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Your key to the latest industrial automation and process control information

ARC's Most Excellent Forum Yet!

ARC Advisory Group staged their 21st annual industry forum in Orlando, Fla., in February. Rebounding from several years of lower attendance, this forum was the best attended and largest in the 21 year history of the event.

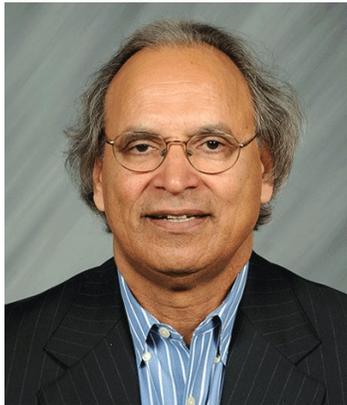
It began with a Super Bowl watching party Sunday night, which was probably the best game ever in Super Bowl history, and then a day-long cyber security focus on Monday.

Also on Monday, the attending press were treated to an afternoon of nose-to-tail press conferences. Unlike his White House colleague though, ARC's Paul Miller kept them on track and interesting for the most part. More about the press conferences later in this report.



Marty Edwards—DHS

ing was made up of keynote speeches by Marty Edwards, from the U.S. Department of Homeland Security, Don Bartusiak from ExxonMobil Research and Engineering, and Andy Chatha, the host of the Forum and President of ARC Advisory Group.



Andy Chatha

Edwards, the first DHS executive who has actually worked in automation, had a new thing to say. "Pick the one thing you cannot have fail, and take it off line. Do not connect it to the Internet. Have a big red button to shut it down in case it is attacked."

Edwards admitted that it was not possible to prevent all attacks. With even the DHS being willing to note the truth in public now, it seems like we ought to be ready to talk about how to make plants "Intrinsically Safe" from the field devices to the control system, to the asset management system, and to the cloud.

Exxon chief engineer Bartusiak gave a state of the state report on the Open System movement, which Exxon sponsors. The open systems model, clearly, is an asset-owner and end user's dream— a vendor neutral platform where best of breed applications can be plugged in without halting the control system



Don Bartusiak—ExxonMobil

The General Session on Tuesday morn-

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Outlook is Positive

Want to know the **Mind of the Customer™**? Do you know why your customers buy and why they buy specific products or services, and don't buy others? If you don't know, call us to find out how we can help you! Call **Walt Boyes** at +1-630-639-7090.

ARC's Most Excellent Forum Yet! (continued)

or removed without damage. The INSIDER has been pressing for such a system since before Walt Boyes' tenure, and in fact, Walt first described such a system six or seven years ago at a board meeting of the Smart Manufacturing Leadership Coalition (SMLC).

The problem is, of course, that the big automation vendors will not play. Neither Honeywell nor Emerson have evinced more than token interest. This is because it is evident that a vendor neutral control platform will remove the legs of the vendor annuity—all that installed base. Yet from the asset owner's perspective, this is what is needed to overcome the increasingly huge cost of changing control systems out as they mature and get antiquated.

This is not to say that work isn't being done. SMLC had the kickoff in February for the Clean Energy Smart Manufacturing Innovation Institute. In partnership with the U.S. Department of Energy, the Clean Energy Smart Manufacturing Innovation Institute (CESMII) brings over \$140 million in public-private investment to radically improve the precision, performance and efficiency of U.S. advanced manufacturing. CESMII is the 9th Institute of the Manufacturing USA, established by the White House to spur U.S. innovation, sustainability and competitiveness. The institute will use the SMLC open manufacturing platform for demonstrations and testing.

ExxonMobil has retained Lockheed Martin to design and build another test bed for smart manufacturing, and has formed the Open Group forum for the same purpose.

At some point, the large automation vendors will have to seriously declare their purposes. Usually, as in the case of all too many ISA standards, the large vendors go at each other while delaying the implementation of standards not solely favorable to them for as long as they can.

The Press Conferences

Every year, provides a for vendors to big splash announcements, new products, new management, and This years' conferences exception. As done before, SIDER has



HIMA Press Conference

ARC place make of ac-prod- so forth. press were no we have the IN-posted

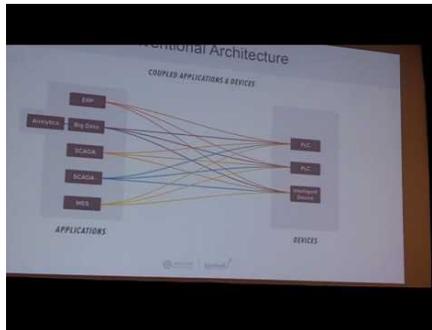
videos of the press conferences, with hyperlinks to the videos embedded in these images.

HIMA began the conferences by discussing what the data in your safety system can do for you. Managing Partner Steffen Phillip and Sales Manager Buddy Creff talked about the company's smart safety solutions and how they can release the data trapped in your safety system, like HART diagnostics from the safety instruments. These solutions include ways to extract and use sequence of events reports.



Honeywell Press Conference

Paul Bonner, from Honeywell, introduced the Honeywell Connected Plant business, which combines HPS solutions with UOP intellectual property, and Honeywell's digital transformation solutions. "The connected plant is about connecting plant, people, and assets. Here, Honeywell has the control expertise, UOP brings process expertise, and our INspire partner ecosystem s bring in additional domain expertise, as needed," Bonner said.



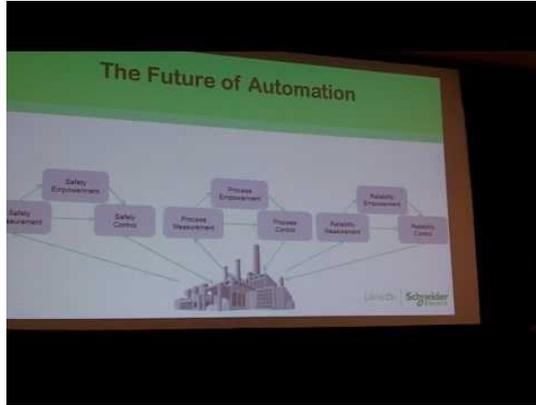
Inductive Automation Press Conference

Inductive Automation's Don Pearson, Chief Strategy Officer, Travis Cox, Co-Director of Sales Engineering, Inductive Automation; and Arlen Nipper, President and CTO, Cirrus Link Solutions (co-inventor of the MQTT protocol), introduced Ignition Edge, a new solution "for the edge of the network." According to Pearson, Ignition Edge empowers enterprises to build complete IIoT infrastructures — from the network's edge to the Cloud to local sites — all on one platform. He referred to this as "end-to-end IIoT." Travis Cox did a demo while Nipper described several real-world use cases. We encourage our readers to keep their eyes on Inductive Automation. They seem to have their finger on the pulse of change in the automation industry.

Schneider's Peter Martin described the Holy Grail that he and INSIDER editor Walt Boyes wrote about in their 2014 book *Real Time Control of the Industrial Enterprise* (see page 14).

ARC's Most Excellent Forum Yet! (continued)

Schneider, using the Seeq data management engine, has developed a Profit Advisor which will allow a plant to run using financial metrics as control variables. Obviously, the INSIDER is very pleased that the vision we espoused in 2014 is in serious danger of coming true.



Schneider Press Conference

L&T Technology Services' Samir Bagga, Chief Marketing Officer, introduced the company to the US market. L&T Technology Services was a global engineering services supplier, Bagga said as he discussed some of the company's partnerships and their significance for industrial organizations. These include a ten-year partnership with Rockwell Automation and plans to set up an "Internet of Everything" lab with Rockwell at L&T Technology Services' campus in Bangalore, India. Here, the two companies will jointly develop next-generation IoT and Smart City solutions. Samir also discussed the company's collaboration with Dell EMC



L&T Technologies Press Conference



Bentley Systems Press Conference

to roll out modular smart building solutions, and with Microsoft Corporation to delivery Microsoft Azure Engineering Solutions for industry. L&T is typical of a dozen or so Indian "we do anything" companies that have tried to enter the US Market over the past twenty years, albeit with more street cred than most. It will be in-

teresting to see how they do.

Greg Bentley, CEO of Bentley Systems, shared more interesting video of his software, and announced a global partnership with Siemens to develop and maintain digital models for Siemens' Walkinside training modules. It is fascinating to see what low cost digitization has done for the ability to make 3D models of plants and "walk through them."

Jagannath Rao, Sr. Vice President, Data Services, Siemens U.S, presented the company's MindSphere industrial cloud infrastructure as "a cloud-based, open IIoT operating system," making it an essential element on the path to the digital enterprise.



Siemens Press Conference

The INSIDER notes that it helps a great deal to understand what the data means, before collecting and mining it.

Satoru Kurosui, Director and Executive Vice President, Yokogawa Electric Corporation presented the company's new vision to support customers' best-in-class operating performance and its solution business roadmap to maximize the synergistic effects of strategic acquisitions. Andrew Howell, CEO, KBC Advanced Technologies, discussed the KBC Co-Pilot Solution, a unique co-innovation solution designed to provide new perspectives that can help end users strengthen their asset value and overcome challenges. Yokogawa is not known for its ability to manage acquisitions, yet they have attempted a bold restructuring of the company for the 21st century.



Yokogawa and KBC press conference

The INSIDER's February 2017 Roundup

ABB In Serious Trouble?

ABB has apparently fallen victim to what a spokesperson called a "sophisticated criminal scheme" at its South Korean subsidiary. ABB revealed last Wednesday that the chief suspect was an executive responsible for ethics training.

The executive, apparently a South Korean ABB employee, Oh Myeong-se, was treasurer and one of two integrity ombudsmen for ABB Korea - to whom staff were supposed to report any ethical concerns - according to an online company magazine available on ABB's Korean website.

A source familiar with the investigation noted that Oh was also the head of compliance at ABB in Korea until 2010, a role that carries responsibility for maintaining legal and ethical integrity.

Oh Myeong-se disappeared on Feb. 7 and ABB subsequently discovered significant financial irregularities, the company said.

Oh is suspected of forging documents and colluding with third parties to steal funds, ABB's spokesperson said, estimating it would take a pre-tax charge of about \$100 million for the affair, which analysts said raised concerns about its corporate oversight.

This on top of an investigation ABB faces concerning suspected bribery and corruption in the UK.

Group Chief Executive Ulrich Spiesshofer described the alleged fraud as "shocking news", which he said could harm the power



ABB CEO Ulrich Spiesshofer

equipment and industrial firm's reputation. "The entire ABB group - all 132,000 of us - will have to live with the consequences," Spiesshofer told staff in a letter after the company said it had uncovered significant embezzlement and misappropriation of

funds at its South Korean subsidiary.

ABB has revealed that the incident may well delay its annual report. It is not yet clear whether Spiesshofer will be able to survive this latest blow. The automation giant has been under severe shareholder pressure for several years due to shrinking orders.

Spiesshofer won some breathing space when the firm reported the first uptick in new business in nearly two years in the fourth quarter of 2016, but this latest issue has given new ammunition to its second largest, and most dissident, shareholder, Cevian Capital. In an interesting coincidence, ABB said it had nominated Lars Forberg, managing director of Cevian Capital, for election to its board. Cevian has been saying loudly for about three years that ABB is worth more broken into its constituent parts than maintained as a functional organization. A call by Cevian, to spin off its power grids business, was rejected by ABB last year. With Forberg on the board, and with two scandals plaguing Spiesshofer's administration, it might be smart to expect a new CEO and a renewed call by Cevian for divestiture.

ABB's biennial user group conference starts March 12 in Houston. There may be some surprises there.

Krohne appoints new Managing Director by Nick Denbow

The Advisory Board of the Krohne Group has appointed Dr Ing Attila Bilgic as Managing Director of Ludwig Krohne GmbH & Co KG. He assumes global responsibility for research and development



Michael Rademacher-Dubbick



Attila Bilgic

(R+D) and extends the managing board of the Krohne Group alongside the existing Directors, Michael Rademacher-Dubbick and Stephan Neuburger.

Dr Bilgic's main task is the "digitization" of the Krohne measuring devices and measuring systems, their networking and their integration amongst themselves, as well as with and into the digital systems of the users. The area of "smart sensors", which Krohne has already

The INSIDER's February 2017 Roundup (continued)



Stephan Neuberger

pioneered with various research projects under his leadership, is also of particular significance. With more than 350 employees, The Krohne Group currently employs about 10% of all staff in research and development, with more than 350 R+D employees and a budget of approximately 8% of the total group turnover (in 2015 the turnover was approximately EURO 500 million). The topic of networking has been the major topic in the previous career of Dr. Bilgic: prior to joining Krohne, he held various positions in the "Communication Solutions" division of Infineon Technologies AG from 2000 to 2009, most recently as Director of System Engineering. From 2007 to 2009, he was head of the Department of Integrated Systems at the Ruhr-Universität Bochum. Since 2016, he has been a member of the board of the VDI / VDE Society of Measuring and Automation Technology. He is also a member of the German Physical Society and the Institute of Electrical and Electronics Engineers (IEEE).

From left to right: Karl-Heinz Gerdes (HIMA Product Manager), Udo Brestrich (HIMA Purchasing Manager), Sophie Bothe (Process Automation Sales Director Germany at Pepperl+Fuchs), and Hartmut Leistner (HIMA Sales Manager Germany, Austria & Switzerland).

HIMA and Pepperl+Fuchs Sign Global Agreement

HIMA Paul Hildebrandt GmbH has signed a global framework agreement with Mannheim-based automation equipment manufacturer Pepperl+Fuchs GmbH. It comprises the jointly developed H-system termination boards and associated modules

from Pepperl+Fuchs, which are connected through pre-assembled system cables to the connector boards of the HIMax family. The agreement also governs uniform formal and legal aspects for all

companies in the HIMA group, including warranty, liability, obsolescence management and uniform commercial conditions.

Udo Brestrich, Purchasing Manager at HIMA, comments: "Pepperl+Fuchs is a leading global manufacturer of industrial sensors and



H-System isolated barriers with HiMAX

products for explosion protection. They are one of the key suppliers to the HIMA Group. The global framework agreement strengthens our cooperative relationship with Pepperl+Fuchs, and for us it is an important part of maintaining HIMA's technology leadership in the future."

With safety-oriented controllers, an additional isolation level is necessary for channel-wise galvanic isolation or isolation from explosion hazardous zones. This level can be implemented with the pre-assembled system cables and H-system isolated barriers from Pepperl+Fuchs mounted on termination boards. For each signal type, termination boards and HIMax connector boards can be connected easily, using tested standard system cables. This eliminates wiring errors and ensures the shortest possible commissioning times. Board design and layout are conceived for cabinet installation in accordance with HIMA specifications.

"Together with HIMA Product Management, Pepperl+Fuchs has played a decisive role in the development of the unique and advantageous termination board solution for HIMax safety controllers. We are pleased to be able to expand this good cooperative relationship to the global level based on the framework agreement", says Sophie Bothe, Process Automation Sales Director Germany at Pepperl+Fuchs.

The H-system isolated barriers can be mounted on the termination board without tools and are hot swappable. This creates the ideal plug & play solution for using HIMax controllers to process signals from explosion hazardous areas. It is also the most compact solution of its sort commercially available.

The INSIDER's February 2017 Roundup (continued)

Gambica urges U.K. Automation industry to engage with new group set up to advise government on digital technology for industry

In the government's green paper on Industrial Strategy published on 23rd January this year, a new review group was announced to be led by Juergen Maier, CEO of Siemens UK and Ireland, to advise on the opportunities and challenges for U.K. Industry offered by digital technology.

The new group will be known as the Industrial Digitalisation Review Leadership Team and is intended to work for six months producing the review report.

Juergen has chosen a team from across industry and commerce to form this new group (see list below) and this includes one member representing the automation industry - Brian Holliday, the MD of Siemens Digital Factory, UK.



Brian Holliday, MD of Siemens Digital Factory UK

As well as being a keen supporter of GAMBICA, Brian is also the Chairman of ESCO, the council representing the Electronics and Electrical industries in the UK, which was set up in 2012 by three trade associations, including Gambica to increase the dialogue between the industry and government. He will need use cases and other evidence from the automation industry in order to help produce the review report.



Graeme Philp, CEO of GAMBICA

Dr Graeme Philp, Chief Executive of Gambica and leader of the Industry 4.0 work group on ESCO com-

mented, "We are delighted to see this review team formed while there is still time for the UK to take up a leadership position in the digitisation of industry. We now need the UK automation industry to come together as never before to make the case to government loud and clear. Brian will be our channel to achieving this"

Brian Holliday added, "The Industrial Digitalisation Review is unquestionably positive for the automation sector and British industrial productivity. By concentrating on benefits and use cases, we may be able to unlock the drivers and identify the policy instruments that help stimulate investment in skills and new technology. In turn this will boost the competitiveness of U.K. Industry."

Facts about the Review

Technologies in scope include Artificial Intelligence, Augmented reality solutions, Automation, Robotics, Blockchain, Data Analytics, DATA for increased productivity and commercial gains, High Performance Computing / Big Data, Highly integrated communication systems, Industrial machines processes and the internet of things, IT and cloud based platforms, 3D Printing

The members of the review team are Phil Smith (Chairman, Cisco), Carolyn Fairbairn (Director General, CBI), David Stokes (CEO UK & Ireland, IBM), Roger Connor (Head of Global Manufacturing, GSK), Ralf Speth (CEO, JLR), Oliver Benzecry (Managing Director and Chairman Accenture UK), Professor Andy Neely (Institute for Manufacturing and Director, Cambridge University), Sean Redmond (CEO, Vertizan), Grace Gould, (Entrepreneur in Residence, Local Globe), Brian Holliday (Managing Director, Siemens Digital Factory UK), Sir Charlie Mayfield (Chairman, John Lewis – attendance and advisory only), Dick Elsy, (Chief Executive at High Value Manufacturing Catapult), Jeremy Silver (Chief Executive at Digital Catapult), Nick Roberts (CEO, Atkins UK & Europe), Nick Wright Pro VC, Newcastle University, Adrian Gregory, CEO, ATOS UK)

The INSIDER's February 2017 Roundup (continued)

FANUC expands green robot collaborative range

FANUC now offers three small, Collaborative Robots as part of its large industrial robot portfolio: the CR-4iA, the CR-7iA and the CR-7iA/L. These new additions to the range will complement the larger,

green-coloured CR-35iA Collaborative Robot which, with a payload of 35kg, remains the strongest of its kind.

The CR-4iA is the smallest of the FANUC collaborative range, with a payload of 4 kg, while the CR-7iA and CR-7iA/L (long arm) are able to lift up to 7kg. Through proven sensor technology, the FA-



CR-4iA

CR-7iA

CR-7iA/L

NUC collaborative range ensures a completely safe stop whenever the robots encounter an unexpected obstacle - human or otherwise.

The range is TÜV certified to meet international safety requirements ISO 10218-1. The robots' collaborative nature also enables these machines to work alongside a human workforce. In many cases, the need for safety fences is eliminated as the robots' small and compact designs enable them to be fully integrated into a human workspace.

Furthermore, there is also the option to incorporate FANUC intelligent functions into these robots, including industry-ready plug-and-play vision and force sensor technologies. This facilitates new interactions between humans and robots in many different applications. FANUC vision sensors can be used in a variety of tasks, including locating workpieces, part or process inspection, or reading barcodes. FANUC force sensor technology offers a wide range of precise assembly strategies for complex assembly tasks in fields such as automotive or electronics.

Due to their small and compact frames, the robots can be ceiling or wall-mounted, offering a wider range of motion without interfering with the opera-

tor's workspace. The robots can also be mounted on a mobile platform due to their lightweight and slim design. This flexibility makes it easy to change the robots' work stations, allowing them to complete a variety of tasks along the assembly line depending on the operator's or business's needs. The expected tasks of such robots include light, tedious, and repetitive manual tasks for different types of material handling, small electrical parts transfer and assembly.

Although these new Collaborative Robots are green on the outside, they are yellow on the inside, which means that they operate like any other FANUC robot. With standard FANUC control technology, they offer a well-known interface for simple integration into manufacturing plants.

FANUC's expansion of its "green robot" collaborative range arrives as worldwide sales of Collaborative Robots are increasing, with an expected market value of more than \$2billion (£1.6billion) in the next five years.

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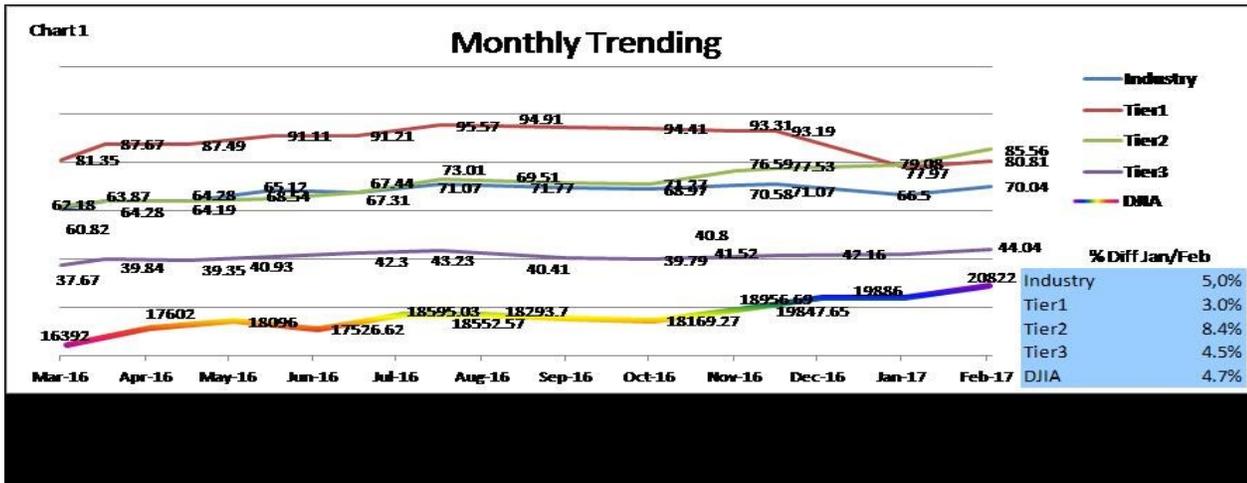
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Poised on the brink?

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INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch



also in line with general Dow performance.

Alps Electric moved from the losers list to the index lead-

Another good month for our Industry and the Dow! But there are signs of a dramatic fall off that may be in store.

Overall, the Industry Index increased by 5% since last reporting, in line with the Dow's increase of 4.7%. The mid-sized companies in our report were the stars for

February, showing an average increase of over 8%, outperforming

ers in a very dramatic fashion, up a total of 30% since year end.



the stellar Tier 1 performance of +7% last month. Tier 3 also did well, with an increase of 4.5%,

IMI, Yaskawa, Gefran, Horiba, Roper, Mettler-Toledo and IDEC rounded out the leader board for February.

Poised on the Brink? (continued)



Health Watch

And now for the rub. As Chart 4 indicates, overall, 65% of Index members showed increases in stock price since last month's reporting, a decrease in the percent of increases seen over the last two months: January - 84%, December - 75%. Conversely, the percentage of those companies who reported losses was up to 31%, compared to 15% in January

and 20% in December. The difference between the totals in each bar and 100 is the percent of compa-

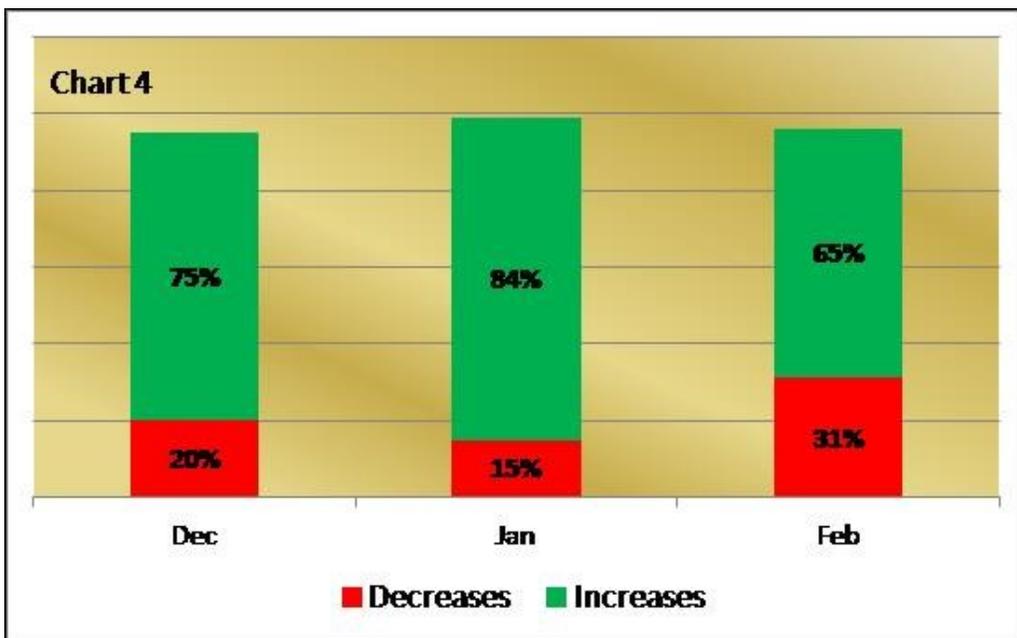
nies that showed no change. That is a rapid slowing of increases that may be tied to early warning signs from the Trump administration. It is not clear yet what the budget will be, and it is not clear what manufacturing companies are going to do in the near term and in the long term either, for that matter.

...the percentage of those companies who reported losses was up to 31%, compared to 15% in January and 20% in December.

The losers list is longer, this month, too. The biggest loser was HLS systems, aka Holly-

sys. They announced on February 14th that they had missed their revenue target, and their earnings per share by \$0.31 per share. Hollysys is a good bellwether for the health of the automation market in China. This is another sign of market slowing.

FMC continues to perform badly, even though their merger with Technip has gone through, and there is better news on the oil and gas upstream front. The



Poised on the Brink? (continued)



Health Watch



der has

better news isn't enough to turn around their stock, and they have suffered some significant sales declines.

Vishay Precision and Meggitt have been on the losers list for a couple of months now. Once again, we see this as a sign of market slowing in the automation space.

Belden is also showing signs of a slowdown, both in its industrial automation products and in its home networking and cable product lines.

Among the most interesting decliners were Flowserve and Rotork. To have two of the largest control valve manufacturers in the

losers column is not a good sign either.

Schlumberger is still a loser, at -6%, so it isn't an anomaly that FMC hasn't seen an uptick with the signs of renaissance in drilling either.

Last, we should take note of Schneider Electric in the losers column. Schnei-

made some effective acquisitions and may well be in the winners circle next month.

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waltboyes@spitzerandboyes.com



THE WAY I SEE IT

Editorial

No, Mr. Trump, it is skills we need, not jobs.

On February 23rd, the ad hoc committee of manufacturing leaders that President Trump convened in January reported back to him about how they were going to create new jobs in the United States.

No, they said, they don't need jobs, they have plenty of those going begging. What they need instead, are the skilled people to hire for those jobs. As you might expect from a blue-ribbon group of CEOs, they are exactly right. It percolates throughout manufacturing and is just as important for automation as it is for any other manufacturing sector.

Jobs now, skills now, AI later. That seems to be the view from the height in manufacturing. We know that advances in AI and advances in robotics are going to eliminate thousands more jobs in the next 10-20 years. But before they go, we need skilled people to do the work those robots will replace them at.

What we need is job training programs, skills training programs, that will create the trained workforce that can fill all the

jobs that are going unfilled in the United States. Some of those jobs are very high paying, too.

It will take several years to get those programs off and running, if we can find somebody to pay for them. We certainly aren't

No, they said, they don't need jobs, they have plenty of those going begging. What they need instead, are the skilled people to hire for those jobs.

going to get the US Government to pay for them, so company CEOs, listen up! Your budgets had better have a significant line item for training and education in them starting right now. Who knows, you might be able to get Congress to vote you a tax credit for teaching people how to do those computer based jobs.

It is clear that productivity in the United States is tied closely to increased automation, and the jobs that President Trump promised during the election are simply no longer in existence. In fact, last week, China announced that they were laying off 500,000

coal miners and steel workers because the markets for coal and steel are glutted. And getting back to those skilled jobs, we can see it will be quite difficult to do what we've always done to fill them— H1b visas for engineers from outside the US. With the current uncertainty about immigration in the United States, it will be increasingly difficult to get new skilled workers from India, China, and the Middle East— which is where they have been coming from.

Automation vendors may not see a continued increase in automation projects and instrumentation, though. If the EPA, OSHA, and the Clean Water

Act are repealed, the resulting reduction in automation purchases for environmental protection and controls may be as much as 25-30% of revenue for companies that are heavily invested in those types of projects and products. People simply aren't going to need analyzers for water, air, and solid waste. They won't need to measure flow if their discharge permit is so much waste paper. And that's just a few agencies.

There are policies that will work in the long run to improve American manufacturing. We know what they are. What we don't know is whether our government knows what they are, and is willing to install them and fund them.

Comments? Talk to me!
waltboyes@spitzerandboyes.com

Read my Original Soundoff!! Blog:
<http://waltboyes.livejournal.com>

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Rajabahadur V. Arcot: India's Growth Outlook is Positive

India's Growth Outlook is positive

Walt Boyes, adding his editor's comment to my article "India's development report in 2016, the seventieth year of its independence" that appeared in the December 2016 issue of the INSIDER wrote "The only two countries with forward looking economic policies in the coming years may be India and China, as we've said in our cover story this month."

India's US\$2.2 trillion economy, presently the seventh largest in the world in terms of nominal GDP (and the third largest in purchasing power parity terms), is likely to reach US\$5 trillion by 2025.

countries and the good news is that the country has jumped three places compared to the previous report.

With the aim of leveraging the manufacturing industry to achieve its economic growth objective and create jobs, India has launched an ambitious *Make in India* program.

Its target is to increase the contribution of manufacturing to country's GDP from the current 15 percent to 25 percent by 2025; this implies the Indian manufacturing sector to grow in excess of 12 percent year on year.

Growth projections

Numerous reports highlight positive near and long term outlook for the Indian economy.

Regarding the long term growth prospects, Morgan Stanley's research note says, aided by supportive demographics and government's policy action, India's US\$2.2 trillion economy, presently the seventh largest in the world in terms of nominal GDP (and the third largest in purchasing power parity terms), is likely to reach US\$5 trillion by 2025.

Reports such as the IMF, UN, and World Bank provide near term growth prospects and they are all positive in their outlook.

Even after taking into consideration the recent demonetization of high value currency notes' negative impact, International Monetary Fund (IMF) has projected India's GDP to grow by 7.2 percent and 7.7 percent in 2017 and 2018 respectively.

In comparison, IMF "World Economic Outlook October 2016," estimates the world GDP to grow by 3.1 percent in 2016 and recover to 3.4 percent in 2017.

The cover story opined that China and India may become the real manufacturing superpowers of the 21st Century.

While many countries are grappling with tepid growth prospects, these two major economies continue to post robust economic growths but with differing growth models. In the case of China, manufacturing industry has been the major contributor to its economic growth.

However, in the case of India, its economic growth has been largely driven by the service sector. While China's economy is investment and export driven, that of India is private consumption powered with limited dependence on merchandise exports. In addition, China's growth is slowing down, but that of India is still to reach its full potential.

In recent years India has overtaken China to emerge as the fastest growing economy, but it is still in the process of evolving as a major industrial hub.

According to the United Nations Industrial Development Organization (UNIDO) Yearbook released in April 2016, India ranks sixth among the top-ten largest manufacturing

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During the same period, the advanced economies are expected to increase their growth from 1.6 percent to 1.9 percent and the emerging economies from 4.1 percent to 4.5 percent. “India in particular is showing robust growth” says the report.

The UN report, “Economic and Social Survey of Asia and the Pacific 2016”, says that India’s GDP will grow at 7.6 percent in 2017 due to rise in investments and strengthening of manufacturing base.

According to the report, stabilized agricultural activities and new policy reforms will provide support to broad-based growth of consumption and private investments. The growth story is expected to remain intact next year as well.

According to the recent World Bank’s Global Economic Prospects report, while India’s economy is expected to grow by 7.0 percent in 2016 and accelerate and rise to 7.6 percent in 2017, the economic growth in advanced economies is expected to be 1.6 percent in 2016 and edge up to 1.8 percent in 2017.

The emerging and developing economies will see growth accelerate to 4.2 percent this year from 3.4 percent last year.

Taking note of this overall signs of stronger economic prospects, the World Bank Group President Jim Yong Kim believes that “Now is the time to take advantage of this momentum and increase investments in infrastructure and people.”

Growth supportive investment trends and policy initiatives

Certainly, investment trends and policy initiatives in India are growth supportive. Large scale investments are slated in the infrastructure and manufacturing sectors. These include generating 175 GW of electric power from of renewable sources of energy of which 100 GW will come from solar power, building 100 smart cities, rejuvenation and transformation of around 500 existing mid-sized cities that have a population of around 100,000, building roads, sea ports and airports, and digitizing India.

An important aspect is that these investments are aligned with the global technological trends and aimed at expanding the manufacturing industry in India. There is also synergy among them. The essential components of building smart cities, renewable energy thrust, and digitizing India are the extensive

reliance on information, communication & automation technologies (ICAT) among others to achieve connectedness, seamless less flow of information, and self-governing systems.

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At the policy level, India has finally adopted one common Goods and Services Tax (GST) in place of the existing multiple indirect taxes and other levies that the country currently collects.

India has a federal system and both the Central Government and State Governments impose and collect taxes at multiple points and under multiple jurisdictions, with consumers paying for it.

This is the country’s greatest tax reform that does away with tax boundaries and makes the entire country one common market for the first time in history.

There are numerous benefits that GST brings to the table and giving boost to manufacturing industry is one among.

Other benefits at the broadest level are as follows: the GDP growth rate is expected to go up by one percent and indirect tax compliance to improve; reduction of overall taxes that consumers pay; free the movement of goods within the country and bring down logistics costs; the economy will become more efficient and competitive; make domestic manufacturing industry more competitive; and increase investment by making it easier to take advantage of input tax credits for capital goods.

National Capital Goods initiative, a unique Confederation of Indian industry (CII) driven – government led plan, lays down the roadmap to strengthen India’s capital goods industry.

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While it aims at increasing the production of capital goods to expand treble from the present level by 2025, the scope covers the priority sectors envisaged under the *Make in India* initiative, such as machine tools, textile machinery, earthmoving and mining machinery, heavy electrical equipment, process plant equipment and others.

More importantly, the initiative envisages expanding direct and indirect employment opportunities.

While the policy aims to increase the share of domestic production in the country's demand for capital goods from 60 percent to 80 percent, on the export front it expects to increase exports from the current 27 percent to 40 percent of the total capital goods' production in the country.

The objective is to make India a net exporter of capital goods and a partner in the global value chain.

In addition, CII has also identified manufacturing sectors that have immense potential to grow, create jobs, enhance manufacturing GDP, and spur economic expansion. They include aerospace and defense, auto and auto components, cement, chemicals, engineering, electronic system design & manufacturing (ESDM), pharmaceuticals, steel, and textiles.

India, with growth oriented policies, favorable growth momentum, and attractive investment potential that are well supported by favorable demographics and large educated workforce, holds the promise of remaining a vibrant economic engine in the years to come.

The UN Population Division (UNPD) medium variant projections envision India in 2030 as a youthful country of about 1.5 billion people with a median age of 31–32 years.

The working-age manpower is set to grow more rapidly than the overall population in the decades immediately ahead. This augurs good chemistry for growth, and for companies looking to invest in markets with long-term growth markets, India is a destination worth exploring seriously.

Walt Boyes and the other INSIDER staff are available for speaking engagements, webinars, and workshops. Walt is a member of the Association of Professional Futurists, as well as an ISA Life Fellow and an INSTMC Fellow in the UK. For information, contact Walt at +1 630-639-7090 or waltboyes@spitzerandboyes.com.

Over the last fifty years, almost none of the productivity gains in manufacturing have come from better chemistry or better design, or even better management and financial controls. Rather, those gains have come from better automation and control of the processes: continuous, batch, hybrid, and discrete. The secret to making manufacturing sustainable is better control.

So, why aren't the theories that have led to enormous gains in productivity being used above the plant level? This book explains both why not and how better controls can be applied to the supply chain, and to enterprise financial management. This book provides engineering and technology managers the insight and tools for achieving a fully integrated automated manufacturing enterprise, from the technical and engineering side to the business management side. It is particularly helpful to readers seeking to bring the non-technical parts of a manufacturing operation - customer service, cost and financial management - in line with the already-automated production, inventory management, and plant management. The reader will learn: how to use the principles of real-time process control to manage and measure your manufacturing business more effectively; how to achieve much greater speed of information transfer for improved control over supply chain and distribution; and how totally integrated inventory control, automated manufacturing, automated customer service, and smart pricing control - and ultimately lead to higher profits.

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