



ERP and Your Journey to Industry 4.0

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ERP AND YOUR JOURNEY TO INDUSTRY 4.0

INDUSTRY 4.0: BIG HYPE, BIGGER QUESTIONS

Those working in the manufacturing industry may be weary of the considerable hype over the technologies associated with Industry 4.0. After all, despite dramatic predictions about Industry 4.0, it does not alter manufacturers' primary aspirations. With or without Industry 4.0 technologies, manufacturers remain motivated to increase productivity, run more efficient supply chains, deliver higher quality products, delight customers, increase sustainability and improve profitability.

Why then does the hype about Industry 4.0 persist? One reason is because Industry 4.0 is still at an early stage. Why is Industry 4.0 taking so long? Because Industry 4.0 intersects multiple advanced technologies – not just one or even two. Each Industry 4.0 technology, alone, is significant and disruptive. Taken together, however, the technologies will eventually alter the core of manufacturing execution at the individual operation level. Manufacturing business models will transform across the entire spectrum of the supply chain as a result. Considering the following projections:

- Estimated investments will be about 1 trillion dollars per year through 2020
- The economic impact of Industry 4.0 will be about 4 trillion dollars by 2020, 14 trillion by 2030!

While many of these estimates are no more than wild guesses, most companies believe in the Industry 4.0 effect at least to some degree:

80 percent expect Industry 4.0 to impact their business model. Despite all the interest, there are two common problems facing manufacturers that want to start on their journey to Industry 4.0:

1. Industry 4.0 is so broad that many manufacturers find it challenging to develop a comprehensive strategy, or simply determine how to get started. Some believe that the first step involves embracing the Internet of Things (IoT) by connecting digitally-empowered devices and then analyzing the augmented data set. While connecting smart devices, collecting all that new data and having analytics tools to sift through the data are foundational, just adopting those technologies does not provide value. The benefits of Industry 4.0, while depending on technological innovation, will be realized by manufacturers by business innovation.
2. Given all the hype, it is difficult to find an accurate set of information about each technology to understand the maturity (e.g., machine learning is significantly more than blockchain), the reality of costs, risks and expertise required for implementation, and, perhaps most importantly, the business use cases that will result in benefits.

The basic hurdles explain a fair amount of the drag on Industry 4.0 adoption. Despite belief in the inevitability of Industry 4.0, only 15 percent have systematically implemented Industry 4.0, and only 16 percent have a comprehensive strategy.

The hype focuses on shiny new technologies but overlooks the imperative that manufacturing solutions such as ERP and related business

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process and practices must transform as well – in parallel with Industry 4.0. Rigidity in the core systems will inhibit the speed and success of Industry 4.0 adoption. Industry 4.0 means disruption. Supporting systems must be responsive to that disruption.

Manufacturers cannot buy Industry 4.0 and plug it in. Manufacturers should think about Industry 4.0 in terms of how existing processes and tools accelerate, rather than inhibit, realizing the benefits of Industry 4.0? Industry 4.0 success will come from smart adoption, a more integration friendly set of core systems, and a commitment to change and fresh thinking. What follows are several examples that underscore the need for fresh thinking and ensuring that core systems can help adoption.

SPEND FOUND GOLD WISELY

The most frequently cited scenario of potential Industry 4.0 impact is associated with asset performance management. In this scenario, a critical piece of manufacturing equipment is fitted with affordable sensor technology which allows for the collection of unprecedented volumes and variety of data. Advanced analytics, like machine learning, provide remarkable new insights into the operation of the asset. These revolutionary pursuits are grouped under the title of Predictive Maintenance. (PdM). The pot of gold at the end of this PdM rainbow is nearly always a drastic reduction in unplanned asset downtime.

This seems straightforward, but PdM has been available for years. A wider perspective offers more benefits. Consider that there are two distinct asset categories for a manufacturer. The first is the asset or physical equipment that the manufacturer uses within the four walls of the plant to make the end product. These assets are essential in the delivery of quality goods at the

lowest possible cost. The second category is the end product itself. More and more products are being made with native intelligence that allows for both connectivity and evaluation after they are deployed and in use. The performance of the product after deployment is of interest to both the user and the manufacturer of the product.

This is not an argument against the worthwhile pursuit of improved asset performance. It is important to acknowledge, however, that asset availability is not the ultimate goal. Extra hours of availability of a critical asset are only as useful as what can be done with those extra hours.

In high-volume, low-mix manufacturing environments the asset is dedicated to the production of a single SKU. There is a direct and obvious correlation to the value of extra hours of capacity. Extra capacity immediately translates to extra production and can be the basis for avoiding overtime shifts and or the burden of capital investment in additional assets. This is a big win for the manufacturers of laundry detergent or high-volume food products.

Most manufacturers, however, lack the luxury of dedicated equipment and a hyper focus on tuning a repeated process. Product variation and demands for customization result in equipment designed for flexibility and adaptability. Resultant increase in capacity is only a true benefit if the right order is processed and the appropriate customer delighted. The extra capacity will not solve legacy issues of matching demand to production or provide collaboration between conflicting organizational goals. In worst case scenarios the extra capacity could actually produce even more unwanted inventory of the “wrong” product.

For many manufacturers, deep knowledge of asset performance must be matched with modern demand and supply chain planning tools. There

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will not be a windfall of benefits from asset performance if the impact is throttled by legacy spreadsheet planning.

ERP IS AT THE DEEP END OF THE DATA LAKE

To achieve higher levels of ROI in the PdM case, IoT-based asset-centric data should be balanced with critical ERP data. The ERP data sets are centric to the transactions needed for material planning and business processes.

There is information that may be uniquely housed in the ERP data that can be a core part of the Industry 4.0 effort. Flexible manufacturing equipment can be used to produce many different SKU's. There is a difference in the wear and tear on the equipment while producing the respective SKU's. There can also be a difference between individual operators and how they run the equipment. This data on variation between production orders and assigned operators often resides in ERP.

The form and format of this production data obviously looks completely different than the time-streamed scalar values that represent the feeds and speeds that come directly from the asset and IoT. The difference in data format does not diminish the importance of considering all aspects of production to deliver full understanding.

This disparate but relevant data must be considered as manufacturers turn to, for example, machine learning technology to drive true PdM. The sensor data for any given period can only truly be evaluated in the context of the applicable production order(s), and other factors. Manufacturers should prepare all enterprise data sets to be part of the greater data lake (data lake is a nickname for a large data repository housing data from many diverse sources). Advanced analytics like machine learning can then deliver the deeper understanding of asset performance.

ENHANCED PRODUCT LIFECYCLE INSIGHTS

Industry 4.0's potential business impact on product development and design is often lost in the hype. IoT and asset insights should do far more than improve predictive maintenance. This same data will offer into the actual asset usage. What better predictive maintenance strategy could there be then incremental design improvements that eliminate root causes of potential failure? OEMs of equipment and manufacturers of intelligent products can drive very real improvements based on increased asset knowledge. Machines will provide better performance because they evolve into better machines.

The increase in knowledge associated with asset performance will shorten product design cycles. Engineering design changes will occur at a more rapid rate. The launch and management of product revisions may even vary between incremental manufacturing production orders for the same SKU. Business systems supporting production planning and quality management will need to support the tracking of manufacturing versions and revisions of as-delivered products

Challenges around genealogy have increased over the last decade but will be magnified by Industry 4.0. More robust component lot traceability, serialized identification of end-products and the management of as-built data collection will all become more critical. Efforts to move to digital transactions and automated document handling will increase as a priority to match this need. ERP, quality management and material management must evolve to align with faster product revision cycles and their impact on manufacturing operations.

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ITERATIVE INTEGRATION REQUIRES FLEXIBLE INTERFACES

Most manufacturers are in the early stages of laying the foundation. No single technology provider can sell a manufacturer Industry 4.0. The technology involved ranges from sensors, through secure networks, data management software, deep data analytics and much more. Individual manufacturers will embrace technology or technologies iteratively and discover new combinations. The ability and motivation of each manufacturing enterprise to embrace the various capabilities will be balanced with sustaining current daily operational execution.

The selection of vendors and the alignment of technologies and application layers will accentuate the requirement for the next generation of integration tools. Single-threaded API, flat standards or the generalized ability to customize with code are no longer sufficient. Flexible integration based on non-coding approaches is key to developing full solution sets and adapting to the inevitable barrage of anticipated and unanticipated changes.

ERP, planning systems and operational functionality must be based on platforms that embrace change rather than those are braced against change. The rapid pace of change associated with Industry 4.0 requires the ability to adapt. In globally competitive marketplaces these capabilities enable the responsiveness that will determine the vitality of both manufactured product and the corresponding manufacturer.

INDUSTRY 4.0 AND RAPIDLY EVOLVING MODELS

Many markets include the potential for disruptive change, enhanced business models and incremental revenue/growth potential. It is inevitable that a manufacturer that retains a live

connection to its products after deployment will modify its respective warranty and service model.

Enhanced service models around smart products allow a manufacturer to offer improved performance and possibly increased product life. This level of service may be an opportunity for short term market differentiation and even premium pricing.

Many manufacturers are shifting from the traditional sale of the product to a commercial relationship where they are selling product service hours. This transition is happening across a complete range of deployed products. Manufacturers of simple air compressors are selling volumes of consumed air and not the compressor. Manufacturers of large complex assets such as jet engines are selling flight hours and not the actual engine.

This evolution of the business models requires unprecedented flexibility in the supporting business financial systems. No longer are transactions limited to a purchase order of discrete quantities and an associated invoice. Financial systems must support an ever-growing range of consumption-based models and service-centric relationships. The ability to support an expansive variety of relationships includes flexible approaches to financial processes such as revenue recognition and billing in a global environment. The corresponding change cycle will require business systems that foster cross-functional collaboration and rapid response to customer needs.

In globally competitive marketplaces these business and financial capabilities enable the responsiveness of a manufacturer in a dynamic, highly competitive commercial landscape.

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CLICHÉ OF THE DAY: CHANGE IS THE NEW CONSTANT

Most manufacturing organizations are just embarking on the journey to Industry 4.0. The main barriers cited by these organizations include obtaining accurate information about the technologies, difficulties in coordinating Industry 4.0 activities across different organizational units, concerns about IoT-related cybersecurity, and data ownership, particularly when working with third-party providers. In a cultural sense, some manufacturers simply lack the courage to push through a radical transformation.

The sobering news is that all these barriers will likely remain to some degree. Gartner has predicted that 80% of IoT implementations will waste opportunities and fail to completely monetize IoT data. This dire view can and will be counteracted with an approach that is based on making change-driven choices.

Rapid pace of modern business change and challenges requires unprecedented flexibility fueled by the underlying agile technologies. Today's choices on technology and approaches must be made on both the technologies' current form and function and the inherent ability of that technology to adapt to change.

In the diverse and complex Industry 4.0 architecture there will always be technology winners and losers. Elements of the architecture selected today may be short lived in terms of vitality. All technology choices must be balanced with well-positioned business systems delivering core functions that parallel the new technologies. The key is choosing platforms that can readily adapt to the inevitable changes within the architecture and approach.

Your Strategic Assessment: To find out how you can obtain an assessment that clarifies where you stand today on cloud security, contact a client advisor at QAD. With a full decade live in production, QAD Cloud ERP has an excellent track record of availability, performance, security and rapid, successful implementations.

SOURCES

Accenture, Cisco, Goldman Sachs, Infosys, i-SCOOP, McKinsey, PwC, Stanford.



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