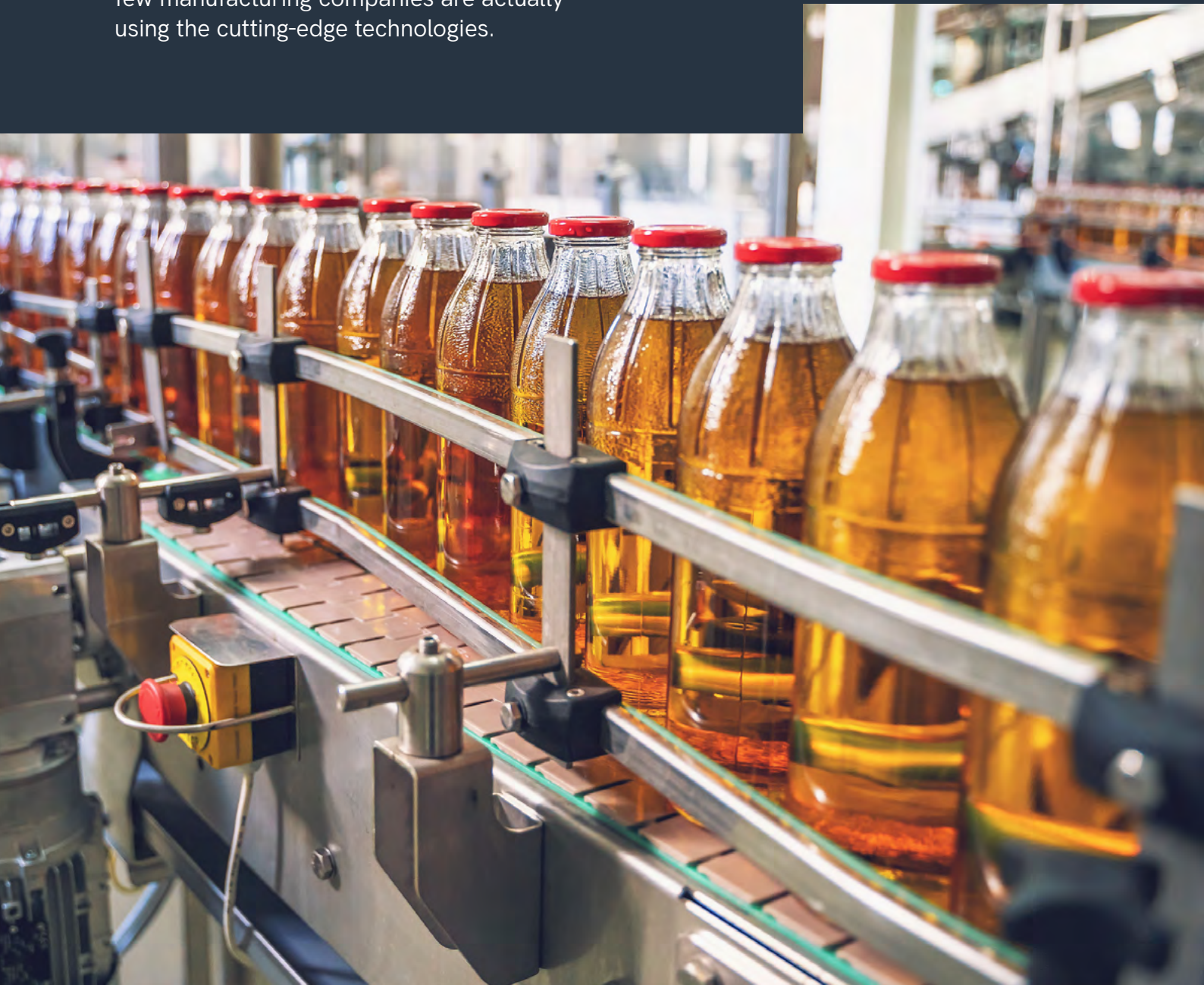cepheo

Create new opportunities with Industry 4.0 in process industries

Industry 4.0 is one of the most talked about concepts in recent years, but very few manufacturing companies are actually using the cutting-edge technologies.

Create new opportunities with Industry 4.0 in process industries

Industry 4.0 is one of the most talked about concepts in recent years, but the fact is that very few manufacturing companies are actually using the cutting-edge technologies. This is also true of manufacturers in the process industry, such as those producing food and beverages, pharmaceuticals, chemicals and plastics.

That's why we have gathered a wealth of inspiration for you on the following pages, where you can learn about:

- **Why and how you should use Industry 4.0**

- **What value and competitive advantage you can generate**

- **Where the biggest opportunities lie in your industry**

- **How to ready your company for Industry 4.0**

We are, of course, ready to help you plan how to innovate in your manufacturing company with Industry 4.0 technologies.

You can find contact details at the end of the brochure if you are interested in discussing your opportunities with our specialists.
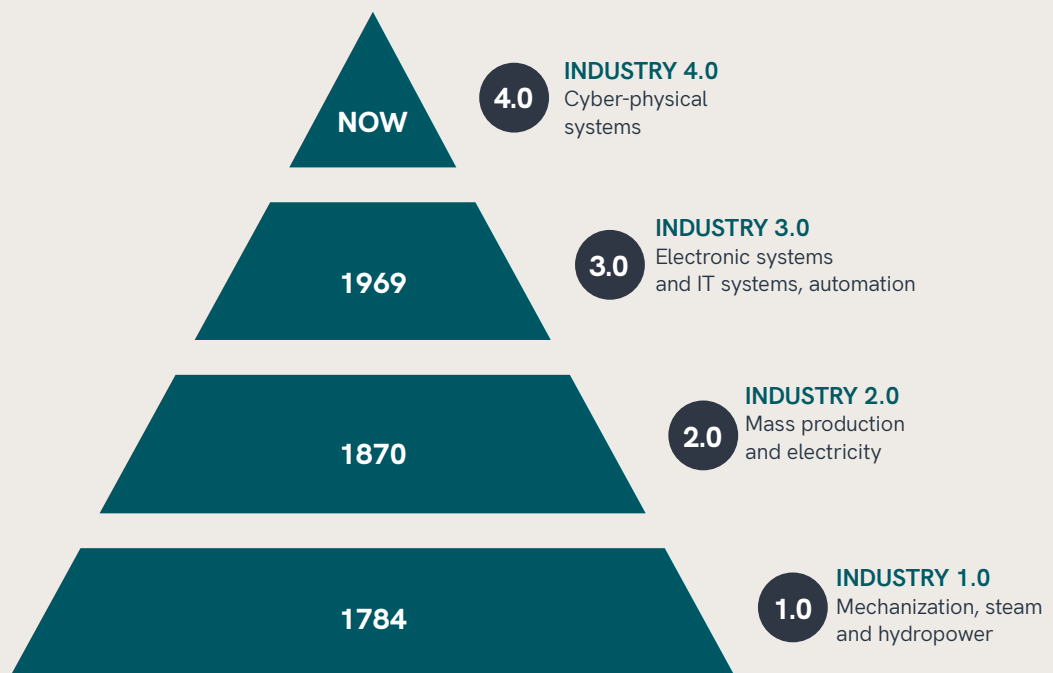
Happy reading!

What is Industry 4.0?

Industry 4.0 is where physical production meets the digital world. This means that traditional practices in the manufacturing industry are being automated through modern, intelligent technologies and digital systems.

A central concept in Industry 4.0 is the "smart factory" where connected physical and virtual (cyber-physical) systems and people collaborate with each other;

production functions are monitored, predicted and controlled in real-time; and decision-making is data-driven, decentralized and autonomous.

Although Industry 4.0 concepts and technologies are rooted in the discrete manufacturing field, it is definitely relevant to companies in the process industry as well.

NOW

4.0 INDUSTRY 4.0
Cyber-physical systems

1969

3.0 INDUSTRY 3.0
Electronic systems and IT systems, automation

1870

2.0 INDUSTRY 2.0
Mass production and electricity

1784

1.0 INDUSTRY 1.0
Mechanization, steam and hydropower

The evolution of Industry 4.0

We have gathered some actual examples of how your company can use Industry 4.0:

- **Connected sensors that use wireless broadband connections or 5G connectivity to exchange information with each other.**

- **Machine learning and artificial intelligence (AI) solutions that transform company, manufacturing and supply chain data into value and enable more informed decisions.**

- **Virtual reality, augmented reality and mixed reality platforms that enable enhanced visualizations and assisted maintenance, training and user processes.**

- **3D printing systems and digital twin simulations of physical devices, systems and processes that enable virtual design, prototyping and testing capabilities.**

These new technologies can be connected as elements of an Industrial Internet of Things (IIoT) and merged into an augmented physical production process to enhance efficiency and levels of automation not previously possible.

When this automation is combined with the advent of low-cost sensors, high-speed networking, innovations in autonomous robotics, computer-generated visualization, artificial intelligence and cloud & edge computing capabilities, the stage is set for a new vision of manufacturing based on a global network of machines in an intelligent factory setup, able to autonomously exchange information and control themselves and each other.

In short, a vision of a single cyber-physical system that can operate autonomously, with full visibility throughout the supply chain and the entire product lifecycle – from the beginning of design to the end of life.

But while Industry 4.0 was touted as the savior of industry in 2015 when the term first emerged, the truth is that implementation has been slow.

This is largely due to a lack of clarity about where to start and widespread uncertainty about how the promised business value would be realized. As a result, many companies in the process industry still see Industry 4.0 technologies as unproven or even speculative.

The obvious questions are, where can Industry 4.0 technologies add value to your manufacturing company and how you get ready to transition to intelligent, connected manufacturing?

Find out in the following pages, where you'll get an insight into some of the possibilities, so you can start planning your company's path forward.

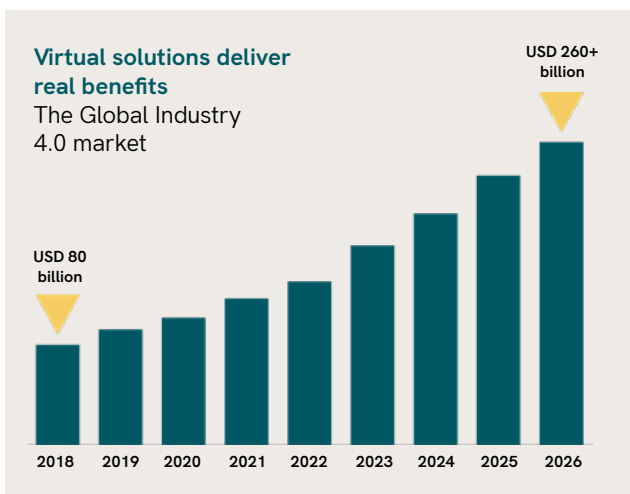# Why should you use Industry 4.0?

We've clarified what Industry 4.0 is, so let's look at why you should use Industry 4.0 in your production.

With Industry 4.0, your company achieves higher productivity, lower costs and increased profitability. It may be necessary to upgrade to new IT to take advantage of Industry 4.0 technologies, but over time it will be a good investment.
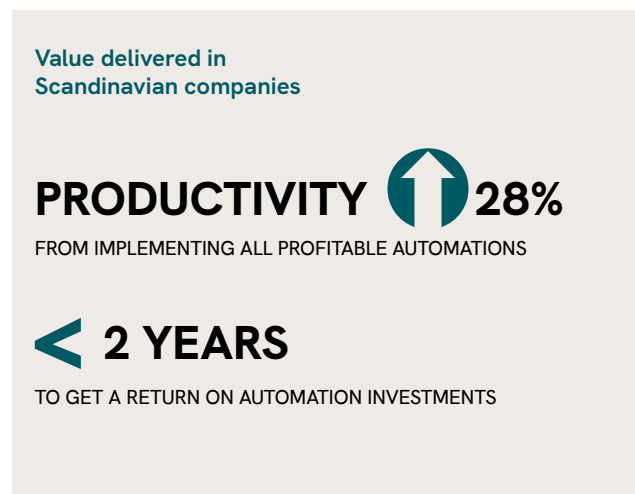
Industry 4.0 technologies lead to fewer unexpected work stoppages, which increases productivity.

The vast amounts of data also provide the opportunity to get better information about which products consumers are currently demanding, and automation makes it easy to change production quickly to meet demand.

The above are the reasons why companies in the process industry should use Industry 4.0. On the following pages you can read about which technologies you can use, what they can do and what competitive advantages they create for your company.

Virtual solutions deliver real benefits
The Global Industry 4.0 market

USD 260+ billion

USD 80 billion

2018 2019 2020 2021 2022 2023 2024 2025 2026

Source: 'Fortune Business Insights'

Value delivered in Scandinavian companies

PRODUCTIVITY ⬆ **28%**

FROM IMPLEMENTING ALL PROFITABLE AUTOMATIONS

< 2 YEARS

TO GET A RETURN ON AUTOMATION INVESTMENTS

Source: 'How far have Danish companies come with Industry 4.0?', IDA, 2020

# Which Industry 4.0 technologies exist, and what can they do?

Internet-of-Things (IoT), sometimes referred to as **Industrial Internet of Things (IIoT)**, is the network of objects (such as pumps or valves) equipped with sensors and other technology so they can exchange the information they gather with other connected devices over wireless networks. This connection enables remote monitoring, control and simulation of the objects and the systems they are part of, based on the collected data.

Augmented Reality (AR) gives you the opportunity to experience a version of the real world that has been digitally enhanced with additional information or simulated objects (e.g. Pokémon Go). **Virtual Reality (VR)** replaces the real world experience with a fully immersive computer simulation (e.g. gaming headset). **Mixed Reality (MR)** is a mixture of both, where physical and digital objects co-exist, interact and can be manipulated in real-time (e.g. Microsoft HoloLens).
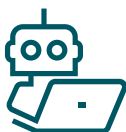
Artificial Intelligence (AI) and **Machine Learning (ML)** are related concepts that are often confused. AI is the creation of intelligent systems that can simulate human thinking and behavior. ML is a specific application of AI that enables a system to learn from input data and improve its own capabilities without programming. Big Data refers to the extremely large data sets from many data sources and in many different formats that AI and ML can analyze and interpret.

Additive Manufacturing (AM) uses a digital model (or scan) and a 3D printer for low volume production or individually customized objects. These objects can be used in production processes for prototyping and testing, or to facilitate the creation of other objects (e.g. a mold for an industrial injection molding machine).

This **5th generation (5G)** mobile network standard offers faster data transfer speeds with lower latency (delays). The increased performance enables a more reliable, seamless, high-bandwidth wireless connection between sensors, machines and devices in the network. These features make 5G an excellent platform for data exchange in IoT installations in industrial production.
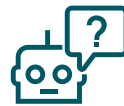
A **digital twin** is an exact virtual twin replica of a physical object, process or service. A twin can be used in the design and prototyping process, for example on a machine, to simulate and analyze daily operations under carefully controlled conditions, and to proactively predict failures or issues before they occur.

Robotic Process Automation (RPA) uses software ("robots") to mimic how a human interacts with digital systems to run a business process. RPA software uses the user interface to interpret data, provide answers and communicate with other systems to perform repetitive tasks – only faster, 24/7 and without errors.

Connected Factory: A connected factory uses sensors, digital twins and cloud-based data to analyze historical and real-time data from production devices and processes. It provides a timely, detailed insight into the quality, efficiency and yield of production facilities.

This is where Industry 4.0 adds value and competitive benefits to your company

1. Better business insight

Industry 4.0 technologies offer your company real-time reporting, better analysis of data and improved presentation of data in usable formats. This data leads to greater knowledge of business and production processes, which in turn leads to better decision-making.

This gives your company a number of benefits. For example, the data makes it easier to identify areas of improvement, giving a better understanding of where resources are best spent. You'll also be able to use the data for product development and demand forecasting.

2. Increased productivity

Industry 4.0 creates the smart factory, where cyber-physical systems monitor factory processes and track production in real-time. This makes it possible to optimize equipment efficiency and maintenance, and even predict and prevent machine downtime.

It can also help you ensure your employees are as efficient as possible. With more detailed information available about employee efficiency, production rates and quality statistics, it will be much easier to identify which employees need more training and the areas where they need support.

3. Lower operating costs

Higher productivity isn't the only thing Industry 4.0 can do for your company. The technologies can also help you save on costs by increasing automation. For example, it can accelerate time to market.

Another option is to use sensors on your equipment to send a signal when a component wears out, after which an inventory computer checks the availability of the part and orders a replacement if necessary.

The same is also possible with raw materials and other supplies. With a well-stocked facility, operations can continue at the highest level at a low cost.

Food and beverage industry:
The automation of the food and beverage industry is expected to have a value of 28 billion US dollars by 2026.

Source: www.globenewswire.com

4. Increased scalability

Automating your production will make it much easier to scale your work. This allows you to expand your range of products and test existing offers in new markets.

5. Better product quality

Data from the smart factory allows you to monitor production in much more detail in real time. This allows for much greater quality control as it is easier to detect errors, helping ensure that all products meet the agreed specifications.

For example, food and chemicals may require specific humidity and temperature levels during transportation for safety reasons and to maintain strength.

Thanks to monitors and GPS in transportation vehicles, it's possible to track products constantly after they leave the facility. This helps ensure that the products remain top quality all the way from the factory to the consumer.

6. Stronger customer relationships

With Industry 4.0, your company will be better able to serve your customers, which will ultimately keep them coming back to you rather than your competitors.

With Industry 4.0, you can reach consumers more directly, so you can tailor offers to them to match exactly what they want, when they want it. This could be a new soft drink flavour or a new type of bread.

**The pharmaceutical industry:
A study from McKinsey concludes that Industry 4.0 in the pharmaceutical industry can increase production by up to 200%.**
Source: www.mckinsey.com
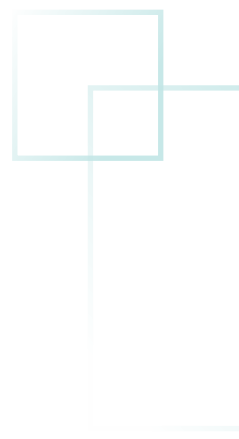
Where are the largest
Industry 4.0 opportunities
in your industry?

Food and beverage industry

Industry 4.0 offers an unprecedented opportunity for business gains for food and beverage manufacturing companies through automation.

The technologies will improve traceability, monitoring and control of food quality, while also providing more accurate predictions of production equipment condition and consumer preferences, resulting in reduced downtime, less waste and loss of resources and faster time to market. This enables a complete overview from the start of the production process until the finished product has been consumed by the consumer.

The pharmaceutical industry

Companies in the pharmaceutical industry also stand to gain great value from Industry 4.0. Especially when it comes to detecting deviations in production or making future-looking predictions and simulations. This is where digital twins with artificial intelligence can be a big help.

This is a useful way to investigate your production of pharmaceuticals because you can, for example, take a closer look at how tablets of different sizes break down in the body. You can also see the likelihood of a patient developing certain side effects. This opens up an exciting new way to manufacture drugs by running simulations of potential scenarios and using the data to develop and design new products.

The chemical industry

Industry 4.0 unlocks new growth opportunities for companies in the chemical industry. For example, you can use AI to explore and design new materials or chemical structures and develop new synthesis routes that improve sustainability. This allows researchers to be more precise in identifying the impact of individual ingredients in the mix, improving product quality.

Automation can also speed up research and development of new products from years to months, allowing you to meet new demands much faster.

The plastics industry

The biggest opportunities with Industry 4.0 in plastics processing lie in the production of individualized, customized parts and shorter development, start-up and set-up times. This makes it possible to produce even small batch sizes at a much lower cost.

How does your company get ready for Industry 4.0?

Whether your company produces food and beverages, chemicals, pharmaceuticals or plastics, the intelligent Industry 4.0 technologies have a huge potential to deliver benefits in the form of efficiency and cost savings. Yet many companies in the process industry fail to get started or reach their goals because the options are too confusing and the questions are too numerous.

We've put together four tips for you to consider first to ensure your company is ready to take the first steps towards getting value from Industry 4.0 technologies.

1. Your data must be in place

The most important step on the road to Industry 4.0 is to get your company's data under control, otherwise you could end up with corrupted data that affects the reliability and thus the quality of the decisions you make based on your data.

If you're not there yet when it comes to structuring your data, you're far from alone. According to Forbes, a study shows that unstructured data is the biggest challenge for 95% of companies that participated in the survey. However, a McKinsey study shows that taking up the challenge can pay off, with 94% of respondents saying that Industry 4.0 has made their companies more resilient to crises.

That's not the only thing you can achieve by getting a handle on your data. There are many ways to get the most out of your data, but the most common are related to optimizing production efficiency. For example, studying data from sensors in factories to learn how you can prevent production from stalling or how production can be improved.

Data can also help with predictive maintenance and automated production.

95% of companies say in a Forbes survey that unstructured data is the biggest challenge.

Source: www.forbes.com

2. The advantages of having a modern ERP system

Any business in the process industry can benefit from Industry 4.0 even with legacy systems, but to get the most out of the technologies, we recommend that yours has a modern ERP system in place. The reason is that you get the most value from Industry 4.0 technologies in the front end when your ERP and operational systems are up-to-date and future-proofed in the backend. If backend systems are outdated and don't fully support the company and enable agile processes and operational flexibility, they are unlikely to be a good starting point for adding new frontend technologies.

That's why a new and modern ERP system can benefit you.

If this is the case for you, our recommendation is to choose an ERP solution from the Microsoft Dynamics 365 platform, because a cloud-based, flexible and scalable solution will give you an excellent foundation to build on. Dynamics 365 solutions will also help ensure process efficiency, information collection and analysis, cross-device collaboration and structured knowledge sharing.

The Dynamics 365 platform is continuously updated, so your company can integrate new technologies and services as they are developed. That allows you to extend your platform with, for example, Microsoft Power Platform, which provides tools that enable your IT team or even unskilled developers to implement exciting business ideas and customized processes that can be designed and implemented in a fraction of the time it would take with typical application development processes.

3. See more value with industry-specific solutions on top of ERP

Process industry companies can also get more value from Industry 4.0 when they add an industry-specific solution on top of their ERP system. This could be Cepheo Process Industries Solutions, which is based on Microsoft Dynamics 365's cloud-based platform. The industry solution can more directly enable and support critical manufacturing, supply chain and logistics processes across the enterprise and along the supply chain without the need for customization and patches.

A production-focused solution helps ensure that business processes and production processes can be combined into a single cohesive ecosystem. With a future-proof ERP system and an industry-specific solution in place, the foundation is laid to get your business ready for Industry 4.0.

The combination of the two will help break down silos and remove bottlenecks in your company, so you can get more value from any additional front-end features you choose to add. The end result is a single integrated backend platform that will continue to add value to the company without the risk of becoming obsolete. In short, the perfect starting point for the ongoing and recurring digital transformation of your company.

According to McKinsey, 94% say that Industry 4.0 has made their companies more resilient to crises.

Source: www.mckinsey.com

4. Make a plan for the future – for your company and workforce

Getting your IT foundation in place to replace old-fashioned manual processes with intelligently connected manufacturing is an exciting part of the process of preparing your company for the future.

But it's not just about transforming the company and its technology. It's also about taking care of your employees and getting them through a cultural change that affects the way your organization is structured and managed.

A company can only move as fast as its people. Therefore, the transformation may raise concerns about the new skills required to operate and maintain "smart" technologies and the potential reduction of the workforce as a result of automation and digitalization.

Implementing a technology shift while maintaining existing production capacity and workforce requires leadership and collaboration with a strategic partner that is able to ensure that the technological transition is accompanied by carefully implemented change management, user training and employee upskilling.

Curious about Industry 4.0?

We hope you've been inspired to take a closer look at the opportunities that Industry 4.0 can offer your company.

You are, of course, welcome to contact us to discuss where it makes sense for you to start to use some of the technologies.

Contact

Rasmus Kjærgaard
Senior Sales Executive
+45 51578209
rasmus.kjaergaard@cepheo.com

Read more on **cepheo.com**

Cepheo A/S
Paulas Passage 1, Carlsberg Byen
DK 1799 Copenhagen V

cepheo@cepheo.com
cepheo.com

Cepheo empowers businesses to adapt and succeed in a changing world. With locations across the Nordics, and decades of experience in implementing and evolving industry-specific solutions powered by the Microsoft platform, we help our customers use technology and data to make more informed decisions, optimize daily operations and bring out the very best in their people. Learn more at cepheo.com.

cepheo