

Advanced Manufacturing: GE's Response To Full Employment

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When Tom Donilon, the National Security Advisor for President Obama was asked what the two most pressing issues that kept him up at night, he replied, terrorist attacks and the US declining national competitiveness. The backdrop of 600,000 unfilled manufacturing jobs at a time when unemployment is near 8 percent has most certainly been his nightmare in the making. He must be asking himself, how could our educational system fall so out of line with industry demands, especially when student debts have exceeded \$1 trillion? With such a large investment made to prepare our youth, what kind of a workforce do we have as a Nation? If vacant manufacturing jobs were filled today with US workers, experts tell us that the contribution of our manufacturing economy would jump from its current level of \$1.8 billion to \$2.2 trillion! What has gone terribly wrong?

Political leaders supporting manufacturing initiatives in Washington are calling for another '[Sputnik moment](#)' [1] to inspire American students to pursue manufacturing careers. Without a ready inventory of workers to support a competitive manufacturing base, America's future will always be vulnerable to outside economic threats. History reminds us of our true potential, when in 1945, 50 percent of the products produced in the world were "Made in USA." Today that number has trended down to 22 percent.

At a recent press gathering in Washington DC's [Newseum](#) [2] sponsored by [GE](#) [3] (General Electric Company) and [The Atlantic Magazine](#) [4], GE's CEO, [Jeff Immelt](#) [5], along with an impressive slate of industry experts and thought leaders addressed the next chapter in US manufacturing and its expected role in creating jobs. [David Arkless](#) [6], [Manpower Group's](#) [7] President of Global Corporate and Government Affairs, led the discussion with a non-sugar coated account of how the Chinese have managed to grow their manufacturing base, while the White House has been floundering along forming more committees than solutions. Arkless explained how the Mayor of Tianjin, [Huang Xingguo](#) [8], (the 4th largest urban population in China) learned from speaking with over 2,000 foreign firms in his district that their number one concern was a ready supply of skilled workers at the right cost. Working with his local universities, the mayor and his team of advisors forecast the skill sets companies in Tianjin would need in the future and created specific course tracks that met these requirements. Local students who chose a STEM career were offered a tuition-free package and employment after graduation. [Tianjin's](#) [9] efforts appear to be paying off well, since this year the city is expected to grow at 17.5 percent, well above China's average of 6.5 percent. Arkless asked out loud why the US Government could not do the same as the Mayor of Tianjin.

Could/should the US follow a similar manufacturing strategy as the

Chinese?

The other panel members argued strongly against Arkless' recommendations, citing that the US has a different political system and could never 'get away' with what is socially acceptable in China. What the US Government could do, instead, is establish a set of certification guidelines that colleges can follow and employers can use to hire with confidence. Colleges that produce well-trained employees using these standardized tests could expect their employers to reciprocate with needed financial support, which in turn would alleviate the need for future government subsidies. Based on each college's performance, free markets would determine the academic institutions that can deliver and those that should be dissolved or merged.

Despite the many efforts to entice students to follow a manufacturing career track today; however, the US strategy is clearly not working. For starters, most students are not aware that goods are produced on factory floors in the US. For years they have heard negative news coverage about the loss of US factory jobs to other countries with lower wages, so much so, that college to them is their ticket to avoid a dead-end job on an assembly line. Like a page taken from a Charles Dickens novel, they perceive factory jobs as requiring long tedious hours in a dark and dingy work space spewed with numerous health hazards.

At the event, GE's CEO, Jeff Immelt, exclaimed the pressing need to change this archaic perception of factory work among young students. Parents, teachers, and guidance councilors alike had to be on-board too. Results from a recent survey showed that only 3 out of 10 parents supported a manufacturing career for their children. Without greater parental support, the hurdle to attract students to a STEM career path (Science, Technology, Engineering, Mathematics) would become insurmountable, especially among the emerging, young Latino population who tend to be family centric. [Alcoa's](#) [10] VP of Human Resources, [Natalie Shilling](#) [11], noted that children's long-term interests in STEM subjects tend to drop off significantly during the 6th grade level. In response Alcoa has partnered with local schools to sponsor science fairs and family factory visits but expressed concern that their 'grassroots' efforts may be insufficient. Like GE, they also see the urgent need for a formalized regulatory framework backed by sound government policies.

Advanced Manufacturing

Factories today are referred to as operations of 'advanced manufacturing'. Unlike yesterday's plants, they include robots, 'lean' manufacturing practices that improve overall process efficiencies, and local distribution channels. They are smaller, cleaner, and automated. For example, the labor required for the production of a GE refrigerator is only 1.8 hours, less time that it might take to install the unit at a customer's home and read the manual. Breakthrough technologies such as 3-D printing are pushing the limits on smaller runs of customized products with near-zero waste. GE is investing heavily in [3-D printing technology](#) [12] citing its shorter design cycle benefits. Shaving one or two years off the traditional design-to-production process could translate into significant savings and competitive advantages.

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Immelt's predicament poses an interesting future for manufacturing. As wages have been squeezed out of the cost of production, the focus on future investments has shifted away from countries with cheap labor to regions that offer a steady flow of skilled workers, access to specialized materials, and a basic infrastructure to move goods to consumers. Where specific components are lacking, GE is prepared to make investments to ensure the integrity of their business model over an expected plant life-span of 40 to 50 years. Immelt believes that this 'in-country' strategy will prepare GE to serve an expected one billion middle class entrants over the next five years.

What does Immelt consider to be a skilled workforce worthy of GE's consideration? According to Immelt, future workforces must be capable of performing 'additive manufacturing', which means they will need the knowledge-base to combine some computer training with artisan skills. They must also work competitively in teams. How important are team skill sets to Immelt? Recently the shortage of skilled workers prompted GE to call back veteran GE employees, who according to Immelt, will need some technical training but will easily fit in, since they already have proven GE team work experience.

...and yet, one key question remains. Can GE's 'advanced manufacturing' strategy achieve full employment without an increase in US exports? Time will tell.

As currency wars mount, what will stop US trading partners from setting up their own 'advanced manufacturing' operations that service their own local markets? Factories will be cheaper to build and faster to set up locally, therefore, offering a distinctive advantage over imported finished goods. Furthermore, STEM online training courses such as edx.org [13] and ocw.mit.edu [14] will help prepare a viable pipeline of qualified local STEM students/workers virtually anywhere in the world.

Immelt's predecessor, [Jack Welch](#) [15], once envisioned the future of manufacturing with factories mounted on moving barges that would dock at different ports-of-call depending upon the market demand for a manufactured good. In part his vision had some validity. The barges he referred to, are today, smaller and more agile high-tech factories that can be easily built adjacent to their intended buyers.

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Mr. Kadala is an internationally recognized writer, speaker, and facilitator on topics that concern CEO's and political leaders. He is well-versed in economics, engineering, technology, finance, and marketing. His views are regularly published by prominent industry publications and also distributed to an exclusive list of contacts, some of whom he has met personally during his 20+ year tenure as the founder & CEO of Alternative Technology Corporation (ATC, Inc.).

For more details on his BMI process or his blog, please visit www.ResearchPAYS.net [17] and www.TomKadala.com [18].

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