Connecting STEM with Real-Life Manufacturing Jobs

written by Lauri Moon | July 12, 2016

How small and medium-sized companies on Long Island are trying to bridge the disconnect between what's learned in school and the diverse tech opportunities out there.

(IW – Laura Putre: 6-30-16) Joe Spinosa grew up around his parents' aircraft equipment business on Long Island, doing everything from sweeping the floor to putting things together. Give him thirty seconds, and he can recollect the names of all the hamlets and villages that the company moved to as it grew: Bellmore, Syosset, Farmingdale, then Hauppauge, then Ronkonkoma.

The company, East West Industries, that began 45 years ago with Mom and Dad's kitchen table conversation—"Why are we doing for other guys what we can do ourselves?"—is now a finely tuned 50-person operation. Lockheed Martin, Boeing, and Grumman are among the clients for its military aircraft ejection seats and oxygen support systems. Last year, East West was one of only 100 of 13,000 suppliers that received Boeing's Performance Excellence Gold Award.

The place is a wonderland of machinery and problem-solving. Four or five different kinds of engineers work on the small staff, and the range of equipment is vast, from tiny reducers with valves and poppets in them, machined to ten thousandths of an inch, to portable floor cranes that service aircraft and weigh thousands of pounds.

Spinosa, who inherited the business with his sister, Teresa, recently started conducting plant tours with sixth through twelfth graders from the local school district, hoping to give kids a little piece of his own manufacturing immersion experience. Recently, 25 students, from sixth to twelfth grade, hand-picked by their teachers, got to poke around in every corner of the place: the sheet metal shop, the military sewing shop, the oxygen test lab. They learned about (and in some cases, witnessed) the product cycle, from conversations with the customer to mock-ups on a 3-D printer to prototyping and then low-rate initial manufacturing.

"When it finally comes together from these little parts that come off the machine, that's where you see their interest pique up," says Spinosa. "'Wow, this is pretty cool.' That's the kind of

stuff that was going around. ‘Take a picture of me in the seat. Can we see the oxygen lab?’”

Spinosa is a supporter of a new initiative through the Long Island Workforce Development Institute (WDI) to connect schools and manufacturers. In New York, he says, schools have a mandate to teach technology, “but there’s a disconnect in terms of what the careers are and what to teach the children other than ‘Here’s how you take a CAD design and put it into a 3-D printer and print it out.’ What’s the use of that? what’s the utility of that? How does it knit into the whole picture?”

Another challenge is that without a huge manufacturing corporation to bring it all together, the 3,000 small to midsize manufacturing companies on the island tend to keep a low profile.

“We have a wonderful pipeline of manufacturers out here,” says Spinosa. “And I don’t think anyone really realizes it. They think that when Grumman and Republic moved off the island, things kind of died, but it’s not that way.

Last month, Long Island WDI made its first attempt to bring everyone together with a Manufacturing Innovation Institute that included manufacturing employers, teachers, guidance counselors, workforce development people and parents. Participants could try out a virtual reality welding simulator and listen to a panel of manufacturing leaders talk about tech careers.

The idea was to “chip away at the industry perception that we all struggle with, and educate the educators about what’s happening in the industry,” says Rosalie Drago, WDI’s Long Island regional director.

Drago’s group took a look at job postings from 200 manufacturers on Long Island over a 12-month period. All told, there were 2,300 tech jobs posted, and 81% of those jobs paid a salary of $80,000 or more.

Spinosa says one of the goals of the effort is to help teachers come up with more challenging curriculum. For instance, with 3-D printing, a typical classroom project is to make a very simple cellphone holder. But a creative kid who likes tinkering, might quickly be asking what’s next, and at school, there is no next. A stronger partnership between manufacturing companies and the schools can help answer that question.

Spinosa and others are starting to work with teachers on more advanced projects. For 3-D

printing, it might be designing and creating everyday things with between 5 and 7 parts—like a tape dispenser, for instance.

“It teaches them the assembly and how do you look at something and make it manufacturable. What’s the cost at the end? Now they’re thinking on multi-levels.”

BREXIT: Ten Things Manufacturing Companies Should Know

written by Lauri Moon | July 12, 2016
(Manufacturing Leadership Council – Paul Tate: 6-28-16) When the world woke up last Friday morning, news that the U.K. had voted to leave the European Union after more than 40 years sent shock waves through the world’s political elite, global currency and stock markets, and company boardrooms.

Over the last few days the U.K. currency has gone into free fall, at one point hitting a 30-year low against the dollar; stock markets have trembled, not only in London but across Europe, the U.S., and Asia; British Prime Minister David Cameron, who had campaigned to remain in the EU, has resigned; major banking institutions like HSBC have announced potential plans to move thousands of staff out of the U.K. to European locations; Standard & Poor’s and Fitch both downgraded their U.K. credit ratings; Moody’s has dropped its outlook on U.K. debt to negative; and warnings of protracted economic doom have hit the world’s headlines.

As a result, the future for the U.K. economy, and the rest of Europe, now looks highly uncertain. What’s more, any sense of real ‘certainty’ is unlikely to return soon.

Under the EU’s Article 50, the process for a member to withdraw will take two years from the moment it is triggered. This may not happen until a new U.K. Prime Minister is appointed in October. However, this process is most likely to cover the

general EU governance and regulatory issues only. Some observers believe that sorting out new trade agreements with the 27 remaining EU countries, if that is the chosen way forward, or any new rules governing the ultimate flow of workers across borders, may take much longer.

How, and when, the U.K. formally exits the EU, and under what conditions, is still a mystery. Will the U.K. shed all ties with the 27-nation single market and simply trade as yet another national economy? Or will it cut some kind of deal to remain part of the European single market in a different form, without some of the accompanying controls from Brussels?

One critical element missing from the vote-winning Leave campaign so far, of course, is any clear plan about what to do next. The 'Leavers' appear to be as surprised as the rest of the world that the British public voted for BREXIT at all.

In the midst of all this economic uncertainty and political turmoil, the question now is: What are the possible implications for manufacturing?

Will the BREXIT vote be remembered as an Independence Day for British manufacturers as they seek new, unfettered global markets –– or will it mark a Doomsday for U.K. industry, driving the economy and its manufacturing base to shrink into recession and industrial contraction?

And where does this leave the rest of Europe, and the numerous global manufacturing companies with existing plants and important customer bases in the U.K.?

In an effort to provide some clarity in the midst of the confusion, here are 10 things that manufacturers should know about when trying to assess the future of manufacturing in the U.K., and some of the potential implications of BREXIT on their businesses.

1/ The Current State of U.K. Manufacturing:

The U.K.is the world's fifth largest economy and its manufacturing base is currently the ninth largest in the world, according to a recent report from the U.S. Congressional Research Service.

Manufacturing contributes around $460 billion in gross added value to the U.K.'s GDP each year, says the Confederation of British Industry (CBI), and accounts for around 46% of the U.K.'s total $345 billion of worldwide exports.

Growth in the U.K. manufacturing sector, however, is flat right now, in no small part due to the uncertainty generated by the run up to the BREXIT vote last week. The UK's manufacturing PMI only just crossed the growth threshold of 50 points in May with a figure of 50.1, after dipping into contraction in April for the first time in over three years.

The Eurozone PMI, however, is faring better, with a flash PMI growth projection for June of 52.6, marking a six-month high.

2/ The Downside:

According to some forward economic projections, the impact of BREXIT could hurt the U.K. economy worse than either of last century's two world wars, or the 2008 global banking meltdown.

That may be overly dramatic, but there are already some worrying signs that the U.K. economy now faces a number of significant issues.

A new report from the U.K.'s Institute of Directors reveals that two thirds of the 1,000 members it surveyed over the last few days said the BREXIT vote would have a negative impact on their businesses, a quarter planned to freeze employment, and 5% said they would be cutting jobs. More than a third also intend to reduce their investments plans, and a fifth said they would consider moving some operations out of the country.

Many of the U.K.'s manufacturing industry associations are also deeply concerned and have appealed for clear thinking over the difficult months ahead. "Great care must be taken during the negotiation process to protect manufacturing's interests and we will be working hard in the UK and in Brussels for that outcome. We believe that we can leverage UK manufacturing's reputation for innovation and flexibility to secure the best possible deal for our members outside the EU," James Selka, chief executive of the Coventry-based Manufacturing Technology Association, told the

U.K.’s Engineer magazine.

3/ The Upside:

Not every economist is predicting doom and gloom, however. Oxford Economics has suggested a range of losses could be between as little as 0.1 per cent and 3.9 per cent, and that these may be short-lived as the U.K. will then be free to forge new trade deals with other, faster growing nations around the world.

“We should look ahead to opportunities to trade more freely with the rest of the world, as well as building on existing trading relationships with customers and suppliers in Europe,” commented Lord Anthony Bamford, chairman of the $4 billion British construction equipment maker, JCB. “We have little to fear from leaving the EU.”

In addition, some observers argue that because the falling pound will make British exports cheaper on world markets, and the U.K. a more cost-effective place to manufacture and set up business, any short-term downturn will be mitigated by longer-term gains.

Also, the UK has traditionally had a strong focus on high-value added manufacturing. Coming out of the EU might help UK manufacturers compete better on a global stage, as they will no longer be hindered by highly regulated EU industrial policies.

4/ European Trade:

Based on 2014 statistics, the UK manufacturing sector exported $155bn worth of goods to the EU that year, including over 600,000 vehicles. On the other hand, the EU exported nearly $260bn worth of goods into the UK over the same period.

The ‘Leave’ campaign’s argument was that these figures show the EU needs the U.K. market more than the U.K. needs the EU. As a result, some believe that EU businesses like BMW or French Energy companies will be eager to ensure there are as few trade barriers as possible that could restrict future access to U.K. markets.

Others, however, expect the EU to punish the U.K. by making it as hard as possible to cut new trade deals with the remaining 27 countries in an effort to dissuade other

European nations from taking their own exit options in the future. For example, there are already moves in France, The Netherlands, Hungary and Italy to push for similar EU referendums following the U.K. vote.

The problem is that if the U.K. fails to cut a beneficial EU trade deal, manufacturers may then face export tariffs to EU countries of up to 10% on cars, 4.6% on chemicals, 1.7-4.5% on machinery, and around 20% or more on food and beverages.

Potential tariffs, plus low sterling values, could also make imported technology purchases significantly higher in price, and hamper essential investments in future digital solutions across multiple industries, including manufacturing. One suggestion is that BREXIT may wipe out up to $4.6 billion of the value of tech spending in the U.K. this year alone.

5/ Foreign Investment in Manufacturing:

In 2013, FDI from Europe into UK manufacturing activities was estimated to be nearly $150 billion, including nearly $4.6 billion in R&D spending from non U.K.-based companies.

This level of inward foreign investment is now at risk. Foreign companies are expected to put on hold, or perhaps reduce, any plans for investing in U.K. manufacturing concerns until the future relationship with the rest of the EU is clarified. This is unlikely to happen for the next couple of years.

“This is very bad news for the EU, but even worst for Great Britain,” commented Industry 4.0 pioneer Dr. Detlef Zühlke, Executive Chairman of Germany’s SmartFactory Initiative and a member of the Manufacturing Leadership Council’s Board of Governors. “The direct impact will hit GB soon when foreign investors, banks, and companies have to rethink their investments.”

6/ Global Manufacturers in the U.K.:

For the time being, trade deals between the EU and the U.K., and the rules governing the free movement of European talent, will remain the same. Foreign companies with plants in the U.K. do not face an overnight crisis – yet.

But they are clearly worried about the future. Airbus, Ford, and BMW have all actively voiced their BREXIT concerns. BMW's head of its Rolls Royce group, for example, wrote to staff warning; "Tariff barriers would mean higher costs and higher prices and we cannot assume that the UK would be granted free trade with Europe from outside the EU … Our employment base could be affected."

Commented Chad Moutray, Chief Economist at the National Association of Manufacturers in the U.S. "It does create some challenges for businesses, particularly those that have a presence in the United Kingdom as a gateway into Europe. This is especially the case for the financial sector in the United Kingdom, but it is also the case for manufacturers. Those firms will likely watch the upcoming negotiations closely, ensuring that their ability to trade with the continent and others remains unabated."

So a lot will depend on how the U.K. goes about agreeing trade deals with the EU as part of its exit strategy, and when. If the trade barriers are high, foreign companies like Nissan or BMW may well decide the balance between access to UK customers, versus access to the entire EU customer base, is not enough to warrant maintaining production on British shores and so could move existing plants, or focus investments in new plants, onto the European mainland.

7/ Raw Materials:

In the short term at least, if the pound continues to lose ground against international currencies, price rises in imported raw materials for U.K. manufacturers seem inevitable.

In the medium term, if the U.K. decides to ditch, or is not allowed to maintain, the current free trade agreements with EU countries, prices of imported materials from the EU are also likely to be higher than they are today, due to potential import tariffs.

Manufacturers, both British and global, will need to be vigilant about tracking the impact of price fluctuations of raw materials on their costs of U.K. production, and continually assess the effectiveness of their current sourcing policies and partners, until the BREXIT negotiations deliver more clarity about the future.

8/ Manufacturing Skills:

One of the most fundamental aspects of EU membership is the free flow of talent across borders. This has become a major, and sometimes contentious, issue for many populations in Europe – both in terms of EU citizens moving from poorer economies like Poland and Romania into wealthy ones like the U.K. and France, and the influx of non-EU migrants into the region from other areas of the world.

Irrespective of your point of view, one of the key benefits has been access to a wider pool of talent for manufacturing companies, and the U.K. has benefitted as much as other nations.

While there are currently few suggestions that the existing EU-originating workforce in the U.K. should suddenly, or even eventually, be removed, the U.K. may well lose access to this wider talent pool if it decides not to adopt a reasonable border policy in the future. It may also reduce its attractiveness to talented foreign workers as new border controls are introduced.

With a limited number of skilled next-generation workers coming through the U.K.'s educational system, and a skills gap already having a dampening impact on growth, one of the key issues now facing the U.K. manufacturing sector will be where the next wave of workers it needs to thrive in an increasingly digitally-driven future will come from.

It remains to be seen if a new, non EU-bound, U.K. government can successfully address this critical skills issue before it makes a significant economic difference to Britain's industrial sector.

9/ Product Innovation:

One of the things that the U.K. has a world reputation for is innovation – whether it's for new pharmaceuticals, new production techniques and materials, fashion goods, or leading-edge motor sport design.

Currently the British government maintains a comparatively hands off policy of innovation investment, focusing on programs such as Innovate U.K., with its Catapult and Advanced Manufacturing Center schemes. These, however, are not as

coordinated or as powerfully funded as either the network of Manufacturing Innovation Institutes like the DMDII or America Makes in the U.S., or Germany's Fraunhofer Institutes that support German SMEs to continuously upgrade their products and processes by driving technology adoption.

In addition, the UK receives more funding from the European Research Council than any other country in Europe. Disengaging with the EU would mean this research support would be lost. Automotive, aerospace, pharmaceuticals, and chemicals are the verticals that could be most affected in an acrimonious divorce.

If the U.K. is going to maintain its innovative reputation, future British governments may need to review the country's manufacturing and technology innovation support strategy and adopt a far more direct, proactive, and better-funded approach.

10/ The Future of a Single Digital Market

From extended manufacturing supply chains, to common digital platforms for customer support and the delivery of new services, there's a significant global trend underway across many industries today to harmonize as many regulations, laws, systems, policies, and standards as possible to drive out complexity in global networks and keep them secure.

In the past, the EU has launched a number of harmonization initiatives designed to help companies make it easier to do business across the continent, both in physical and digital terms. Inevitably, the U.K.'s departure from the EU now raises questions about whether this move to end-to-end harmonization can progress as swiftly as before if some countries are going to start to make up their own rules, or refuse to abide by others.

As one U.K. supply chain academic warned, if this happens, U.K. manufacturing suppliers may find themselves losing some of their traditional partners. "In a competitive environment where small changes can have significant impact on performance and relationships, switching between supply chains and countries may become an increasingly popular choice," said Dr. Christos Tsinopoulos, Senior Lecturer in Operations & Project Management at Durham University Business School.

As global industries become increasingly digitized, the need to maintain access to a single digital market in Europe may turn out to be one of the most important and complex areas of forward-thinking negotiation between the EU and the U.K. in the BREXIT divorce.

So What's Next?

Unfortunately, the true implications of BREXIT for U.K., European and global manufacturing companies look set to be clouded by continuing uncertainty until the EU and the U.K.'s new government thrash out an acceptable plan of action for both sides – and that could take at least two years.

While the shock waves continue to ripple across the continent, there are now even suggestions that a second referendum may be required detailing the specific exit plans before being signed into U.K. law. Some observers also assert that many British voters are fast moving from the BREXIT camp, to the 'REGREXIT' camp, as they begin to realize just how significant the vote could be for the future of the U.K. economy and industry.

Who knows what the next few months will bring? The future for manufacturing in the U.K. seems as tough to predict as the surprise outcome of last week's vote itself.

Watch this space …

Additional contributions from Frost & Sullivan's Muthukumar Viswanathan in London, and Karthik Sundaram in Frankfurt.

(Paul Tate is Research Director and Executive Editor with Frost & Sullivan's Manufacturing Leadership Council. He also directs the Manufacturing Leadership Council's Board of Governors, the Council's annual Critical Issues Agenda, and the Manufacturing Leadership Research Panel.)

How to Revitalize U.S. Manufacturing

written by Lauri Moon | July 12, 2016
U.S. manufacturing employment has edged up in recent years. New policies could accelerate job gains and investment in manufacturing. Illustration: Harry Campbell for The Wall Street Journal

Click here for full article.

Small Things that will Increase Innovation in Your Company the Most

written by Lauri Moon | July 12, 2016
(Innovation Excellence — Yoram Solomon: 6-13-16) Last month I delivered my "un-kill innovation" executive workshop to an executive team of a Fortune 500 technology company in Florida. It was a great experience all around, but at the end I was asked for the key takeaways, and I narrowed them down to the following.

There are three key things that will increase innovation in your company the most.

They are small things. They have no investment or budget associated with them. They don't require you to roll out new processes or infrastructure. They don't need company-wide training. All they need is a change of attitude — ***yours***.

Accept that you are not driving (or even fostering) innovation. You are

***allowing* innovation.**

Your employees already know how important innovation is. They know it's good. You don't have to tell them that. All they need is the ***autonomy*** to do it. Innovation is like the sport of curling than golf. It is not the driving of the stone that gets it there–it's the swiping and altering the state of the ice in front of it that allows the stone to reach its destination. And you can only make small adjustments. You can't drive large ones.

Ask yourself: how do I react when one of my employees tells me that he (or she) tried something I didn't authorize and failed?

If you react severely, and let them know that there will be consequences for trying unauthorized things–they will never do it again. But here is the thing–you know who never fails? Only those who never try. Accept that there will be trial and error on the way to success.

Let your employees try, and help them get on their feet again after they fail. This will give them the autonomy and creative freedom to try again. When your toddler starts walking, soon thereafter they start running. Very quickly they fall. What is the first thing they do after they fall? No, the first thing is not crying. The first thing is ***looking at you*** to see your reaction. Your reaction will tell them whether they should cry, or get up and keep going. If you yell "oh, no!" or react in horror–they will cry. But if you yell "come on! keep going!" they will get up and keep going.

When an employee comes to you with an idea, avoid "I'll be the judge of that" or "I'll know it when I see it." Replace these reactions with "Let me tell you what will make me say yes."

One of the most powerful factors affecting creativity (and thus innovation) is sharing the "big picture." If you share the big picture with your employees and let them know what will make you approve a product idea (and the budget and other resources they are looking for)–you are forcing ***them*** to consider all aspects of their idea, and not just throw it over the fence to you for approval. You also ***reduce*** your workload (what a concept…), empower your employees, increase the probability that ideas are well vetted (your employees are in the front line of technology and

customers, and are better positioned to assess the viability of their idea. I'm sorry to say, but you are highly disqualified to vet an idea from your position…)

Do those three things and you are guaranteed to increase the level of innovation in your company by orders of magnitude. As one of the participants in my workshop last week said: it will be transformative to the organization. Try it!

(Dr. Yoram Solomon is an inventor, a creativity researcher, coach, consultant, and trainer to large companies and their employees … is active in regional innovation and technology commercialization … and is a speaker and author on predicting the technology future and identifying opportunities for market disruption.)

How U.S. Manufacturers Can Compete

written by Lauri Moon | July 12, 2016

(Forbes – Bill Fotsch and John Case: 6-15-16) Nearly every politician these days bewails the loss of American manufacturing jobs. Nearly every politician promises—somehow—to bring them back. We're skeptical of these promises. Many thousands of factory jobs have been lost, and will continue to be lost, to automation, just as millions of farm jobs were lost to new technologies a century ago. And some manufacturing industries, such as garment making, will always find it impossible to produce goods in high-wage environments like our own.

All that said, US manufacturing may still be poised for a comeback. Some companies have found that overseas suppliers can't deliver top-quality goods. Others have discovered that transportation costs and long shipping times undermine whatever cost advantage they get from producing abroad.

Some large manufacturers, like GE, have learned to compete with anyone in the world. But what about the smaller suppliers that every big plant relies on? They'll have to step up their game if they expect to compete in a global marketplace. To see how, it might help to pay a visit

to Trinity Products.

Trinity is a steel pipe manufacturer and custom fabricator, located not far from St. Louis. It employs about 160 people and does close to $100 million in annual revenue. The company makes big, infrastructure-size pipes and structures. You can see its handiwork in everything from bridges and power plants to giant signs and scoreboards. This is a tough business, dependent as it is on the level of infrastructure spending around the nation—something that Trinity's leaders have no control over.

But Trinity is thriving, because CEO Robert Griggs and his team know something about manufacturing that many executives and company owners seem to have forgotten: no one knows how to do a job better than the person who is doing it. They have turned Trinity into a kind of learning organization, with people on the shop floor making the company more and more competitive every day. (For a fuller description of how Trinity goes about this, see our article in this month's Manufacturing Leadership Journal.)

Trinity's journey started with open-book management. Griggs and CFO Jim Nazzoli helped employees learn about—and track—the company's revenue, costs, and profits. Today, the company circulates a scoreboard every morning showing billings and backlogs by product or process, along with key monthly statistics such as total orders and total mill tons.

Then they began working with a firm called the Cycle of Success Institute, known as COSi. (We have no connection to this organization.) COSi coaches helped Trinity create a system in which employees flag obstacles and bottlenecks and figure out how to solve them. "You identify a problem, put it on a list, monetize it, and prioritize it," explains Nazzoli, who has added the title of chief continuous improvement officer to his CFO job description. High-priority projects are assigned to a team, and every two weeks the team reports back to the COSi steering committee on its progress.

"We've accomplished 125 projects at the mill over five years," says Griggs. "We have all the data. We took coil splices from 25 minutes to 15. Changeovers from one size to the next size went from eight hours to five and then to three or three-and-a-half. We continuously organize and prioritize the projects. These lists never go away."

US manufacturers have long experimented with continuous improvement systems, of course.

But this one is a little different. Because the books are open, employees can see the effects of their efforts on costs and productivity. They can also see when they're on track for a profit-sharing bonus. That answers the question "Why should we worry about all this?" that some employees might ask. In the last five years, annual bonuses have ranged from $1,000 to $6,000 per employee.

Getting employees involved, helping them learn to think like businesspeople, sharing the wealth that they help create—this is what it will take to make American capitalism competitive again. And in the process, it just might save or generate a few more manufacturing jobs.

(We work with and write about companies that are improving business results and the lives of their employees through open-book management. *Bill*, founder and president of Open-Book Coaching, has more than 20 years' experience as a business coach and has helped nearly 400 companies bring the economics of the business alive for their people. *John*, editor of the online publication RetoolingCapitalism.com, is author of the classic books Open-Book Management and The Open-Book Experience. His articles appeared in Inc. and Harvard Business Review.)

Automation Investment High Among U.S. Manufacturers

written by Lauri Moon | July 12, 2016

MAPI survey shows actual, planned automation investment high among U.S. manufacturers

(Logistics Management – Patrick Burnson: 6-13-16) A new report from the MAPI Foundation indicates that despite the economic slowdown in the industrial sector over the past year, the incidence of actual and planned automation investment is very high in American manufacturing.

The report is based on a national survey of U.S. manufacturers and non-U.S. manufacturers with a presence in this country and is the second in a series of

studies on productivity that the MAPI Foundation is producing this year.

Written by Cliff Waldman, director of economic studies at the MAPI Foundation, and sponsored by Rockwell Automation, a global leader in industrial automation, the findings of the national survey show that the high incidence of automation investment spans various company sizes and manufacturing subsectors:

- 83% of respondents indicated they engaged in automation investment in the past five years.
- More than three-quarters (76%) plan to engage in such investment during the next three years.
- 45% indicated their automation investment was part of a broader technology upgrading and 35% said it was a stand-alone investment. The remainder of respondents indicated they engaged in both.

"Automation implementation exhibits characteristics of both capital investment and innovation investment," observes Waldman. "While deploying machinery into a production line has characteristics of capital equipment investment, it does not appear to be as short-term oriented as capital investment."

Waldman added, "Automation also does not appear to be an element of business expansion. Rather, *it is more like process innovation whose principal goals are cost reduction and product quality improvement."*

"The findings in the MAPI Foundation's second study confirm that automation is a critical driver of productivity and quality improvements for manufacturers as they seek to stay competitive in this challenging environment," said Joe Kann, vice president of global business development at Rockwell Automation.

"The study also points out that automation investments are more often seen as part of a broader business-wide technology upgrade as opposed to a stand-alone application. This is consistent with Rockwell Automation's vision of *The Connected Enterprise* in which operational technology is converged with information technology to drive higher levels of productivity and competitiveness," Kann noted.

(Patrick Burnson is executive editor for *Logistics Management* and *Supply Chain Management Review* magazines and web sites.)

DCED Releases Business Services Matrix

written by Lauri Moon | July 12, 2016

Pennsylvania offers a variety of financial and technical assistance programs to support business location, expansion and industry growth. The Department of Community & Economic Development (DCED) has compiled a list of the department's business assistance programs.

IMC is part of the state's Partnerships for Regional Economic Performance (PREP) program.

DCED Business Services Matrix 2016

The M4.0 Tidal Wave is Coming-Are You Ready?

written by Lauri Moon | July 12, 2016

(Manufacturing Leadership — Paul Tate: 6-7-16) "Industry is about to experience more change, across more aspects of the business of manufacturing, and in a shorter time than perhaps any period of transition in the history of manufacturing", predicted David Brousell, Co-Founder and Global Vice President of the Manufacturing Leadership Council in his opening address at the *2016 Manufacturing Leadership Summit* earlier today.

Hosted by international research and consultancy company Frost & Sullivan at the Omni La Costa Resort in Carlsbad, CA, the theme of this year's 12th Annual Summit focuses on ***Manufacturing 4.0****: The New Rules of Leadership,* and has brought together over 200 senior industry leaders from across multiple sectors of the global manufacturing sector.

Citing the results of the Manufacturing Leadership Council's recent research study on *Factories of the Future*, Brousell continued that over the next five years the research suggests that a "tidal wave of digital change is coming" for manufacturing. This will engulf production and assembly processes, the devices and equipment on plant and factory floors, how design relates to production, how companies interact with customers and suppliers, and, perhaps most importantly, how and where leadership teams will pilot their companies in the years ahead.

On a broader scale, the impact of this digital transformation across society will be profound, he added. For example, until about 1900 observers suggest that human knowledge doubled around every 100 years. But today, he noted, IBM estimates that the build out of the Internet of Things alone will cause human knowledge to double every 12 hours!

Yet the digital transformation that is inherently part of M4.0 for the manufacturing sector, is still in its early stages in most companies, he explained. What's more, any manufacturing company that believes M4.0 is simply about investing in new digital technologies alone is missing the point.

Digital tools are critically important, of course, but M4.0 is also about "cultural change and organizing differently – understanding and successfully implementing such things as flatter organizational structures and a collaborative innovation model – as well as re-tooling leadership teams with non-traditional skills sets," he added.

The problem is that many manufacturers appear to be struggling today to fully absorb and get into position to drive and lead this new industrial revolution.

Citing another recent Council research project on *Next-Generation Manufacturing Leadership,* Brousell reports that, "While manufacturers expect to receive significant benefits from digitization, they also say their leaders have not yet fully adjusted their

mind-sets, behaviors, and skills in ways that will be necessary to take advantage of the possibilities of digitization."

Perhaps that's where the biggest challenge along the journey to M4.0 may lie for many manufacturing organizations in the years ahead. Time, however, is not on the side of those who delay.

"You will not have 25 years to get on board with M4.0," advised Brousell. "You are going to have to act fast – and with as much precision as possible."

(Paul Tate is Research Director and Executive Editor with Frost & Sullivan's Manufacturing Leadership Council. He also directs the Manufacturing Leadership Council's Board of Governors, the Council's annual Critical Issues Agenda, and the Manufacturing Leadership Research Panel.)

The Rise of Manufacturing Marks the Fall of Globalization

written by Lauri Moon | July 12, 2016

(Geopolitical Weekly – Rebecca Keller: 6-7-16) Whether you're reading this article on a smartphone, tablet or laptop, chances are the device in front of you contains components from at least six countries spanning three or more continents. Its sleek exterior belies the complicated and intricate set of internal parts that only a global supply chain can provide. Over the past century, finished products made in a single country have become increasingly hard to find as globalization — weighted a term as it is — has stretched supply chains to the ends of the Earth. Now, anything from planes, trains and automobiles to computers, cellphones and appliances can trace its hundreds of pieces to nearly as many companies around the world. And its assembly might take place in a different country still. Opportunities for producing and assembling products and their components have spread worldwide, making it is easier for countries to climb the production value ladder. States at the bottom, extracting raw materials,

can gradually move up, first making low-value components and then progressing to higher-value ones or basic assembly.

But just as technology spurred globalization and the shifts in international trade that followed, so, too, will it revolutionize how countries again do business with one another. Compounded by the economic and demographic changes taking place today, automation, advanced robotics and software-driven technologies are ushering in a new era — one of shorter supply chains that will provide fewer opportunities for the developing world. Regions once labeled "emerging economies" may instead stagnate, and the divide between the haves and have-nots within and among nations could widen further.

2016-17 WEDnetPA Funding Applications Now Available

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Did you know that the cost for attendance at one of IMC's Open Registration Workshops or Onsite Training at your facility could be covered by WEDnetPA funding? Contact Lauri Moon to discuss your training needs.

Applications for the Workforce and Economic Development Network PA (WEDnetPA) training reimbursement program for Fiscal Year 2016-17 are now available. Funding is provided through the PA Department of Community and Economic Development (DCED) and administered by 27 WEDnetPA Partners throughout the Commonwealth. The goal of WEDnetPA is to strengthen the business environment of Pennsylvania by providing qualified employers (primarily manufacturing or technology-based businesses) training reimbursement funding for new and existing employees that can improve their skill level and productivity. Companies determine their own training needs and can select among a wide range of training providers (the WEDnetPA partners, third-party providers or in-house staff) as well as how and where the businesses will receive the training (onsite, offsite or online). For more information on

WEDnetPA visit www.wednetpa.com or click here.