

guide.

Cloud-powered digital transformation will revolutionize manufacturing.

The future of manufacturing with Industry 4.0.





Introduction

Industrial and technological progress has historically been achieved in stages. The steam engine brought about the age of mechanical production, which is commonly referred to as Industry 1.0, by making factories independent of wind, water or muscle power. The age of science and mass production, Industry 2.0, made companies more efficient with the help of electricity and scientific breakthroughs. The invention of information technology and robotics furthered the automation of production. Today we call this era the digital revolution, or Industry 3.0, a time when innovation and development accelerated at a rate never seen before.

It is difficult to identify the same obvious technological leaps today because of the constant stream of new innovations. But it is clear that we have taken the step into the next era – Industry 4.0 – with cloud computing and technologies born and bred in the cloud opening up completely new digital possibilities. The combination of new energy, new technologies and new business models is what's defining Industry 4.0.

How will this new reality impact your company? And what can you do to explore the new possibilities and stay ahead of competition?

Only by boldly embracing digital transformation will companies be able to seize the opportunities of Industry 4.0 for exponential increases in productivity and competitiveness.

Digital transformation is about using digital capabilities to transform the way you do business, switching from a traditional business model to a data-driven, cloud-first mindset. This requires using digital technologies to enhance business models, capture new revenue streams and add value.

This guide will look at the challenges and opportunities for manufacturing companies moving towards digital transformation and Industry 4.0.

The trends and future of manufacturing

Some clear trends are emerging as manufacturing moves into the digital realm. The trends are fuelled by digital technology and changes in customer behaviour. Some are contradictory and some seem small, but they will play a major role in determining which companies will prosper and which will struggle in Industry 4.0. Consider the following key factors to stay ahead of the competition and attract customers.

Customer proximity is gaining ground over mega factories

There are indications that the age of mega factories producing for a global market is coming to an end. Although they made sense from a financial point of view historically, today they seem too slow in adapting to changing markets and customer needs. Manufacturing is moving closer to the customer with small-scale factories close to the physical market, and additive manufacturing (3D printing) is spearheading this movement.

The very nature of the global marketplace contradicts this trend toward customer proximity. Globalization is both an opportunity and a threat – your market is now global but, at the same time, your competition can come from anywhere. As a manufacturer, you need to have a firm grasp and a strategy of where you fit into the global customer experience. One product will probably not be relevant to all customers on a global market. Technology is the key to improving the customer experience by tailoring your offering to local needs.

Sustainable manufacturing is rising in importance

Consumers are getting more interested in how the products they buy are produced. A brand's environmental profile now plays a larger role in buyers' decisions than in the past. Local production close to the consumer not only reduces shipping but also enables production to be tailored to local needs. This reduces the environmental impact, conserves resources and decreases wasted products, resulting in a more sustainable product lifecycle and saving money.

Circular economy redefining growth with Product as a Service

In industry, the circular economy means taking responsibility for a product, from production through use to end of life. One of the circular models gaining ground is the subscription business model where the customer does not buy a product but instead pays for availability and use (→Product as a Service). This changes the focus of manufacturing from maximum production output to maximum product-life. Circular product offerings in industry are a long-term and complex process of change with major business challenges that put increased resource efficiency in focus. Technology will be an enabler for this change and through IoT sensors that report data critical to maintenance, longevity and customer usage analysis. In addition, a circular economy is more environmentally friendly, driving innovation for sustainable production methods, products and business models.

Challenges for manufacturing companies

With market and customer expectation rapidly changing, the pressure is on manufacturers to innovate in order to keep their products relevant. Whereas product shelf lives could previously be months or even years, these are rapidly getting shorter, down to only a matter of weeks in some cases. This impacts innovation processes and challenges product development to become faster and more agile without compromising on quality.

Production management – optimizing for shorter product cycles

“Now is the time to go to market!” Shorter shelf lives, faster innovation cycles and tight deadlines put pressure on manufacturers to launch products – fast and often. Your customers constantly expect new products, and the time to market is getting shorter by the day. Project planning, production scheduling and supply chain management both before and after production needs to be on point and managed well or you risk losing market share.

Flexible and agile production will improve innovation

Scaling down does not make you agile (enough) – flexibility does. Agile production involves manufacturing what customers want when they want it, which will optimize your inventory since less products will be left lingering in your warehouse. This saves time and money, attracts new customers and improves your ability to innovate.

Skilled labour – a coveted resource

As the baby boomer generation is set to retire, they will not only reduce your body count but also weaken your workforce’s experience and skillsets. Your production will become more reliant on automation and machines with sensors that can make intelligent decisions based on collected data. As manufacturing becomes more advanced, you will need employees with a high-tech skillset and an analytical mind. On-the-job training will play a vital role in ensuring production quality and product safety.

Keeping up with new technologies – a question of survival

Digital transformation plays a key role in transforming your business to meet the ever-changing market. Machine learning algorithms and advanced data analytics require data to deliver new insights and enable autonomy. These insights are the key to a data-driven approach that can significantly boost productivity, increase revenue and add value.

Continuous innovation is the key to survival

Embracing technology is the key to future-proofing your production process and your business model. With a curious mindset looking for trends in the data you collect with the help of AI tools, you can set your company on a path toward growth and increased revenue. Companies willing to question everything while looking for answers in their data will stand the best chance of prospering in the future. A customer-centric approach to continuous innovation requires digital tools and processes. These are now being developed predominantly in the cloud.

Advanced robotics, industrial internet of things (IIoT) and additive manufacturing technology is advancing in several fields rapidly, and many manufacturing companies struggle to keep up. The new technology landscape includes everything from smart sensors, massive data collection and extreme analytics to autonomous machines and factory virtualization. Agility and the ability to adopt new technology will be a deciding factor in the future.

The challenges facing manufacturing companies are also a stepping stone and an opportunity to evolve. Facing and overcoming these challenges by employing digital tools and embracing digital transformation holds the potential to propel a company to the forefront of their industry.



The three building blocks of digital transformation

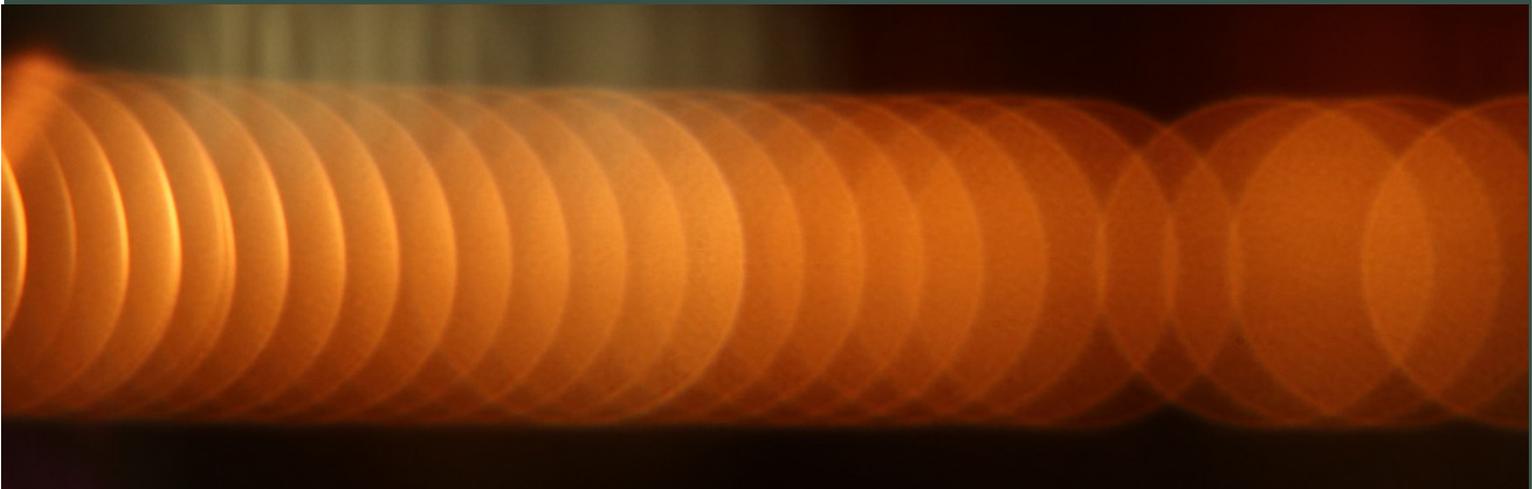
In the past, production development was linear in many cases. A handwritten text became printed, the printing was mechanized, the printing press was automated, the printout got scanned and finally the text was written on a computer with all the possibilities of a digital world at hand. Today, with digital transformation, things are less linear but more complicated. Manufacturing companies who want to stay competitive on a changing market need to change their ways of working in three areas:

1. Customer experience

One big opportunity is to leverage digital transformation to improve the customer experience. This requires that you understand customer needs and behaviours. Streamlining customer-facing processes and touchpoints using data was a challenge, and getting data was slow and cumbersome. Today's plethora of data collection opportunities completely change this, connecting both people and things. For instance, data from real-life use cases of your product can be harnessed to improve the customer experience radically. With a global market, rival products can emerge from anywhere and the way to stay ahead is to put the customer front and centre.

2. Operational processes

Another opportunity is readily available by Digitalizing your operational processes will improve production performance and empower workers to work more efficiently. Then, when your operations technology (OT), such as production workflow systems, converges with your IT, revolutionary things will happen. Your IT, fed by data from IoT and your products through customer interaction, can help you continuously improve production. Adding AI and machine learning to your OT will take your data analytics to a new level while fuelling innovation and product development.



3. Business models

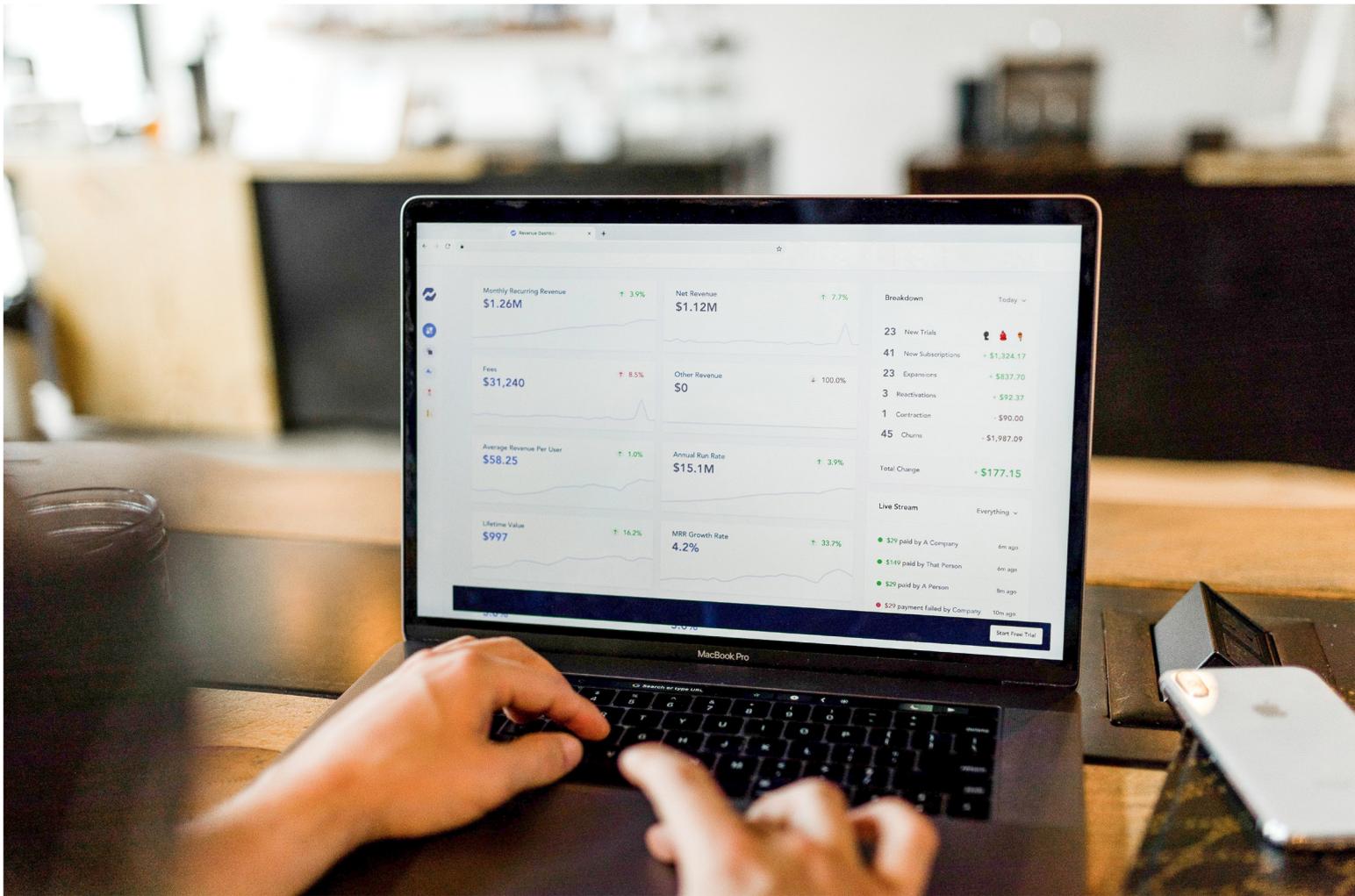
A third opportunity can be seized by leveraging digital transformation to develop new business models. When questioning everything from innovation to manufacturing in order to create an agile workflow, you need to look at your business model. Digital transformation must happen at all levels and not rely on old business truths. Look for new business models and new ways to offer services to your customers. Are there opportunities to develop your aftermarket or to manufacture customized products in a smarter way? Perhaps your product could be offered as a service – selling use and availability instead of physical products. Moving companies towards a sustainable circular economy.

The foundation for transformation is made of digital capabilities

The prerequisite for achieving this is a foundation relying on digital capabilities that bring together data and processes and that support business and IT integration. Digital transformation needs to be prepared in the sense that it will continue to add value and be adaptable to future technology. What technology the future will bring is impossible to know but it will most certainly be cloud based and in a data-centric context. What system you use will not be as important as what data you have and how it is structured.

You will need new and modern platforms for your systems on which to build your digital capabilities. By moving beyond the traditional lift and shift of servers into the cloud, you can use the cloud strategically to enable digital growth. This will give you the power, speed, flexibility and agility to make the most of cutting-edge Industry 4.0 technologies and new digital possibilities. You will have the tools you need to drive and accelerate your digital transformation.





New technology enables Industry 4.0

As manufacturing companies move towards Industry 4.0, not only to stay relevant but also to grow, they need tools. These tools are often found in the cloud. The development of cloud-based platforms and systems has opened up many new possibilities for the manufacturing industry to address the trends and opportunities of a changing market.

Today, with advanced robotics, machine learning and additive manufacturing technology, small-scale production can be made as cost effective as mass production. But all these technologies need data to be efficient.

Collecting more data than ever before

Most companies have already started collecting data. Large amounts of data. Not only from the web and customers visiting an online store but from everywhere. Data is now being collected all the way from the production of a product through the use of said product to its disposal and end of use. External data like weather and economic trends are added to enrich this data. Vast amounts of data need a large storage solution and structure to be usable.

Data analysis for deeper understanding

All this aggregated data, with the support of machine learning algorithms and the vast computing power of the cloud enables companies to perform data analytics at a scale that was impossible earlier. The product journey can intersect with the customer journey to unlock new insights and fuel innovation.

Standard platforms and applications

One of the big advantages of the cloud is that standardized platforms are far more adaptable, which facilitates a wider range of applications and capabilities. This enables you to focus your resources on your core business that generates revenue, not waste them on backend system development for your specific manufacturing purposes.

Agility in platform and mindset

Adopting an agile workflow that can measure up to changes in market demand and customer needs, shifts in production, and business transformation is all about using flexible platforms and applications. Large-scale and monolithic systems on a classic infrastructure are too rigid in terms of structure to provide the agility manufacturers need today. Technology has moved beyond the big slow steps of traditional system development to a fast-paced race with small steps at an ever-increasing pace. Cloud platforms enable you to keep up with that pace.

Regardless what you want to achieve with your digital transformation, your ability to adopt digital technology and digital capabilities will be a key success factor. This is especially true for manufacturing companies that have a wide range of devices, applications and data that are difficult to identify, interconnect and make better use of. This requires a highly flexible, scalable and agile foundation powered by the cloud.

A learning organization will prosper

New experiences need to be added to old truths. With faster evolving technology, new customer demands and behaviour, your organization needs to learn and adapt. Do you need to move your production closer to your market? Is there unforeseen user behaviour in your data? How can your organization best improve the customer experience? The siloed company that does not learn from its data has a low chance of prospering in the future.

Companies taking the leap and embracing digital transformation are set on a path to innovation and growth and will prosper on an ever-changing global market. Looking beyond lift & shift is the key to opening up infinite digital possibilities and Industry 4.0 potential for your business. Curiosity about how digital transformation can be used to future-proof your applications and get your OT and IT resources out of their silos and into a platform that enables innovation and productivity will open up opportunities beyond your wildest dreams.

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