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Manufacturing in U.S. Expands at Fastest Pace in Two Years

Manufacturing in U.S. Expands at Fastest Pace in Two Years
Bloomberg Business
By: Michelle Jamrisko
1/3/2017

American manufacturing expanded in December at the fastest pace in two years, reflecting firmer output and the biggest pickup in orders growth since August 2009.

The Institute for Supply Management said Tuesday that its index increased to 54.7, the fourth straight advance, from 53.2 a month earlier. The median forecast in a Bloomberg survey called for 53.8. Readings above 50 indicate growth. The ISM's measure of orders surged 7.2 points, while its gauge of prices paid for materials climbed to the highest level since June 2011.

The jump in bookings, including the strongest pace of export orders since May 2014, will help keep factories on solid footing early this year as business confidence improves. Plant managers responded to the brighter outlook by adding to staff at the fastest pace since the middle of 2015, according to the ISM's report.

Additional hiring and the pickup in inflation at the producer level help explain the Federal Reserve's decision last month to raise interest rates.

The ISM's index of prices paid climbed to 65.5 from a November reading of 54.5.

The group's gauge of new orders increased to 60.2 last month after 53 in November. The measure of orders for overseas customers rose to 56 in December from 52.

A rebound in export markets has helped give an added boost to U.S. factories following deceleration over the past couple years. Domestic companies have also made progress getting inventories more in line with demand and

there are early signs corporate investment is beginning to firm.

To be sure, a rally in the dollar since the presidential election risks restraining overseas sales of U.S.-made goods.

Production, Jobs

The ISM's gauge of production increased to 60.3, the highest since November 2014, from 56 a month earlier.

A measure of factory employment picked up to 53.1 in December from 52.3 the prior month. The national payrolls report due Friday from the Labor Department is projected to show about 180,000 jobs were added in December, in line with the monthly average in 2016, according to the median estimate in a Bloomberg survey.

"Employment is pretty strong throughout the country, and that's certainly true for manufacturing," Bradley Holcomb, chairman of the ISM factory survey, said on a conference call with reporters. Consumer confidence helped lift demand in the second half of last year, particularly after the election when "momentum built on itself," he said.

The ISM report also showed gauges of factory inventories shrank at a faster pace in December from a month earlier.

U.S. Manufacturing: It's Not Your Granddad's Grubby Factory

U.S. Manufacturing: It's Not Your Granddad's Grubby Factory
Forbes
By: Harold Sirkin
1/5/2017

American manufacturing is either on the cusp of a remarkable renaissance or in the throes of a long-term death spiral. And there's plenty of data and anecdotal evidence to satisfy both views.

Although BCG generally sees the needle moving in the right direction, we've noted with concern the sharp slowdown in U.S. manufacturing productivity, which for years had been increasing at more than 4% per year, but now is moving in reverse, as the Bureau of Labor Statistics (BLS) illustrates here.

We've also noted the need for skilled workers. According to BLS's October 2016 Job Openings and Labor Turnover Summary (the so-called JOLTS report), released in December, the U.S. had approximately 322,000 manufacturing job vacancies.

The National Association of Manufacturers (NAM) sees the skilled labor shortage existing for years to come. NAM has projected that U.S. manufacturers will need an additional three-and-a-half million workers over the next 10 years; but more than half of these jobs—as many as two million—may go unfilled, NAM believes, because employers can't find workers with the proper skills.

In addition to the 322,000 manufacturing vacancies reported by BLS, another 197,000 vacancies existed in transportation, warehousing and utilities (an interesting combination), the first two of which are essential cogs in the manufacturing supply chain.

This, too, is likely to continue, say those in the know. The trucking industry trade group—the American Trucking Associations—for example, sees the current truck driver shortage—about 48,000—increasing more than three-fold, "to almost 175,000," by 2024.

The picture painted by such statistics and projections is quite a downer. But fortunately, it doesn't square with what's taking place in the new world of advanced manufacturing.

For a better sense of this new world, I invite your attention to a recent report by Mark P. Mills, a senior fellow at the Manhattan Institute and faculty fellow at Northwestern University's McCormick School of Engineering and Applied Science.

Mills argues that manufacturing has changed so dramatically in recent years that the world of the BLS number crunchers and the world of contemporary manufacturing are in some ways in parallel universes. Instead of accounting for 12% of GDP, as is commonly reported, Mills believes manufacturing "likely" accounts for as much as 30% of GDP.

He offers this as an example: "If final assembly of (often customized) products—unequivocally a manufacturing process—takes place in a warehouse, those employees are counted [by BLS] in 'services,'" rather than manufacturing. By one estimate, he says—that of Marc Levinson of the Congressional Research Service—nearly 30,000 warehouse and storage facility workers "were engaged in manufacturing production activities such as assembly, fabrication and packaging" as of May 2015.

Mills's larger point is that the changing face of manufacturing, which BCG and others have been chronicling for several years, has put the United States "on the precipice of an industrial transformation as deep and impactful as the one that took hold in the early 20th century." These "new technologies and tools will require greater numbers" of skilled workers, he points out, "to fabricate, maintain and operate the machines of the future." Which brings us back to the "skills gap."

While some of the rhetoric on this subject is occasionally overblown, it's clear that we need to find ways to interest more Americans in manufacturing careers and prepare them for the jobs of the future.

Companies can do some of this on their own—by ramping up their apprenticeship and training programs. But as Mills notes, Americans don't seem to have a lot of interest in such careers. "Even though about 150,000 Americans start an apprenticeship each year," he writes, "that total would be one million to three million a year if as many U.S. millennials signed up as they do per capita in France, Germany, England and Switzerland."

One of the reasons for this lack of interest is the American education system, which has been selling the "everyone needs to go to college" snake oil for decades, while shortchanging industrial and vocational education. As I've written in the past, we need to get away from this attitude.

At the end of the day, several factors—including antiquated statistics that underreport manufacturing employment, anti-globalization naysayers who peddle the idea that U.S. manufacturers can't compete, and an education system that has romanticized the notion that a college degree is the only legitimate road to success—have combined to convinced many Americans, and especially American parents, that a manufacturing career is a dead end.

That's nonsense. The factory of the future won't have much in common with the dirty, noisy plant where granddad may have worked for 40 years. It's time for parents to acknowledge that there are many challenging, creative, well-paying jobs in manufacturing and encourage their children to consider them.

TOP

Five IoT infrastructure resolutions for 2017

Five IoT infrastructure resolutions for 2017
IoT Agenda
By: Gary Orenstein
1/4/2017

Opportunities with the internet of things abound, and generally speaking those opportunities make themselves available to those taking action.

In that spirit, we share five IoT resolutions for 2017, a starting point to get your organization on track for IoT success.

1. Capture a new data source

Every day, companies capture data from interacting with customers and suppliers, as well as third-party data based on the economy, weather, social media and more. Here is how to get going:

Find an entirely new data stream Set a plan to capture a new data source for your organization. For example, some industrial equipment may already have the ability to output information but it might not be captured today. Or readily available public data might be easily integrated and correlated with current information.

Add structure to an existing stream

You may have an existing source of unstructured data that is not particularly useful in its current form. Taking that same data and adding enough structure to make it accessible to others in the organization can bring new insights.

Easy opportunities

• Look into popular message queues like Apache Kafka to build a central traffic hub for message streams
• Dig into the industrial internet of things by seeing what information can be captured from existing industrial equipment

2. Scope a new application

Brainstorm a new application that delivers new customer benefit or operational efficiency. Options include:

• A new mobile application
• A user experience boost by delivering more accurate and relevant information
• Time-saving tools for customers and the internal business

While planning and building, ask yourself:

• What combination of data sources will provide the most value?
• Can this application benefit from real-time data?
• Can I move to a push model instead of just a pull model for application interactivity?

3. Build an IoT analytics application

Analytics on a fresh view of existing or new data helps drive a business forward. Consider applying existing machine learning models to existing workflows, or applying models to new incoming streams of IoT generated data.

For example, many machine learning models, or in earlier parlance statistical models, can be exported using the Predictive Model Markup Language, or PMML.

Specifically, tools like SAS export models to PMML that can be integrated directly into real-time pipelines. Modern transformation tiers like Apache Spark and distributed databases like MemSQL can natively host these models so that incoming data can be scored in real time.

Architects can expand on the popularity of libraries such as MLlib and TensorFlow to create predictive analytics applications using these tools.

4. Ensure the right foundational data infrastructure

Successful IoT deployments need to span from edge data collection all the way to the data center. Companies like OSI Software provide just one example of collection tools to help feed data into your pipelines.

Once in the data center, a common architecture involves integrating the following tiers.

Message queue

At the messaging layer Apache Kafka and AWS Kinesis are popular options to aggregate data streams, connecting producers and consumers of information.

Transformation

Most data pipelines require modifying the data from its state at capture to its state for long term persistence. Converting sharding schemas so data is properly categorized can take place at the transformation tier.

Data persistence

The most accurate model for predictive analytics involves both real-time and historical data, so being able to persistently retain data, including records over time, sets the proper context.

Real-time dashboards

Nothing says “wow” like a real-time dashboard that enables quick visualizations of current data. Popular business intelligence dashboards like Tableau, Zoomdata or Looker, along with custom dashboard options using frameworks like D3.js, allow companies to provide widespread access to fresh data.

5. Set an organizational model for IoT success

There is no question data plays a more important role in today’s business climate with everyone clamoring to “transform.” New CxO roles like the chief data officer and chief analytics officer make that more apparent than ever.

At the end of last year, Gartner estimated that 25% of large global organizations had already hired a chief data officer. By 2019, Gartner expects that number to reach 90%.

Further, Gartner sees a rise in advanced analytics:

By 2018, Gartner predicts that over half of large organizations will compete using advanced analytics and proprietary algorithms, disrupting entire industries. This, in turn, is being driven by the proliferation of devices, connected “things,” connectivity and computing power — all of which creates more opportunities to collect data, analyze it, and potentially monetize it.

There is no better time like the present to get started on your IoT infrastructure planning.

IIoT: Choose the Right Tools for the Job

IIoT: Choose the Right Tools for the Job
Plant Services
By: Bob McIlvride
1/3/2017

The American poet Carl Sandburg wrote, “They will go far and see much, and they will never be any good for sitting with the sitters and knitting with the knitters.” As true today as it was almost 100 years ago, those who sit tight and stick to their knitting rarely accomplish much. Right now in the world of manufacturing and industry, a new horizon is opening up: the industrial internet of things (IIoT). Are you curious? Do you want to go far and see how much you can do with it, or will you just sit back and knit?

Even from a distance, the benefits of the IIoT are visible. Plant Services contributing editor Sheila Kennedy highlighted many of them in August in her article Yes, IIoT can drive operational improvements. Put briefly, the IIoT offers a number of ways to optimize your system performance by providing data-driven insights into your processes. Among other things, you can see how well your assets are performing, implement predictive maintenance, simplify logistics, coordinate procurement, and drive down resource costs.

OK, you may say, that all sounds fine. Suppose I am interested. How will it work? Can the IIoT fit with my current system? How much will all of this cost? What about security? And supposing I do want to build IIoT connectivity and capabilities in my plant, how should I get started? Should our company try this on our own, or should we seek expert outside guidance or assistance?

Who builds it?

Taking the last question first, building your own system from scratch may not be the best way, according to those who have tried it. A recent Machina Research survey, "Lessons Learned from Early Adopters of the IoT," shows

that most early adopters in the IoT space who took a do-it-yourself approach found the task to be more complicated to implement than they had expected. “When asked about primary concerns around IoT, adopters have some insight that nonadopters just don’t yet have,” the report’s authors wrote. “Adopters point to ‘complexity of the IoT solution’ as the largest concern around IoT, a concern that nonadopters have yet to consider fully.”

On the other hand, if you do decide to bring in an expert, you’ll have to decide who is most qualified for the job. In her blog post "The IIoT Integrators Are Coming", Stephanie Neil at AutomationWorld claims that control system integrators are not gearing up for the IIoT quickly enough and that SIs from the IT world are stepping in to fill the gap. They are more than happy to bring their experience implementing IoT for IT applications to the OT world. Naturally, some OT system integrators see things quite differently. They point out that it is easier for an OT company to add IoT to its portfolio than for an IoT company operating in the IT space to learn industrial process control. Jeff Miller of Avid Solutions wrote a blog post titled "We Are Ready for IIoT" to make the case that control system integrators are gearing up for the task.

The right tool for the job

Whomever you choose, an in-house team or a system integrator, you can save a lot of time and money by not reinventing the wheel. You can benefit by using tools, and you’ll want to choose the right ones. Because the IIoT looks a lot like SCADA, some may be tempted to continue using the same tools. This can be a mistake, though, because industrial data communications software was not built for the open spaces of the Internet.

Take security, for example. The IIoT presents security challenges that industrial system designers never contemplated. First, there is the obvious need to eliminate the chance of attack from outside the perimeter. But there’s also a need to protect the system and its data from inside as well. Using designed-for-IT approaches like Microsoft’s RDP or a VPN may seem like the logical choice, but Microsoft Developer Clemens Vasters raises valid concerns in a paper titled "Internet of Things: Is VPN a False Friend?" Useful as they are for the purposes for which they were designed, RDPs and VPNs give each user the keys to the kingdom – access to applications and data far beyond what they might need or what you might want them to see. The 2014 attack on Target via a VPN shows how dangerous and costly that can be.

What is needed is a secure-by-design technology that does not rely on a VPN and keeps all firewall ports closed. This can be done by making outbound-only connections to a secure cloud service. This design exposes zero attack surface and makes your system invisible to hackers. At the same time, it allows for bidirectional data communication through reverse proxies, which corporate IT departments are increasingly recommending as a standard for ensuring the security of OT systems. Needless to say, developing this kind of technology from scratch is not a project for your average plant engineering team. Instead, you can get the most out of your team and keep costs down by using a tool designed for the job.

The tool you choose should also support real-time data throughput speeds at scant milliseconds above network or Internet latencies. Ad-hoc approaches like collecting process data in an SQL database and then accessing it from the cloud will slow down your applications like a sloth at the DMV in "Zootopia." You won’t get the response you need. Just because you may be using the Internet is no reason to compromise on speed.

And the tool should be convenient. It should fit unobtrusively and connect seamlessly with any new or existing system, with no need for programming and no dependencies. If the outside network or the Internet goes down, your primary control system should experience no effect whatsoever. The IIoT should be considered as data access or at most supervisory control. All low-level control should be completely isolated.

Start gradually

With the IIoT team assembled and tools in hand, start gradually. There is no need to tackle a huge project. Pick the low-hanging fruit. Kennedy suggests identifying functionality that is already close to the IIoT and using components that are easy to access. You may be able to connect sensors, monitors, or other devices in different locations and aggregate their data or even bridge their data sets.

A well-designed, cloud-based IIoT system does not require much upfront investment in time or money. As long as you work with a provider who offers a monthly subscription, you should be able to start a pilot project for as little as $100 per month. And if the service is reasonably complete, it should only take a few days to get up and running. Of course, you’ll need to ensure that such a system meets your specific needs, whether that means offering data archiving options, web-based HMI, access to analytics packages, or something else.

The adage "well begun is half done" applies here. If you work with a good team, choose the right tools, and start with something manageable, chances are you will succeed. Once you've got some initial experience, the next project can be more elaborate and ambitious, and the one after that even more so. Soon you will be going far and seeing for yourself what the IIoT can do for you and your bottom line.

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