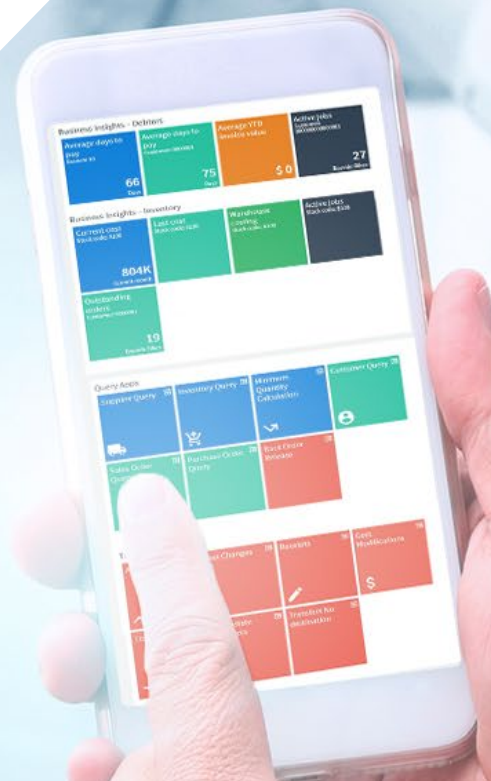


Digitalizing for Manufacturers: First Steps Towards Digital Transformation

As the fourth industrial revolution continues to shake up business models and redefine how work is done, it is important for the manufacturing industry to adapt by adopting emerging technologies that will allow them to continue to remain relevant in the years to come.





Introduction

Industry 4.0 is fast approaching, and many industries and business leaders are already starting to reap the benefits. However, a large proportion of companies are not. Whether it be because they are overwhelmed by the choices of which emerging technologies to implement first, or they cannot free up investment for a business move that will only pay off in years to come, or because the structure of the organization is not set-up for the rate of change the new world of business expects.

This is especially true in the manufacturing industry, where widespread organizational change is particularly expensive and successful use-cases, that are not in pilot phase, are few. Beginning a digital transformation journey requires buy-in from all parties, a roadmap of where to go, and a strategy on how to get there. The World Economic Forum (WEF) predicts that the manufacturing industry, once it fully embraces and correctly implements emerging technologies, will potentially deliver up to \$3.7 trillion in value for the global economy, offering new products and services to society and supporting the environment by optimizing resource consumption.

However, WEF found that these technologies are not being adopted at scale, other than a few early adopters. Business leaders do not want to be left behind but are finding they keep running into the same challenges.

This whitepaper will explore how businesses in the manufacturing industry can take their first steps towards digitalization, how they will benefit from taking those steps, and what they should do when they encounter challenges. It will also highlight what the factory of the future looks like and how they will be a reality sooner than we think.

The Benefits and Challenges of Digitalization for Manufacturers

The manufacturing sector stands to benefit immensely from the fourth industrial revolution. The world has evolved at a rapid pace over the last few decades and new technologies have come about that will completely overhaul the industry.

Research firm Emerald Insight issued a report entitled 'Digitalization and its influence on business model innovation', in which it discusses how the physical and digital world are converging increasingly frequently and need to work together, so that manufacturing companies can also become digital.

According to Lorenzo Veronesi, research manager for IDC Manufacturing Insights, there are three main drivers for smart manufacturing:

“ A renewal in perspective that places the factory at the center of business initiatives, the fact that data are going to be everywhere in the production process, and lastly, the understanding that people and machines will have to work together and not in opposition. ”

While technology like robotics will be important in reinventing the factory of the future, it is the data that the robots create and how it is analyzed that will revolutionize the industry.

The technologies available to manufacturers include, but are not limited to:

- **The Industrial Internet of Things (IIoT):** Intelligent sensors networked with systems, tools, devices and people
- **Artificial Intelligence:** Intelligent machines capable of learning and decision making
- **Advanced manufacturing:** Including robotics and 3D printing
- **Data analytics:** Extracting actionable insights from data
- **Mobile solutions:** Smartphones, tablets, wearable sensors, etc.
- **Cloud computing:** Low-cost processing, data storage solutions, minimization of capital expenditures
- **Demand Chains:** Fully integrated, customer-responsive supply chains

IDC predicts that by the end of 2021, 25 percent of global manufacturers will apply machine learning to data across product development, supply chain, manufacturing, and service for more rapid decision support, improved quality, differentiated products, and innovative business models.

The firm also says that by as early as 2020, one-third of all manufacturing supply chains will be using analytics-driven cognitive capabilities, thus increasing cost efficiency by 10 percent and service performance by five percent. As well as, 60 percent of G2000 (the 2000 largest public companies in the world) manufacturers will rely on digital platforms that enhance their investments in ecosystems and experiences and support as much as 30 percent of their overall revenue.

While the benefits of digitalization and the predictions of how well the manufacturing industry stands to do, it is still overwhelming for business leaders who are tasked with making the change happen.

Emerald Insight in their Digitalization report explained: "Over the past few decades, global industries not only have faced technological changes that have led to opportunities such as greater flexibility, reactivity and product individualization, but also have presented diverse challenges such as rapid technological change, increased complexity and changing customer preferences and legal requirements.

"This has led to challenging situations in a corporate context: manifold new technological opportunities are perceived, but people are uncertain how to use and implement them simultaneously in terms of product and service offers."

In a whitepaper by WEF, in collaboration with McKinsey & Company, entitled 'The Next Economic Growth Engine Scaling Fourth Industrial Revolution Technologies in Production' it is stated that with **current automation technology 60 percent of all manufacturing activities can be automated.**

"The latest developments of the Internet of Things (IoT) allow for connecting and tracking asset performance in real time, as well as for integrating production and consumption processes. Artificial intelligence, which since 2015 has achieved image and speech recognition at the level of the human brain, can process large amounts of data that factories collect to increase efficiencies and inform accurate decision-making. Advanced robots and computers can perform a range of routine physical activities and increasingly accomplish activities requiring cognitive capabilities, such as tacit judgements or sensing emotions."

However, the report also states technology's full potential for production, when adopted at scale, is still far from being exploited. There are a few trail blazer manufacturers, but they are by far the minority. **More than 70 percent of industrial companies are still either at the start of their digital transformation journey or unable to go beyond the pilot stage.** WEF calls this phenomenon 'pilot purgatory' where technology is deployed experimentally at a reduced scale for an extended period due to the inability or lack of conviction to roll it out at production-system scale.

WEF says companies need to adopt technology at scale, across multiple production platforms and through relevant value chains.



In a study done by Deloitte entitled 'Success personified in the Fourth Industrial Revolution' the firm surveyed business and government readiness for the fourth industrial revolution, and found that while executives understood the changes being brought about by Industry 4.0 and were confident they were ready, their actions (or lack thereof) demonstrated they were less prepared and less able than they thought to fully harness and benefit from those changes.

The study done by Deloitte, which covers more than 2000 C-suite executives across 19 countries, found that executives are struggling to develop effective strategies in today's rapidly changing markets. Faced with an ever-increasing array of new technologies, leaders said they feel as though they have too many options from which to choose and, in some cases, they lack the strategic vision to help guide their efforts.

Deloitte did find that leaders who were using a methodical approach to strategy development in the Industry 4.0 era, using data to support decisions, were more confident than other leaders. The study found that these leaders, who made data-driven decisions, also presented leadership characteristics that can position their organizations for long-term success, by being bolder, more committed to their organization's workforces, and ethically driven. It also found that **the organizations with leaders that made data-driven decisions generated five percent or greater annual revenue growth compared to others surveyed.**

Using data to make decisions and prioritizing the collection and analysis of data from manufacturing centers is imperative according to various reports by internationally respected research firms. A modern enterprise resource planning (ERP) system serves as the backbone for digital transformation in the manufacturing sector, ensuring data quality and visibility.

Change Starts From The Top

Digital transformation is on the agendas of corporate boards and has risen to the top of the CEO's strategic plans. As the name implies, a digital transformation journey is one that will – if it is successful - completely transform how an organization operates by overhauling old processes. Data from all parts of the company will need to be digitized and taken out of silos so that never-before-seen insights can be drawn to help the company run more efficiently.

A digital transformation journey could result in a completely different company and for this reason, it is imperative that the CEO becomes the driving force behind it. Team leads and the CIO will be able to make decisions for their departments, but strong guidance from the top is needed to help the process along, get buy-in from all stakeholders, and allocate the correct funding and resources.



Start by giving full support and assigning the right people

The CEO needs to become the company champion for digital transformation. Publicly displaying buy-in will not only encourage people working within the organization to get on board, but it will also show all external stakeholders that the BUSINESS LEADER, and therefore the whole company, is truly committed to transforming the company to fit modern times.

By giving full support to the journey, the CEO will embed themselves in knowledge of how the business strategy will change and what tweaks or major modifications need to be made to the company business model. They will then be able to communicate clearly to employees and be able to answer any questions and ease any fears.

For a successful digital transformation strategy to be pulled off, the CEO will also need to define the roles and responsibilities of those people in leadership positions. If this is not articulated clearly, it could lead to several issues, including execution gaps and infighting, which will weaken the overall program.

Then make funds and resources available

It will cost money and time to digitally transform any company – big or small – effectively, and teams will need to have access to funding and resources they normally do not. The role of the CEO here is to free up investment and allocate accordingly.

When assigning roles and responsibilities to business leaders, the CEO will also need to talk about realistic financial models. This is to prevent leaders becoming detractors if they lose funding for their initiatives. Clear priorities should be set early in the digital transformation program by the CEO so that all business leaders and employees are aligned on what needs to happen first.

CEO will also need to free up people from different departments to leave their current jobs and dedicate all their time to the digital transformation program. This will probably entail moving top performers who are important to achieving short term business objectives. The CEO will have to articulate why these people are better suited elsewhere to help the company accomplish long-term goals, as well as help business leaders help their managers reassign responsibilities.

Be wary of barriers that slow down transformation

Digital transformation programs are essentially change management programs, and as such, come with the same obstacles – people resisting change, and others wanting to change things too fast.

The CEO will need to step in and make sure that the chosen transformation leadership team is regularly meeting with all members at every level of the company to openly discuss how the program is going and give employees the opportunity to raise any problem or complaint.

It is important the CEO is seen to be a part of some of these discussions and be a part of the team that helps solve these issues. As no two organizations are the same, the barriers will also be different and require individual solutions.

A future-fit ERP will help get the company there

Enterprise resource planning (ERP) systems, often regarded as something that just runs in the background, are an effective business management tool for a CEO to have a birds-eye view on what is going on in their company and identify the gaps in the business where exponential value can be added.

By implementing a **future-fit ERP solution**, organizations can easily incorporate new, emerging technologies such as machine learning, artificial intelligence (AI), and Digital Citizens, into their operation. This will not only make the digitalization process easier, but also open the door to **greater efficiencies and growth** as well as expose opportunities to innovate.

Using an ERP system means greater and more efficient controls. This ensures the CEO has accurate and real-time information and assists management to maintain a firm grip on operations. The ERP dashboard gives the CEO a consolidated and comprehensive quick and easy reference of where their business is currently standing with drill-down capabilities.

Resistance to Change

Digitalization is a major transition for any company, and business leaders will find that people within their organization will struggle to change with the company and some that will outright resist it.

“It is not necessarily the strongest, or the most intelligent, who are most likely to survive, but those who are most responsive to change.”

This is a theory attributed not to Henry Ford, or any industrial analyst, but to Charles Darwin. That said, an inability to handle change signposts a far swifter route to extinction in the commercial world than it does in the natural one. The once-dominant, high street retailing giants can testify to that, as they have struggled first with retail parks and now with internet shopping trends.

For manufacturers, implementing ERP as part of their digital transformation journey is probably the most significant voluntary change they can undertake right now. It is also just about the most challenging. Nevertheless, the rewards are immense for companies that get it right.

Far from being a superficial add-on, ERP demands deep-rooted, systematic change within an organization. Given the complexities of selecting ERP systems, seeing the implementation through and even setting goals as a first step, it is hardly surprising when projects fall short of their potential. Knowing the likely problems and planning to avoid them is crucial.



Barriers to ERP Change

There are several barriers to change that need to be overcome in the case of ERP, but it doesn't have to be a challenging process and success is easily achievable, when the barriers are correctly addressed.

These include:

- Resistance to change by people
- A lack of relevant skills in the company
- Inadequate project management
- Overemphasis on one aspect of the business.

Besides these specific barriers, lesser obstacles can throw a project off course:

- Moving goal posts (changing objectives)
- Insufficient internal communication of developments
- Inconsistent drive or failing momentum behind the project

Generally, people don't like change so it's normal to encounter resistance within some, if not all, departments. However, by tackling each of the other hinderances and then training, involving and communicating with them appropriately, individuals and departments can be reassured that change is not only beneficial, but necessary to keep the business competitive.

A lack of investment has left the business in a difficult place, with staff working with an unsupported IT system, leading to wasted time duplicating data input and a reliance on fax machines to send and receive orders. Not only is this time-consuming, but it also opens opportunity for errors to creep into the processes.

As is often the case, key employees in the business hold deeply entrenched views about how best to do their job. They are suspicious of technology and fearful of automation. They still use a fax machine to send and receive orders and the inadequacy of technology means the company's systems are at breaking point.

These systems have been put under further pressure with different divisions are unable to share and access centralized data, which is having a negative impact on productivity, efficiency and ultimately, customer satisfaction.

People Power

The way to tackle the problems is not just about parachuting-in a new technology solution but also about forging a common 'will' to make it happen successfully. Understanding existing points of view and how individuals currently relate to each other in their roles is essential. This is the first step in the vital process of informing and reassuring people about ERP and how it will change their working life for the better.

Departmental self-interests and the personalities driving them are always going to vary, so it's difficult to cover all angles and anticipate any given situation. There are key people in every business department who could play an important part in ERP implementation.

Resistance Factors

ERP technology has created a foundation for smart and connected factories, forming the backbone of business management and security. The technology enables strong supply chain models to function, helping businesses integrate the value chain, better understand customers, enhance automation and become more responsive. Crucially it facilitates the transformation to factories of the future.

Although there are clear advantages of revolutionizing a company through ERP, one or more key factors can derail an implementation project, even before it gets beyond an initial idea.

Automation

There are certainly grounds for apprehension about artificial intelligence in manufacturing businesses. 'I'll lose my job through automation' is a common fear expressed in the workplace.

Self-learning computer technology in the Industry 4.0 era means that machines will be capable of controlling their own production and logistics. They will connect with the Internet and interact with their environment, adjusting their operation to suit prevailing situations. Consequently, production will be in real time, decentralized and individualized – down to batches of a unique item. Decision making will be done without human intervention, optimizing production and managing all the supply chain logistics.

Automation and the use of production robots generate considerable savings in the cost of labor and products. Once the preserve of the motor industry, robotic machines are beginning to be implemented in shop floors. At face value, the argument for robotics and automation is a strong one; they do not require annual salaries, they don't need leave or sickness days, and they can start up immediately, on demand. In many cases, manufacturing plants already have robots on the shop floor connected to their ERP systems, enabling them to begin production the moment a sales order is finalized, in order to deliver instant service to the customer.

Robotics should be there to solve a problem in the business, often a manual, admin-heavy task; robots should not end up being supplemented by more manual work. In this regard, we can begin to create smarter factories where people collaborate with robots, tedious business processes are automated, and people are being empowered by machines to make better decisions.

Obvious amongst the downsides of robotization is the impact on jobs, education and skillset requirements and social change. There is a huge task in managing the necessary change, with potential for loss of workforce morale, disengagement and labor relations issues.

However, **robots and automation can create jobs. This may seem counter intuitive, but robots improve productivity, which boosts competitiveness, improves revenues, generates economies of scale, and therefore improves overall margins.** This creates demand for more design and engineering jobs to innovate and create new products and services.



Clinging to Legacy Technology

‘Our systems work for us and they haven’t failed yet’ – this is a very common line of resistance to change and a difficult position to dislodge. Some companies have even developed their own bespoke software systems over the years and are particularly reluctant to move away from them. Yet technological evolution races ahead and will always be used by competitors to gain commercial advantage.

Although they may be doing the job for which they were designed, today’s familiar technologies are on the path to obsolescence and the opportunity to improve on existing systems should always be explored. When looking at the cost of introducing ERP, it is equally important to question what is the cost of sticking with legacy systems instead?

One certainty is that the costs of maintaining legacy systems will only continue to rise. Failure rates will increase with aging software, as will vulnerability to security breaches. Vendors look to counteract security risk by producing security patches and updates for the at-risk software but only for as long as they continue to support the software. Ultimately the manufacturing company operating legacy technology can be dangerously exposed to security attack, unplanned downtime and serious loss of data.

In terms of future response to change, clinging to old systems is likely to be a highly restrictive option. As younger generations enter the workforce, a certain level of technology will be expected. At some point it will be extremely frustrating if they cannot interact with new technologies in the manufacturing environment. Legacy systems will have little chance of integrating with supply chain partners, limiting the speed and extent of information availability and throttling back performance.

Similarly, mobility is often compromised by retaining legacy systems. It is becoming ever more important that management and personnel in the field can remotely access production, inventory and management software, using mobile devices that communicate correctly with the central system, or cloud hosted solution.

While adaptation to changes in technology, shifting markets and higher customer expectations is vital to the long-term survival of a manufacturing business, there are forces in the system constantly resisting change. Above all, resistance to change by established members of the company is potentially a threat to one of the most progressive steps a manufacturer can make – the implementation of an ERP system.

The Smart Factory

Soon, all factories will be considered 'smart' because of their use and implementation of smart technologies – the integration of industrial internet of things (IIoT).

All smart, connected products share three core elements: physical components, smart components, and connectivity components. For these three elements to communicate and operate together, they rely on an advanced technology stack which can facilitate data exchange between a product, a user, external sources and third-party applications. At the heart of this technology stack, sits an advanced ERP solution.

The typical manufacturing supply chain is quite linear and consists of research and development, IT, production, distribution, sales and marketing, aftersales, HR, finance etc. However, when aligned to the capabilities of smart, connected devices, this entire value chain is disrupted and transformed. At the heart of this process transformation is data.

How often have manufacturing businesses been advised to store as much data as they possibly can? Everything from design drawings and production data, to machine performance information and financial forecasts are constantly being funneled into a centralized ERP system. But how often is that data extracted, analyzed and used to empower people to make more informed decisions about their business processes, their productivity rates and their business models?

For years, manufacturing businesses have generated masses of data through internal operations and value chain transactions. It gave them some idea of what the customer wants but not necessarily how to deliver on these requirements. By generating data from products as well as interactions and transactions, and channeling all of this through ERP, manufacturing businesses can start to actively adjust their production methods, get more out of capital machinery investment, evolve infrastructure models and reduce time to market.

For example, by installing sensors on a machine tool, measuring performance times and channeling this through a centralized ERP system, you can start to predict failures and downtime. By linking data showing the occurrence of problems to data showing the production environment, you can start to understand how and when your machines are most effective. When you compare this information to the transactional data in your ERP system, to forecast demand and production planning, you can immediately create contingency plans.

SYSPRO's chief product officer Paulo de Matos, said: "During the last decade, the focus on material use, improving materials management and the ability to integrate 'shop floor to top floor' was the primary concern when fully integrating the shop floor into their data systems. Today, customers are saying they want to integrate to their suppliers and customers. The idea that companies don't compete individually but rather supply chain versus supply chain, is gaining acceptance.

"In the past, the buyer had to contact organizations [requesting] a price. Now, suppliers can log into a portal and self-service those requests. The buyer can look and say I'm going to select a supplier. It's that integration where customers want to take advantage of automation and optimization."

On the shop floor of the future, sensors and software will operate continuously, predicting and preventing equipment failures, optimizing processes and maximizing productivity. A continuous, real-time flow of data will provide information and actionable insights that make production processes increasingly visible, predictable and controllable.



Conclusion

There is no doubt that Industry 4.0 is upon us, and that there are technologies readily available that will transform the manufacturing sector – even if few are taking advantage of it.

For a digital transformation journey to be effective, business leaders need to react to market changes fast and effortlessly and an ERP system provides the critical information needed to do this. Stats such as weekly sales, employee performance, and inventory levels, are all examples of items quickly available, showing real-time growth or changes in the business.

As digital transformation is about modernizing a company, it is important for the business leader to have an idea of how the organization will operate in the future. It needs to be agile enough to respond to challenges, opportunities and market trends.

ERP is a toolset that goes beyond management – it helps everyone in their individual roles and day-to-day operations. A well implemented ERP system will provide benefits that can support a company's overall digital transformation strategy.



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