ACTEMIUM

Beating the odds of Industry 4.0

Solutions & Services for Industry

VINCI ENERGIES

Target Audience

The target audience of this whitepaper consists of everyone with an interest in Industry 4.0 and digital transformation. Nevertheless, the content is most suited for managers, directors and executives at industrial companies, aiming to improve their business with new technologies and ways of working.

Abstract

Digital transformation and **Industry 4.0** are only two of many tech terms that can be seen as buzzwords. A concern is raised that overuse of these words might possibly lead to a loss of meaning. During these difficult times, managers and executives are pushed to **improve the efficiency and flexibility of their processes**. As they will not be able to succeed with buzzwords alone, the purpose of this document is to **provide a meaningful definition of Industry 4.0** and everything it includes. Furthermore, the paper will **zoom in on digital transformation and discuss the key drivers of success**, including how to build a holistic and robust digital strategy.

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What is Industry 4.0?

This chapter provides an overview of the actual meaning of Industry 4.0, as there are often notable differences between what industrial companies expect from their transformation and what they actually get out of it.

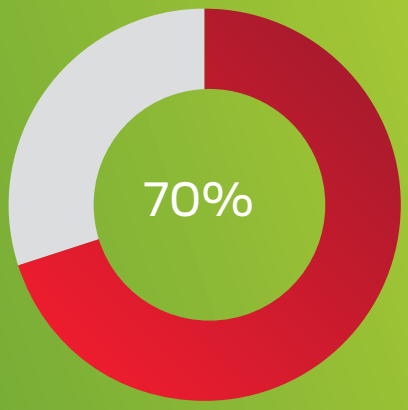
Rather a vision than a tangible goal

Nowadays, Industry 4.0 has become such a vague expression that no one fully understands it anymore. It originates from the term "Industrie 4.0", first used in 2011 as a project in the high-tech strategy of the German government, which promotes the computerisation of manufacturing. After steam power, electricity and computers, they saw data as the main driver of the fourth industrial revolution. Although data still plays an important role in the current definition, the picture has become much broader. The term now includes all tools and technologies that allow a company to work more efficiently, increase flexibility, improve quality and enable new business models. The ultimate goal would be to fully automate the decision responsibility and act accordingly. This would put humans in a more controlling, rather than an executing role.

The right tools and technologies

When looking at the tools and technologies that enable the vision of Industry 4.0, the concept of **cyber-physical systems** is a very important one. Cyber-physical systems are controlled by computers and algorithms. These devices are monitored by computers, who are in control of the physical processes involved. However, the real key to this technology resides in its feedback, which is used by the system to interpret actions, track results, and automatically improve.

As mentioned above, data is a big part of Industry 4.0 and innovations are available all across the data flow. Starting from data capturing, **Industrial Internet of Things** (IIoT) is the term that stands for getting devices connected to the internet, as well as enabling them to communicate with each other. For data transfer and sharing, **blockchain** has become a valid option. A blockchain is a list of records, called blocks, that are linked with each other by using cryptography. This technology is currently not as embedded in the manufacturing industry, but it has a lot of potential for guaranteeing full traceability across the supply chain. Once all the data is available, **data analytics** is all about correlating data from traditional and digital sources. These large volumes of data are generated continuously and might be a very valuable source of information. The data must be analysed in real-time to draw conclusions aimed at increasing efficiency and quality or opening new business lines. Effective analysis of Big Data has become way more convenient by the availability of **cloud computing**, which allows obtaining computing services through the cloud. The



of manufacturing companies is stuck in the Industry 4.0 piloting phase and fails to scale successfully

Source: McKinsey & Company

businesses using cloud computing only pay for the additional resources when they really need them.
Actemium has noticed that, next to data-related technologies, other innovations are making their way into Industry 4.0 as well. Some examples are described below. **Augmented reality** adds extra insights to the real world via smart glasses or mobile devices. It will help factories to improve machinery design and manufacturing and maintenance operations. Within production, **additive manufacturing** is making its way to the shopfloor. One of its main applications is prototyping products in a faster and cheaper way. Another technology with a high impact on production is advanced robotics. **Cobots** are robots that collaborate among themselves or with human operators. It's being anticipated that their use in factories will increase, to ease the tasks of their human co-workers by taking on repetitive or hazardous actions. Linked to this vision, **automated guided vehicles** (AGV) are autonomous vehicles used to automate the transport of goods within or between plants. Possible goals could be to make the operator's job more ergonomic or to optimise the material flow.

Defining the desired benefits

Various technologies have been described, but what about the objectives companies are trying to achieve with them? According to a recent global survey, performed by McKinsey & Company, agility and flexibility were the top priorities for companies implementing Industry 4.0. Agility to scale operations up or down in response to market demand and flexibility to customize products to customer needs have always been top priorities, but their importance was highlighted even more by the unique circumstances of the pandemic. 65% of the survey respondents indicates that they perceive Industry 4.0 more valuable since the pandemic. Besides being more agile and flexible, companies invest to optimize their way of working, in order to improve productivity, reduce costs and protect themselves against future disruptions. By listing these objectives, it becomes clear that the goals of digital transformation are the same business goals as for every other transformation. Therefore, the question arises: how do I ensure this technological transformation will successfully translate into business value?

How to get there?

Although it might seem straightforward, a lot of companies are struggling to break through the buzzwords and create value with Industry 4.0 . McKinsey & Company reports that 70% of manufacturing companies is stuck in the piloting phase and fails to scale successfully. Gartner even mentions that 80% of data projects fail to deliver business value. This is often because Industry 4.0 requires much more effort than just the implementation of new tools or technologies. If those additional steps are omitted, the transformation is doomed to fail.
Building on this insight, Acatech, the German Academy of Science and Engineering, identifies four domains within a company that are equally important to succeed: culture, information systems, organisational structure and resources. They suggest to work on the weakest domains first, instead of further developing the strengths. Their vision is supported by Forbes, among others, who launched the one-liner APPT: align people, processes and technology.

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Previous paragraphs have shown that Industry 4.0 contains both physical and digital technologies. As most difficulties occur during the digital part, the remainder of this paper will focus on this side of the story. Narrowing down the scope will also allow for more specific advice and in-depth analyses of digital transformation.

Main drivers of digital transformation

Combining the available research eventually leads to the definition of five key drivers of digital transformation, explained in more detail in the next paragraphs.

Strategy

It all starts with a holistic view on the whole transformation process, captured in a well-thought-out strategy that will guide the company towards digital success. The different steps to develop a digital transformation strategy are listed below.

1 Know where to start

By doing an assessment of the current status of the company, a complete overview of the digital maturity is acquired. This will allow to identify potential gaps in the current strategy and serve as a basis to build upon. Different governments and renown universities have all developed their own assessments with specific details, but eventually they share their ultimate goal: investigating and benchmarking the current status and vision of a company regarding digital transformation.

2 Identify clear goals

Equally important as defining the starting point, is describing the future state of the company to work towards. The ideal mix of transformation objectives would take into account high-level, strategic goals, combined with more tangible points that are tied to current problems or inefficiencies. By including objectives of these two categories, both higher management and operators will recognize their personal goals. Although the only hard constraint to an objective is that it creates value to the business, it is preferred that they are functional of nature. The suited technologies will be linked to them in a later phase.

3 Create a plan

When both the start- and endpoint of the transformation have been set, the steps in-between them can be thought out. A high-level roadmap could be an interesting way to do so. The ideal roadmap horizon would be around three to five years. It is advised to stay away from a fixed planning in this phase, as it is hard to look so far into the future and estimate how many employees and financial resources will be available at the time.

4 Define next steps

Once the roadmap is completed, everything is set to start using it. To prevent that the roadmap never gets implemented, it is strongly suggested to include some next steps into the strategy already. Whereas the strategic objectives and the roadmap had to remain strictly functional, now is a good time to start thinking about the technical side. A possible starting point could be to pick some of the projects on the roadmap with highest priority and start working on their actual implementation. On the one hand, it is important to define the needed requirements, in order to perform an adequate product selection study. On the other hand, the needed budget and throughput time should be estimated. For both parts the advice of implementation consultants could be useful.

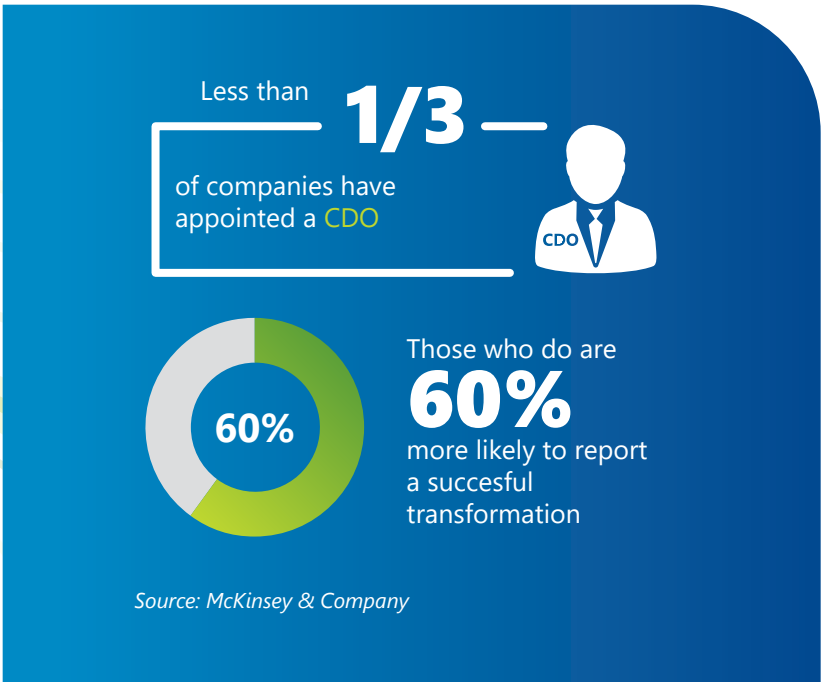
Actemium recommends to strategically work back from the desired outcomes first and then translate them into the needed technologies to avoid random implementation of new systems without integration or clear goals.

Organisation

With a clear roadmap on the table, one of the remaining questions is whether the organisation itself is ready to implement it. **Change management** is often the bottleneck for a successful transformation. Many people resist change to their work environment since it affects their comfort zone and legacy systems. Additionally, digital disruption is often seen as a threat to job security in manufacturing. Transparent and effective communication is essential to get everyone on board and motivated about the potential of new technologies. This will be boosted by the operator-related topics that are included in the roadmap. Furthermore, the vision should be carried out by top executives and a dedicated program manager.

A central **program manager** should be appointed to fully understand and keep track of the roadmap, as he will then spread the word to other employees and convince them of the value. Lying this responsibility with the Chief Information Officer (CIO) creates the risk that the focus will only be on IT and therefore decrease the chances of success. According to McKinsey & Company, the ideal solution would be to appoint a Chief Digital Officer (CDO), who has knowledge of both IT and production processes. Their research has shown that less than one third of companies have appointed a CDO to support their transformation, but those who do are 60% more likely to report a successful transformation.

A next obstacle could be the **war on talent**. Profiles who combine knowledge about digitalisation and production are hard to find, attract and retain. Freelancers or external consultants are always an option, but it is stronger to empower your capable employees and train them to become the next digital leaders. A flexible company structure will improve collaboration and enhance the sharing of knowledge. This will enable other employees to better understand the purpose of the transformation as well.



Source: McKinsey & Company

> When going through a digital transformation, "Think big, start small" is a good way of working.

IT infrastructure

Another important enabler of digital transformation is a robust and scalable IT infrastructure. Data need to be accessible across the full organisation in (near) real-time in a **central and transparent data storage.** This could be in a cloud environment, but is not obliged. A data hub/access point with data flow management is required to manage data flows between different systems and applications throughout the entire organisation. Processed or calculated data is saved back into the centralised data storage, so it is also available for other systems or processes. The centralised data storage and access point will create a standardised single-source-of-truth of the data. The idea behind such a data platform is that it can work and communicate with modular applications around it. By using a standardised data-protocol across the company, dedicated integrations between applications will be highly simplified.

Also **cybersecurity** is a major concern for any digital transformation project, since the operation network and systems will be exposed to the internet. Axians, part of the VINCI Energies Group, explains that the security of industrial IT is often even more complex and needs a specific approach. Vulnerability issues should be recognized and documented and several protection layers and fail-safe mechanisms need to be deployed to ensure that the system is completely safe and secure. Related to this, **data governance** is a system for defining who within an organisation has authority and control over data assets and how those data assets may be used. The Data Governance Institute defines the term as "a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods."

Finding real value

When going through a digital transformation, **"Think big, start small"** is a good way of working. On the one hand, it is important to always keep

the whole picture, i.e. the roadmap, in mind, as every step is part of a bigger initiative and should perfectly fit with the strategy and later projects. On the other hand, experimenting remains essential to get a grasp of what the best practices are and if it is worth continuing. For the latter purpose, a **proof of value** (POV) is an interesting concept. A POV is a small project, preferably with a high priority on the roadmap, used to detect the last practical obstacles that block the way towards scaled implementation. Moreover, this project is also a unique chance to convince the remaining non-believers within your organisation of the value that technology can create. A proof of value takes a deeper dive into the value a solution will provide for the company, in order to justify adoption and measure success.

A POV can be performed in two different steps. First a theoretical estimate of the **Return on Investment** can be made, based on assumptions about the benefits a full rollout of the solution could bring. Sometimes this will be hard to put numbers on, as e.g. the ergonomics of the operators are improved. In a second phase, the assumptions can be put to the test by (partly) implementing the technology on one machine or one line to verify whether the estimated ROI is in line with reality.

Example

Improved Equipment Reliability in the Chemical Industry

The chemical industry relies on the plants and equipment used to produce, distribute and store its products. As they traditionally use a complex and continuous production model, interruptions in the cycle, due to unavailable or poorly maintained equipment, can cause operational slowdowns and unexpected maintenance costs. Furthermore, it will severely limit the maximization of throughput and the efficiency of output. Moreover, delays to product availability or reduced quality of product might occur, both of which impact revenue directly.

Improvements in the reliability, availability and uptime of equipment can significantly strengthen a firm's competitive position and bottom line. By employing technologies such as shop floor connectivity, predictive analytics and machine learning, real-time data can be gathered and analysed to help companies visualize problems before they occur. "What-if" simulations can be used to determine the optimal time to do maintenance, allowing for changes to business processes that can result in increased reliability and availability of components. This technique is also known as predictive maintenance. By learning how and when equipment is likely to fail, more accurate scheduling and budgeting for machine maintenance can result in cost reductions, as well as an increase in operational predictability.

This case is the perfect example of a situation where a digital transformation project was initiated due to a costly problem in the production process. From this starting point, a strategy was set out to examine different solutions and plan the implementation, without forgetting about the bigger picture.

The bigger picture

Digital also means that strategies that only look at the company's own industry are likely to face severe problems. **Ecosystems** allow players to easily collaborate across industries and are eliminating the traditional, fixed model. In a digital ecosystem, many largely independent economic players join forces to create a digital offering that is more valuable than a single company's product or service, e.g. a connected car or a smart home. McKinsey & Company research mentions that an emerging set of digital ecosystems could account for more than $60 trillion in revenues by 2025, or more than 30 percent of global corporate revenues.

The way of working in an ecosystem is called **co-creation**. Deloitte describes the term as strategic partners actively collaborating to create and deliver customer-centric products and services that capture greater value, more rapidly and at lower risk than traditional product-development approaches. Organisations that cocreate effectively can engage a broad set of stakeholders to support their innovation needs, including customers, suppliers, competitors, academic institutions, non-profits, and government agencies. BCG adds that this approach will better protect the company from disruptions, as digital threats often come from new businesses enabled by innovative technologies, start-ups that undermine established business models, or new developments outside the way the company defined its competitive space.

Conclusion

The goal of this white paper was to help industrial companies that struggle to break through the buzzwords and create actual value with Industry 4.0. By understanding the real meaning of the word and keeping in mind the key drivers when going through a digital transformation, you can considerably increase your chances of success. If you wish to go over these insights in more detail or want further inspiration, our consultants are happy to discuss interesting opportunities within your company and provide support from strategy to implementation. **Launch your digital transformation today and enjoy the full benefits of the digital way of working!**

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About the author

As befits a true consultant, Kevin is passionate about creating value. During a previous experience as a management consultant, he saw many companies struggle with the implementation of their transformation. Consequently, he joined Actemium as a Digital Transformation Consultant to make true impact for their clients by aligning strategy, technology and execution. In his spare time, Kevin enjoys good food or a match at the padel court.

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