Part 3- Made in America - Advanced skills wanted

There's no doubt that the Fourth Industrial Revolution will bring abundant change to many industries, however, none so much as manufacturing. With the blending of cyber-physical systems, the Internet of Things, big data and cloud computing, robotics, artificial-intelligence based systems and 3D printing, manufacturing will never be the same again as each of these advances penetrate every sector.

Along with the convergence comes the need for new types of jobs—including some that don't yet exist. The website O*NET, an interactive application for exploring and searching occupations, lists all of these opportunities – which include manufacturing engineering technologists, manufacturing engineers and manufacturing production technicians – as "bright outlooks" and "new and emerging jobs."

Additionally, skills to operate –

- Computer-aided design CAD software
- Computer-aided manufacturing CAM software
- Enterprise resource planning ERP software
- Industrial control software
- Materials requirements planning logistics and supply chain software
- Development environment software

The next workforce will need to make sensors for driverless cars; create designs to 3D print; and keep thousands of robots running properly.

> "If it's possible for a machine to completely replace a human, then yes, I'm superfluous," said David Autor, a professor of economics at MIT. "But if I'm the person who can now manage that machine, then I become more valuable."

The coming draught?

Like the disparity over whether manufacturing is returning to the U.S. or not, numerous opinions about a present or future skills gap also abound. With online newspapers and bloggers pulling from the same sources—The World Economic Forum, Deloitte, U.S. Bureau of Labor Statistics, McKinsey and Company to name a few—you'll hear many different predictions.

In general, most reports conclude there is or may soon be a skills gap. Many factors will impact the ongoing gulf—from the retiring of existing manufacturing workers—to how immediately manufacturers move to retrain or provide advanced training to the existing workforce.

Nick Peter of *The Manufacturer* recently interviewed Kylene Zenk Bastford of Kronos Workforce Management -

> "For 30-plus years, the baby boomer generation have been extremely proficient at running all the machines necessary to create high quality products," said Kylene Zenk Batsford of Kronos, "but they are going to leave the workforce, and all of that knowledge is going to go with them, which is going to be really devastating for the manufacturing industry."

The Department of Labor recently reported that openings for manufacturing jobs this year have averaged 353,000 a month, up from 311,000 in 2015 and 122,000 in 2009. The Department of Labor also

stated that between June 2015 and June 2016, there was an average of two unemployed manufacturing workers for each open position.

Perhaps, however the talent is actually out there; candidates just need to be encouraged to consider a manufacturing career. U.S. census data reports that millennials account for 40 percent of our nation's unemployed, translating into 4.6 million young people out of work.

Many of the jobless millennials may have the transitory skill sets to easily fit jobs of the future while the Gen Y and Gen X groups move into new curriculums that train and prepare them for a much more technologically-advanced and connected world.

A 2015 Deloitte and the Manufacturing Institute 2015 survey gathered this data -

> "Eight in 10 manufacturing executives said the expanding skills gap will affect their ability to keep up with customer demand. It takes an average of 94 days to recruit for highly skilled roles such as scientist or engineer, and 70 days for skilled production workers, they found."

How can manufacturing capture the attention of Gen Y and Gen X and those out-of-work millennials?

Nick Peter of *The Manufacturer* in his article "Labour: the missing piece in the Industry 4.0 jigsaw" concluded that young people shun manufacturing and the lucrative opportunities that exist in modern manufacturing because they and their parents still perceive manufacturing as a grim, low-paying industry.

Suggestions to manufacturers for getting ahead of the issue before it comes full force -

- Make manufacturing and the energy generated by the "Fourth Industrial Revolution" more attractive to the upcoming workforce. Increase visibility about the possibilities.
- Dispel the general perception that manufacturing hires only males and encompasses only blue collar and low-skilled workers.
- Find opportunities to educate young people about the opportunities that will open up by choosing STEM (Science, Technology, Engineering, and Mathematics) degrees.
- Tap technical schools and organizations promoting and developing an untapped, diverse workforce, i.e. women and veterans.
- Train within and develop existing talent.

This quote from President Kennedy seems as appropriate today as it did in 1962 -

> "We can and must improve American education and technical training…One of the great bottlenecks for this country's economic growth in this decade will be…a great demand and an undersupply of highly trained manpower."
>
> —President John F. Kennedy in an address and at the Economic Club of New York on December 14, 1962

The manufacturing industry has continually and successfully adjusted to change in recent years. The upcoming workforce will also need to be "learning agile" as automation rapidly proceeds to disrupt the usual way of doing almost everything.

These three predictions appear in several articles and come from various sources -

- 65% of the students in school today will work in jobs that do not currently exist (U.S. Department of Labor)
- 47% of today's jobs will be automated in the next two decades (Oxford University)
- In 2020, more than 50% of the content in a graduate degree will be useless in 5 years (John Lodder, Balance Consultancy)

The National Association of Manufacturers reports -

> "Over the next decade, nearly 3½ million manufacturing jobs will likely be needed, and 2 million are expected to go unfilled due to the skills gap."

A future job discussion cannot be had without mentioning automation and whether eventually the integration eliminates possibly millions of today's jobs. Will enough new positions be created to balance those that disappear? The assumption has always been that production and assembly work diminished because manufacturers relocated, however automation has fast become the future workforce wildcard.

Manufacturers will have to invest in transforming their workforce if they want to keep up and avoid a worst case scenario of "talent shortages, mass unemployment and growing inequality," said Klaus Schwab, the founder and chairman of the World Economic Forum.

Ensuring education keeps pace with societal and technological change is a necessity -

> "We need to sit down with current curriculums, line them up against new categories of jobs and ask ourselves, 'Are we preparing people in the right way for the future?' said Alison Sander, Director of the Centre for Sensing and Mining the Future at the Boston Consulting Group. "Many of the skills being taught today are no longer relevant for current jobs, which has already led to significant mismatches in demand and supply."

General world awareness of an upcoming skills gap may be the best thing going for manufacturers, and many have already stepped up their training to address the addition of automation into the workforce. Nobody, however, seems to really know how much impact the integration will have on workers. This is not a wait-and-see moment, but a time to change course— not just to adapt but get ahead.

Made in America - conclusion

As the interest by consumers in Made in America goods continues, start-ups and small businesses have been increasingly catered to that market. Additionally, with the apparent rise in reshoring due to a better understanding of the true cost of producing goods overseas, more companies have decided to bring some or all of their manufacturing back to America.

With the return of manufacturing to the U.S., the growing value of labeling a product "Made in America" and the transforming job market, the manufacturing industry is set to metamorphosize. What comes out of the cocoon is yet to be determined.