the month by the most since August 2009, and incomes also grew.*

AME Releases Mid-Atlantic Region May Newsletter

written by Lauri Moon | June 6, 2016

Check out the May AME Mid-Atlantic Region Newsletter featuring upcoming events including a Leadership Techniques to Start Using Right Now Lean Leadership Panel event May 26th in Concordville, PA.

MA Region Newsletter May 2016

Videon Central Announces Manufacturing and Testing Services

written by Lauri Moon | June 6, 2016

What's the opposite of off-shoring manufacturing to countries where labor is cheaper? Bringing it even closer to home. That's what Videon Central is doing with its new Manufacturing Services. Though the business has long manufactured and tested its own products, it is now opening its doors and offering Manufacturing and

Testing Services to other companies in the Centre Region and beyond.

Specializing in contract manufacturing and product testing for highly-regulated industries, Videon's facility has equipment to stress products to the point of failure, a process that offers valuable reliability information and guarantees long term quality. "Our chamber can take a product from -100°C to +200°C in less than 5 minutes," explains Production Manager Ian Urbanik. "Or it can shake the product, simulate lightning strikes, keep it in a humid environment…and in any of those stress scenarios, we identify the weak links of the design. Change that part of the design, and you have a product that will last longer even in rugged circumstances. A more reliable product means fewer field returns and higher bottom line profit."

Read on…

Videon HALT Services Datasheet

Videon EMI Testing Package Datasheet

Videon Temperature Testing Services Datasheet

Two Key Innovation Questions

written by Lauri Moon | June 6, 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!

Wearables and the ‘New Toolkit for Modern Manufacturers’

written by admin | June 6, 2016

With dozens of new products introduced at the Consumer Electronics Show, 2016 might really be the turning point for wearables on the factory floor. If you already implemented some of the new tech, get ready to upgrade. If you haven’t … why are you waiting?

(IW – Matt LaWell: 1-21-16) *Two seconds*. … In 1968, an IBM psychologist named Robert B. Miller presented a paper on computation response time at the Fall Joint Computer Conference that focused in part on that passed-in-a-flash stretch of time. Miller had been studying early computer operators for years and — long before the first personal computers, the first laptops, the first tablets, and certainly before the first connected eyeglasses and watches and rings — focused on what he called the *two-second response* theory.

“The tasks which humans can and will perform with machine communication will seriously change their character if response delays are greater than two seconds,” Miller wrote. More simply, we will shake our heads and walk away (or at least say we will) if our various devices fail to deliver what we ask within two seconds. Good thing wearables help cut down on that response time, technologically spoiling us that much more. The next round of wearables will continue the trend.

New hardware and software, some of it delivered at the most recent Consumer Electronics Show earlier this month in Las Vegas, could finally allow our dreams of a wired workforce to become reality. We all know that Google Glass sputtered for the consumer market and is a relative hit for the factory floor, and that Apple Watch has

sparked more general interest than any other wearable, with strong potential for industry. There are plenty of other options out there now, though, and the number of choices will continue to climb.

The Daqri Smart Helmet and Kopin Smart Glass, for starters, "have the potential to give manufacturers more choices to support workers with real-time, on-body connectivity to applications and data," said Plex CTO Jerry Foster, who is at work on new wearables apps for the floor and the warehouse.

"Wearable devices are part of the new toolkit for modern manufacturers," Foster said, "with cloud solutions making it easy to connect new products and innovation as fast as they hit the market." Which is a little slower than two seconds, but still really fast.

We are still in the early days of adaptation and implementation, but if this round of products delivers, 2016 really could be the turning point — especially for manufacturers.

Let's start with the scale of deployments, which could be even more important this year than the technology itself, at least according to Brian Ballard, CEO and co-founder of APX Labs, which has carved its early wearables niche in developing software for some major names in the oil, gas and defense sectors.

"Smart glasses really cemented themselves as something companies were using in 2015, but … it takes almost a year to get through everything," Ballard said. "You'll start seeing them used on a much larger scale than they were in 2015: Moving from one line to the whole factory, or from one factory to the whole bullpen of factories that support a process.

"There are still some areas inside logistics that we won't see — the hardware can't replace all the tools used today — but in field service and manufacturing, I think you're going to see a big uptick in the technology."

Ballard and APX Labs could play a part in that uptick, thanks to another recent round of funding that increased its total raised to $29 million and included considerable investment from General Electric, which is also a customer. (Boeing is

another customer, as are two of the five largest companies in the oil and gas industries, though they don't allow their names to be used.)

"We started off in the defense space," Ballard said, "building software to power defense-focused wearable technology — almost entirely smart glasses and heads-up displays. … We thought you could eventually do anything and everything on wearable glasses, so we built a flexible, powerful platform, then thought about our feature set in terms of specific verticals.

"If I'm a manufacturer, what are the five or 10 top things every manufacturer has to do? We put a lot of energy into those features, but it has flexibility for a bunch of different use cases." Among those top 10 things are inspection and compliance, the collection and access of knowledge, and the implementation of an easy-to-use work process.

"The same platform your supervisors are using is the same one your technicians are using and the same one your supply chain is using. It's a hyper-connected, multi-player work environment," Ballard said. "We didn't see this as just a bunch of individual users working together. We saw it as a team working together — with your existing legacy systems, with your robotics, with your IoT — and all that together could be a game-changer."

What Will We Use? And Who Will Make It?

Glasses might not be the biggest game-changer, though. A recent study from IDC forecasts about 160 million wearables shipped in 2019, with more than 120 million of them headed for your wrist. (For the sake of comparison, about 25 million wearables shipped in 2014, and close to 80 million shipped last year.) Connected glasses, modular and clothing will make up almost all of the remaining quarter.

"A lot of companies will use ergonomic sensors," including some in clothing, said Rana J. Pratap, principal technology consultant for LexInnova. Why clothing wearables? It's a safety measure, more than anything else, and "safety is a huge area. I don't see a lot of wearable applications used just for the heck of it. More will be used for safety, for improving the worker productivity."

Clothing wearables could be used most prominently to help workers remain visible, especially to, say, forklift drivers, when they would otherwise remain hidden around corners or behind other machines. They could also, Pratap said, help maintain temperature in extreme conditions, though "those applications are more futuristic."

At least as interesting as what the new wearables will be is *who* might be manufacturing them. In a new paper titled "Wearable Technology: Patent Landscape Analysis," LexInnova breaks down which companies have the most current wearable tech patent filings. Smartphone leaders Samsung and Apple do not top the list — ranking fourth and 12th, respectively, with 498 patents and 197 patents, with Fitbit even lower at 15th thanks to its 192 patents. Granted, those companies might have better patents — quality over quantity, which is also measured in the paper — but different companies at the top could open the door to more innovation and competition.

And the top three on that list? Microsoft and Philips, which are neck and neck at 757 and 756 wearable patents, respectively, and Alphabet (which is still just Google for all intents and purposes) at 602.

That number of patents, and the corresponding level of possibility, is exciting. "We're in the first phase of wearables," Plex vice president of development Jason Prater said. "In the next five to seven years, as the consumerization continues to drive the innovation, you're going to see some amazing things. I think this iteration of wearables is going to continue to go faster.

"And even after that," his Plex partner, CTO Jerry Foster, said, "you're going to see ingestibles that start to monitor things inside you. That's fascinating and kind of scary at the same time." Technology, tracking you, measuring you, telling you about yourself … from your insides.

In a 2013 interview with *Wired*, Evernote CEO Phil Libin said that wearables will "make you more aware, more mindful. They'll reduce the number of seconds in the day when you're confused." And they will keep you more aware and give you a sense of where you are, whether you wear them on your wrist, your fingers or your eyes, in your clothing … even whether you swallow them first.

“That’s what this whole connected universe will do,” Libin said. “It will make you a functionally smarter human.”

In just two seconds. Or less.

How the Internet of Things is Pivoting Manufacturers into Service Providers

written by admin | June 6, 2016
(Triple Pundit – Jennifer Tuohy: 1-27-16) Do you know the name of the company that made your doorbell?

If not, you’re pretty typical: Many homeowners make a single purchase from a manufacturer and never return to buy updated models, instead moving on to another vendor or even another product. Industry insiders call it “one and done” – but the age of the smart home is turning this concept on its head.

Nowadays, baked-in Internet connectivity enables everything from your smart thermostat to your smart doorbell to upload new features “over the air.” Thanks to the Internet of Things (IoT), one-and-done now means purchasing one product that gets better the longer a consumer has it.

It’s a positive new spin on a perennial customer-loyalty problem, but it’s one that poses some unique challenges.

Now, manufacturers must plan to continue to work on products, offering improvements and enhancements that can be delivered after the product leaves the loading dock. But this comes with a new responsibility for manufacturers: service and support. Manufacturers will need to be involved in the entire lifecycle of the

product, not just its birth. Are they up to the challenge?

The start of a beautiful new relationship

The ability to improve a product after it is in the consumer's hands is the key for manufacturers looking to unlock the promise of IoT. Building sensors and Internet connectivity into a product are just the beginning. What truly makes a product smart is the ability for it to develop intelligence — to learn and improve. It can either do this on its own through learning algorithms, or through after-market manufacturer input that improves the product with updates based on feedback from sensors and the users.

This new model is a reversal of the consumer-adverse process of making the initial product cheap, then increasing the price of the products needed to keep it functional (think: printers and ink or razors and blades). It hits on two of the core goals businesses should be striving for in today's market space:

1. **Increased profits.** By providing an Internet connection, a manufacturer can reach into a product after it's left the loading dock and fix any issues before they become bigger problems. As any company that has ever dealt with a recall knows, this ability will save millions of dollars. "A big part of the IoT's power comes in its ability to help businesses operate proactively instead of reactively; it essentially addresses problems before they've become problems," wrote Tom Chapman in this post for TriplePundit.

1. **Keeping Customers Happy.** The after-market value IoT can facilitate is almost limitless. By continuously adding value to its products, a manufacturer can transform its relationship with the consumer, creating brand loyalty that will extend to future purchases. For example, Nest Learning Thermostat debuted as a simple smart thermostat in 2011. It learned your routines and programmed itself for you, removing what was once a major pain for consumers.

Four years later, the Nest thermostat is the closest thing a smart home has to sentient brain. A Nest, whether it was bought in 2011 or 2015, can not only control the climate without input from the homeowner, but it can also control compatible

lights: turning them on when it senses you are home and off when it senses you are away. It can activate Nest's compatible security camera to record when you leave the house, and shut down the HVAC system when its compatible Nest Protect detector senses smoke or carbon monoxide.

None of these features were a part of the original launch of the product, but now any Nest owner can benefit from them. Nest also works with other manufacturer's products through its Works With Nest program, further extending its value to the consumer.

The new challenge: Service and support

Of course, this possibility of ongoing iteration presents a new challenge for manufacturers: No longer can a company simply manufacture the best doorbell engineering can produce and move on to the next model. The introduction of something changeable to a product, in this case connected "smarts," necessitates a service to go with it. Whether that service is simply support for the product, or whether it develops into an entire ecosystem that includes monthly fees (as Nest does with its cloud-based video recording for the Nest Cam), is a complicated choice. But in either case, the pivot to providing service and support with the product, while initially costly, will reap huge benefits.

For many Kickstarter-born or Silicon Valley startup products, support and the manufacturer go hand-in-hand, but for larger, more established manufacturers with legacy systems to circumnavigate, the pivot to becoming a service company poses a logistical challenge. Putting smarts into your product and then not providing support to back it up will, in the age of online customer reviews and Twitter, ensure a swift and brutal end to a product's lifecycle.

Better for the consumer, better for business

So, what are the benefits? The combination of data received through an IoT product and feedback through the service/support loop is incredibly valuable. After all, data is the currency of the new millennium. How that data is put to use will vary for each product, but first and foremost it can and should be used to inform product development, whether the product is already in the hands of consumers or still to

come.

Take the example of Ring's Video Doorbell. The product was originally envisioned as a simple way to remotely communicate with whomever was at your front door. In an interview with TechCrunch, Ring's founder and CEO, Jamie Siminoff, said the company learned from early customers that many were finding strangers coming up to their front doors and ringing the doorbell, then leaving when it was answered. This led the company to pivot from a simple connected doorbell to a full-featured security product, complete with motion alerts and motion-sensing recording, so that the doorbell doesn't even need to be pressed for the video to start recording. That video is then stored in the cloud, accessible anytime by the user for a monthly service fee.

The iteration didn't end there. Today, customers who purchased a Ring doorbell can have it unlock their front door, too, if they have a compatible smart door lock. Further integrations within the home are planned for Ring, meaning that while a $200 doorbell sounds like an extravagance, its current and future capabilities could one day save your home.

Service as a product

As manufacturers grapple with the changes IoT is bringing to their business, keeping the concept of service and support as a product foremost in the development process will serve them well. As we've seen, the benefit of a closer relationship with the customer will help produce products the consumer wants, driving up profits and minimizing the impact costly manufacturing mistakes have on the planet.

(Jennifer Tuohy is a tech enthusiast who is fascinated with Internet of Things smart products and the future possibilities they hold. She provides interesting insight on what IoT means for manufacturers.)

Manufacturing 4.0 on the Rise

written by admin | June 6, 2016

(Manufacturing Leadership – Jeff Moad: 1-21-16) A year ago, organizers of the massive German industrial trade show *Hannover Fair* released the results of a survey showing that, despite a rising chorus of attention devoted to the topic, *Industry 4.0* was a subject of conversation at only 50% of manufacturers. Keep in mind that many of the respondents to this study were from Germany, where the government embraced and invested in what it calls Industrie 4.0 as part of its High-Tech Strategy 2020 Action Plan in the hope of establishing the country as a leader in integrated digital industrial technologies.

That led some to note that there was a significant gap among manufacturers between the *attention being paid* to Industry 4.0 (*we call in Manufacturing 4.0)* and *interest in investment*. No big surprise there. Hype around technology-based innovation often outruns reality.

Recently, however, we've begun to notice signs that manufacturers are indeed beginning to take Manufacturing 4.0 much more seriously. In fact, results of a soon-to-be-released Manufacturing Leadership Council survey strongly suggest that, not only are manufacturers internally discussing M4.0, a great many—37%–are already implementing discrete or companywide M4.0-related projects. Twenty-nine percent said they even expect substantially all their production and assembly processes to be digitized within the next five years. That's up from 8% saying those processes are already digitized today.

Forty-eight percent of respondents to the MLC study said the M4.0 notion of digitizing and integrating core processes for the purpose of improving real-time visibility and agility represents nothing less than a new era in manufacturing. Another 44% called it a significant trend.

(Full details of the Manufacturing Leadership Council *Factories of the Future* study will be published in the February issue of the Manufacturing Leadership Journal.)

This was reinforced on a recent Critical Issues roundtable discussion call for

Manufacturing Leadership Council Members entitled “Plant Floor Migration Strategies to Manufacturing 4.0.” On the call, which featured a presentation by Prof. Dr. Detlef Zuehlke, Founder of Germany’s Smart Factory Consortium and a leader in the Industrie 4.0 movement, several manufacturers said their companies are either researching and planning their M4.0 roadmap or actively implementing smart factory technologies.

A top manufacturing executive from a large industrial firm said his company is aggressively educating itself on M4.0 opportunities while assessing the current machine footprint in its factories.

An executive from a large maker of industrial materials, meanwhile, said his company has launched a M4.0 adoption effort. Central to that effort, he said, is training and education for workers and executives intended to help them understand how their roles and their thinking will need to change in a M4.0 era.

A manufacturing executive at a large pharmaceuticals manufacturer said his company is creating a roadmap that will allow it to transition from focusing on smart devices in its plants to entire smart factories. The initial focus, he said, is on strengthening connections between manufacturing execution systems and equipment control systems.

And an executive at a large, diversified industrial company said, after having spent the past two years researching M4.0 and planning for adoption, her company is launching pilot implementations across dozens of plants worldwide.

These manufacturers said the opportunity to reduce operating costs—through improvements such as predictive maintenance and greater equipment utilization—is only part of what’s driving their interest in M4.0. Even more important, they said, is the opportunity to become much more agile and responsive to increasingly demanding customers by reducing cycle times, getting new products to market faster, and delivering greater value through smart, software-enabled products.

Indeed, said Dr. Zuehlke, M4.0 represents an opportunity for manufacturers to correct some of the damage that has resulted from a narrow focus on cost reduction over the past few years. That focus has resulted in outsourcing, long lead times, long

product lifecycles and, ultimately, compromised customer satisfaction.

“Customers expect to be able to order by mouse click and to receive extremely fast deliver,” said Dr. Zuehlke. “So we have to change our production strategy and bring production closer to the customer.”

Dr. Zuehlke emphasized that the road to agile, digitized, and smart factory networks will be a long one for most manufacturers. He estimated this will be a five-to-ten-year process, with plenty of challenges along the way. Standards that can support modular, plug-and-play smart M4.0 systems are still incomplete. And, he said, manufacturers will need to think differently to develop new business models that can take advantage of smart factories and smart products.

Given such challenges and the extended time frame that will be required for widespread adoption, it’s certainly possible that manufacturers will, over time, lose their enthusiasm for the concept and that M4.0 will be just another buzzword footnote. (Remember Computer-Integrated Manufacturing?)

But, at least for now, manufacturers’ commitment to M4.0 seems to be on the rise.