THE SMART MANUFACTURING REVOLUTION GETS DOWN TO BUSINESS

CHALLENGE

"Established high tech manufacturers are just starting to explore the application of advanced digital technologies to increase competitive advantage (Smart Manufacturing). The explosion of data from sensors, automated systems, Internet transactions and process workflows are forcing manufacturers to rethink their mature organizational structures and operating mechanisms to derive new sources of value.

Teams are challenged to identify the organizational impact of technologies with most potential to drive disruptive value creation. They should look for opportunities to stimulate new thinking inside established companies and outline strategies for companies to adapt.

Solutions should be focused on how companies must adapt human resource systems including recruiting, employee training, organizational structure, manufacturing/development tools or operating metrics to name a few. External factors can be part of the solution, such as collaborative development of university programs or partnerships with symbiotic organizations. Recommendations must be action oriented and targeted at the biggest gaps that Smart Manufacturing technologies are likely to expose."

BACKGROUND

In the past decade, the ubiquity of information and the sophistication of analytics and automated systems has given rise to new commercial opportunities. For instance, advanced sensor technology now allows the development of digital twins; computer-based representations of physical parts that can be used to drive higher product performance. Part tracking systems can be combined with sophisticated scheduling algorithms to guide prioritization of production events and assure on time delivery.

The revolutionary emergence of Smart Manufacturing technologies ("Cloud", "Big Data", "Internet of Things", etc.) is spreading rapidly and companies are rushing to update their data management operations to leverage data for competitive gain. Companies are looking at developing analytics to pore through large data sets and identify opportunities to reduce costs, improve quality, utilize assets more fully, and enhance customer service. The opportunities for improvement are outpacing the ability of companies to respond.

As companies begin to develop strategies for exploiting pervasive data and analytics, they are starting to see gaps in their operational structures. Many leaders who are mid- to late-career grew up during a time when information was not as prevalent. Legacy equipment and information systems weren't always designed with the flexibility needed to communicate the right data at the right time to achieve higher productivity or product performance.

This tapestry of opportunity is coming together in what pundits are calling Smart Manufacturing in the US (Industry 4.0 in Europe, China 2025, India Competes, etc.). These Government sponsored efforts represent a recognition that we are looking at a fundamental shift in how businesses will manage and utilize their data, causing shifts in every nation's industrial core. Companies that win in this new environment will adapt their human resource systems quickly. Learning how to adapt is the subject of this challenge.

CONSIDERATIONS

When developing solutions, consider the following:

- The workforce is changing. Millennials are being hired by managers that, in many cases, understand less about information technologies than they do. And job mobility is increasing, meaning that solutions must be implemented faster and more effectively as ownership for initiatives may have to change hands frequently.

- University programs are beginning to offer new programs to support SMART Manufacturing, but more needs to be done to ensure that graduates bring more than computer skills to their new employers. They need to understand the connection between digital technologies and business results.
- Many equipment suppliers are far behind the needs of their industrial customers who seek to have dense monitoring of equipment condition, process parameters, and the ability to communicate that information to systems capable of the aggregation and analysis needed to turn data into actionable knowledge.
- Financial planning horizons are typically longer than many of the data analytics projects. In fact, the waterfall concept of engineering (and financial support) may not even make sense for some of the new technologies being implemented in factories.
- Access to information allows business people to ask better questions and get better answers about their operations, ultimately this enables process understanding and optimization.
- Think about how the Internet Revolution has changed consumer expectations around how we will carry out our daily data exchanges (banking, purchasing, collecting information, etc…). Think about how your own execution on this challenge is different from what it would have looked like in the past. What skills and technologies need to be leveraged to meet your own expectations around 'easy access' to information… and what do organizations that can deliver those systems need to look like.

DELIVERABLE

Solutions to this challenge must be actionable by leadership. The solution should be presented in the form of recommendations with data or logic to back each recommendation. Teams are encouraged to consider the leadership audience and how they must incorporate recommendations into their existing operations.

Where possible, teams should use examples to convey the potential of their solutions and employ graphs, schematics, flowcharts or images to more effectively convey their ideas. The best examples will be ones that involve experiences of team members or anecdotes from industry.

Teams are encouraged to apply creativity to this problem. There are innumerable ways in which data and analytics can impact human behaviors. The problem statement is not intended to confine thinking to any one area. Rather, it seeks to broaden thinking on how organizations should leverage its employee assets – from the perspective of students who will soon be entering the workforce and driving many of these new initiatives.