REPLY

# INDUSTRIE 4.0

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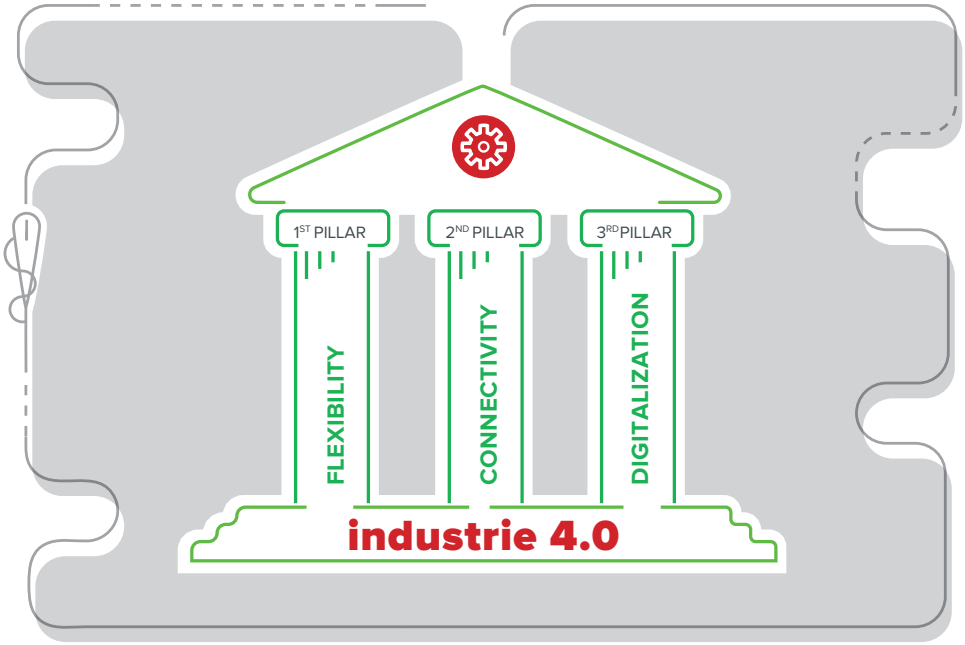
# 1. INDUSTRIE 4.0

The topic of Industrie 4.0, the fourth industrial revolution, is rising in importance in particular for the manufacturing industry. A multidisciplinary approach to new innovations and working practices, such as Industrie 4.0, requires traditional manufacturing companies to build relevant digital capabilities. Most companies are facing a transformation process to ensure they can adapt to changing customer needs and leverage on the possibilities offered by this approach. The three main pillars of Industrie 4.0 are:

- Flexibility - a more flexible, transparent and efficient production process
- Connectivity - devices must be connected
- Digitalisation - products must deliver digital functionality.




Industrie 4.0 requires a holistic solution aimed at creating a comprehensive digital environment to manufacturers across the globe, so that their production can be more flexible, connected and digitalised. The manufacturing process needs to be transparent, which enables manufactures to digitalise their internal vertical processes as well as their horizontal processes with their partners along the value chain. Both customers and vendors are now demanding smart and connected products. Companies wishing to be successful in the Industrie 4.0 space must integrate smart services (e.g. predictive maintenance, big data, etc.) to broaden their digital portfolio, giving them the opportunity to offer new business models, while creating and making products and services in a more flexible and cost efficient way.

The ideal solution consists of scalable, innovative, private or public cloud platforms which cover various aspects of the manufacturing process and help to solve their current business challenges.

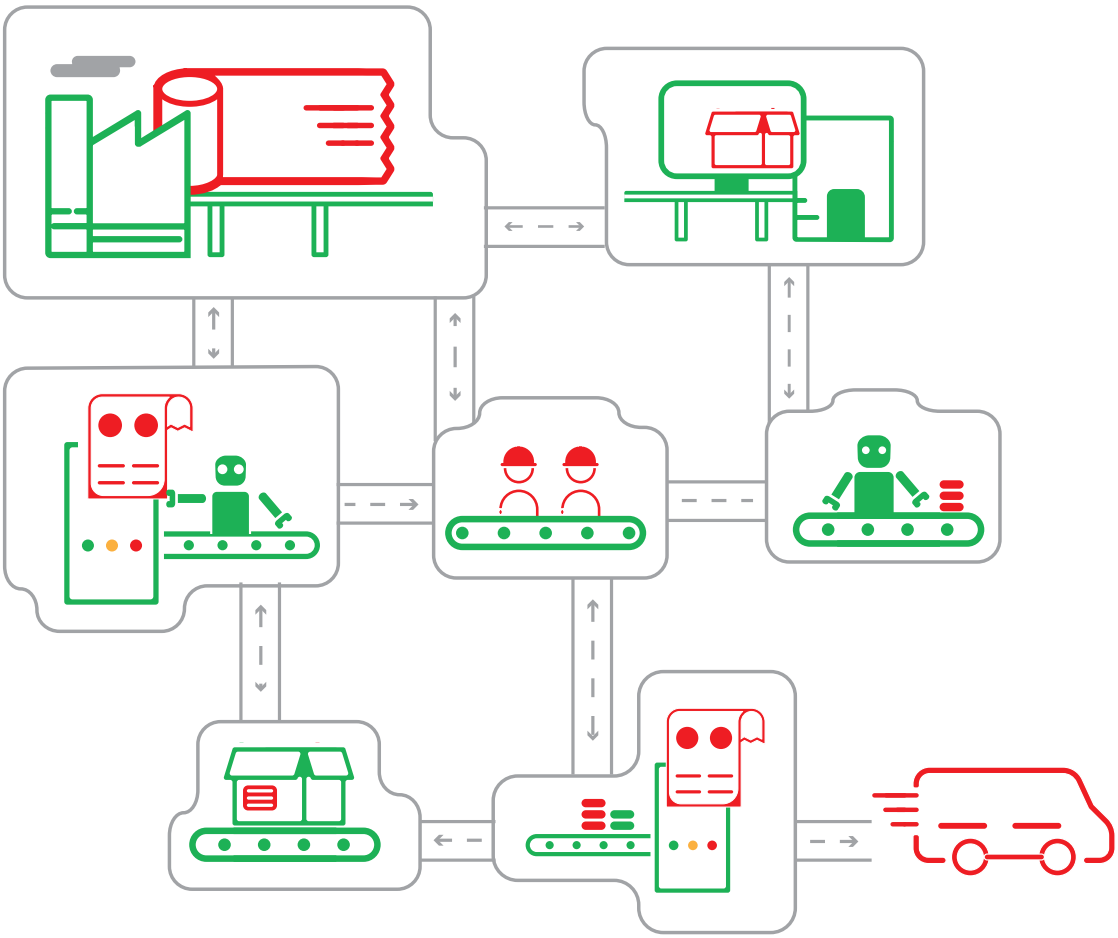
## 1.1 COST OPTIMISATION OF PRODUCTION

The increasing flexibility of production is one of the core benefits of Industrie 4.0. Shifting from mass production to smaller lots is possible thanks to the stronger influence of technology during the production process. Even the ability to customise products on a massive scale is becoming increasingly common and easier to realise, thanks to technologies like 3D printing.

Smart logistics and warehouse management with integrated augmented reality, drones, autonomous vehicles and robots provides the logistics process with visibility and traceability. In addition, the manufacturers' customers are able to integrate with their operational partners and design optimised Supply Chain Management models.

Connected machines enable predictive analytics. automatic diagnostics, prognostics and condition-monitoring solutions designed for manufacturing companies, empowering them to implement predictive maintenance. This allows them to forecast machine failures and thus reduce downtime while increasing the OEE (Overall Equipment Effectiveness).

These technologies give manufactures the tools and scope to switch to assembly islands instead of assembly lines.



Autonomous assembly islands are stations along the production cycles of industrial products, where manufacturing operations are performed independently from the assembly line. Products to be manufactured or assembled are transported to these islands (or cells) where workers perform the necessary tasks – with or without the support of industrial robots.
Afterwards, the product is transported, typically by an autonomous ground vehicle, to the next assembly island, where any subsequent manufacturing or assembly steps are performed. Organising manufacturing processes in this way allows for a largely independent operation of each manufacturing or assembly island. Resources are used in the most efficient way because routing of the product to be assembled can be adapted according to the current load status of subsequent steps.

These benefits are why the assembly island concept is currently considered the most efficient way to produce goods. A higher efficiency of production is a key component of assembly – or production islands.
Plus, due to the higher variety in the daily work routine, workers are more satisfied with their workplace environment, which results in a higher productivity and less sick leave.
Unplanned downtime no longer leads to significant business impact, in the way that it can affect assembly lines. If an assembly line stops for any reason, the whole production for this line is down. If an assembly island is down, production in the other islands can go on as planned. Only the overall manufacturing capacity is then affected. This results in significantly lower costs involved for any downtime.

## 1.2 NEW REVENUE STREAMS

The digitalisation of products facilitates the possibility of introducing new revenue streams. Connected products provide usage and user data to help manufacturers evaluate their use. They can use the information to offer new business models, such as pay per use or pay per performance.

But it is not only new business models that are a core opportunity from Industrie 4.0. The data generated by connected devices allows easy access to a whole host of statistics. This data can be used to gain detailed insights into the wear and application area of products, generating a direct R&D feedback loop.

This data impacts CRM and production, as well as the R&D department. Details about the wear of parts can be analysed, giving production teams early insights about which spare parts to produce, enabling a more flexible production overall. The end result is that the aftersales department can plan ahead, be more efficient and generates higher revenues, while raising customer satisfaction and retention.

Furthermore, predictive analytics are enabled. On one hand, predictive analytics can be used to reduce downtime in the production, while improving the OEE and significantly reducing maintenance costs. On the other hand, these services can be offered to customers as part of the device, generating new revenue streams.

# 2. TRENDS AND CHALLENGES IN IMC

## 2.1 WHERE TO GO FROM HERE?

Emerging trends in the field of Industrie 4.0 are closely linked to its three pillars (shown in Fig. 1). More and more manufacturers want to connect their machines to the internet. This connection enables them to collect data, which can be analysed by cloud providers. On-premise architectures are becoming out-of-date solutions, because they are expensive, inflexible, not scalable and more insecure than cloud architectures. A clear trend, confirmed by Amazon and Microsoft's success as providers of this service, is the transition to cloud solutions.

Smart factory architectures only perform very little data processing and analysis on-site. The architecture of the future collects and analyses data in private or public clouds. The infinite power of the cloud is a core driver leading the flexible production.  Transparent production is possible through real-time material flow, more efficient production planning and predictive analytics.

Predictive analytics is a highly scalable practice, with the potential to drive down costs. Predictive quality and maintenance are enabled by algorithms like machine learning. Solutions such as these drastically reduce maintenance costs, impact the OEE and help identify problems before they appear.

The analysis of machine-generated insights provides value for both the company and their customers, increasing the value delivered and allowing new business models like pay per use or pay per performance, giving both customers and companies measurable advantages. To leverage these advantages, companies need a strong knowledge management base to store and analyse the data in order to make best use of it.

## 2.2 INDUSTRIE 4.0 CHALLENGES

Industrie 4.0 is an interdisciplinary approach, with several touchpoints within and outside the organisation. First, a common understanding needs to be reached, including the technologies used and, based on them, project the gains that could be achieved.

The labour market in Europe is facing a shortage of specialists. Companies in Germany require 20,000 more engineers than the number of graduates from universities in Germany (Source: Institute of Labor Economics). These numbers don't include the need for business engineers and graduates from other disciplines related to Industrie 4.0.

The current labour situation not only makes it very hard for companies to find capable employees, it also inhibits them from building competencies in this area of focus, potentially threating their competitive position.

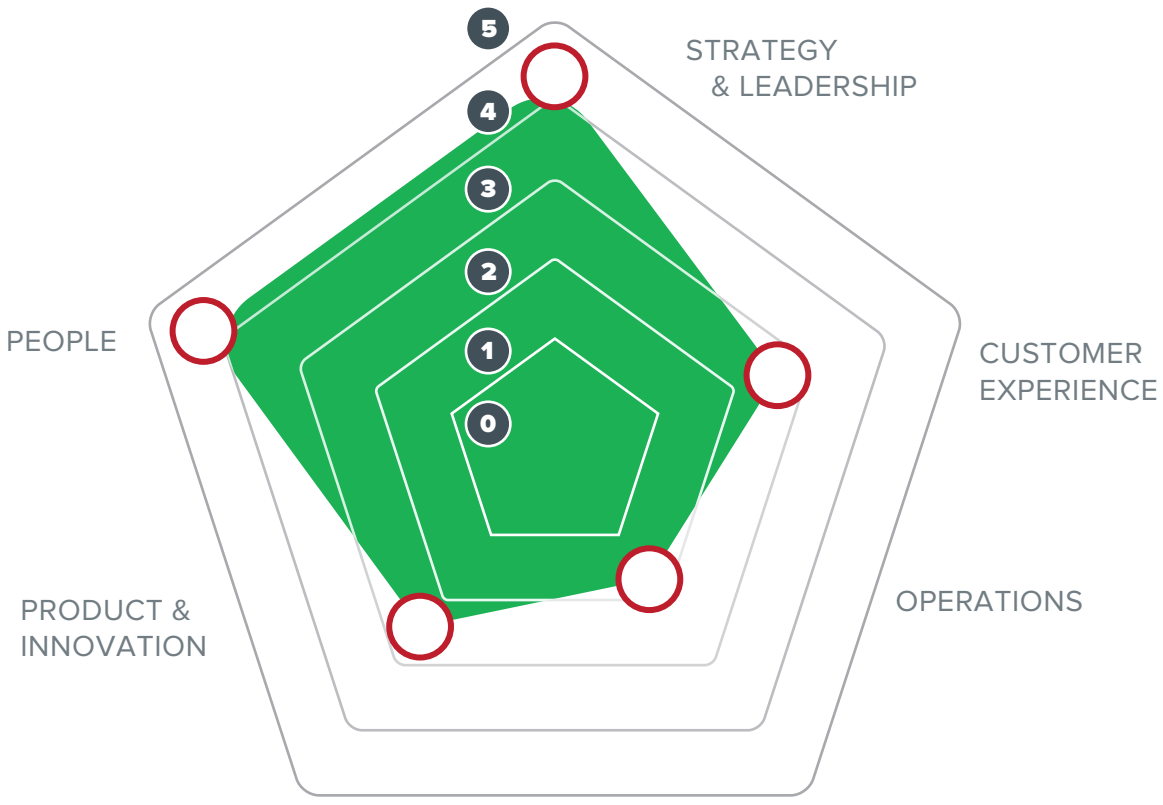
# 3. CONSULTING APPROACH

Reply offers a holistic consulting approach covering all the touchpoints along the Industrie 4.0 value chain as well as internal and external processes. This approach consists of five steps:

## 3.1 DIGITAL MATURITY ASSESSMENT

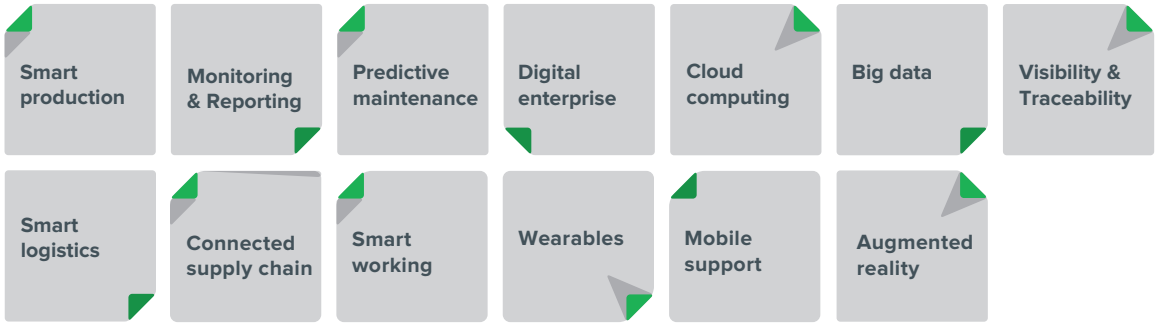
Our digital maturity assessment is an online questionnaire for parties interested in the field of Industrie 4.0. It is meant to give a rough overview about the strengths and weaknesses that the company is facing, in the areas of strategy & leadership, customer experience, operations, products & innovation and people.

The output of this questionnaire is a general assessment of the company regarding its Industrie 4.0 readiness, with a detailed description of the focus areas.



## 3.2 DIGITAL VISION WORKSHOP

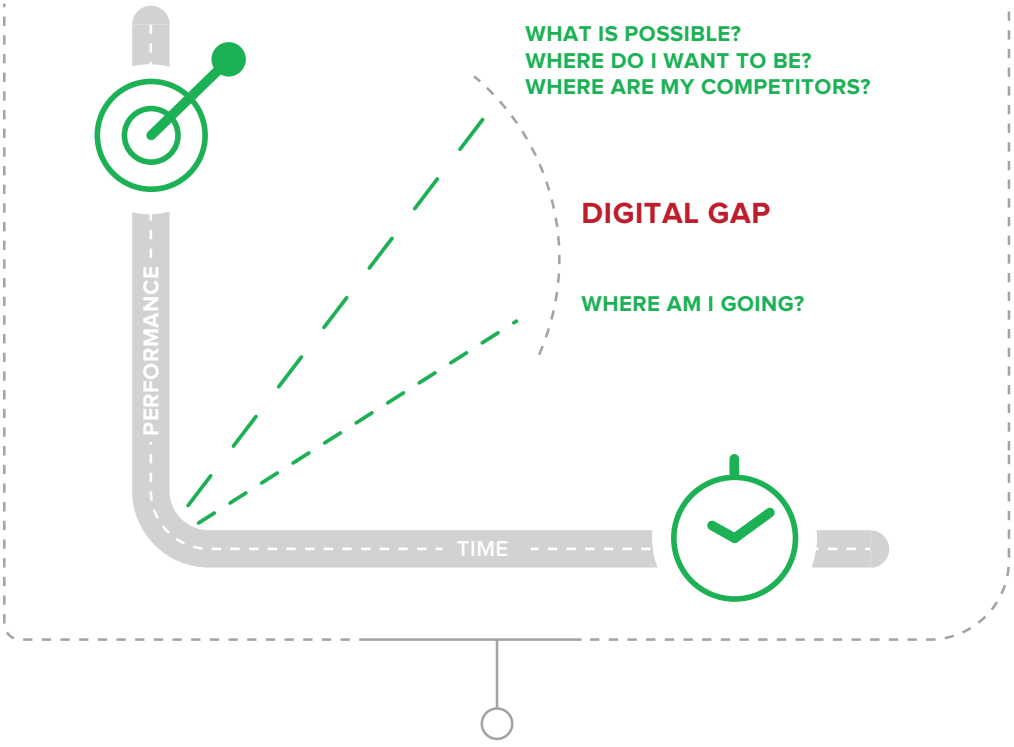
This step consists of a ‘design thinking’ workshop organised by Reply. Intended participants are key stakeholders involved in creating a common Industrie 4.0 vision, helping them to successfully prepare and implement an Industrie 4.0 strategy.




## 3.3 ANALYSIS PHASE

The outputs from the Digital Vision Workshop are used to create a deeper understanding of the challenges that the company is facing. The first step is analysis and a technical assessment. This evaluation is performed by observing processes, interviews with employees and a review of the company. Based on these, a GAP analysis is then performed.

Use cases are mapped out and refined in close cooperation with our customers to perform a cost-benefit analysis. This analysis is the foundation of a digital roadmap which will be created.

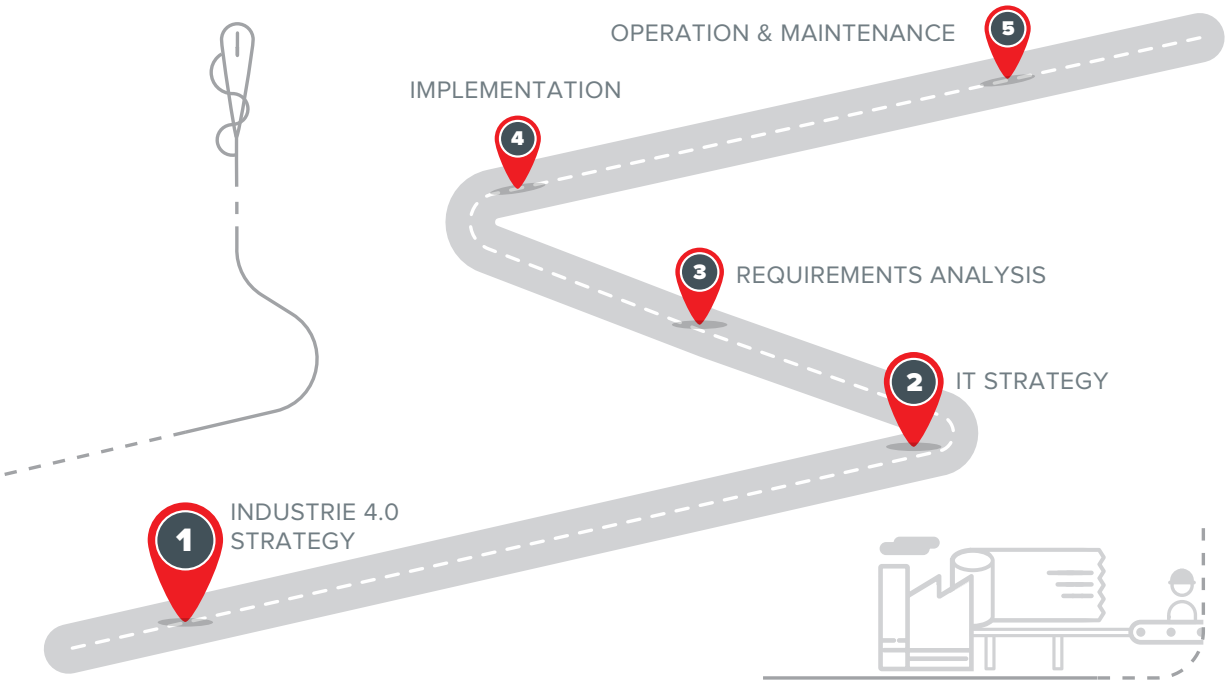


## 3.4 DIGITAL ROADMAP

The Digital Roadmap leads to the next stage of an enterprise. It should be seen as the blueprint for the realisation of an Industrie 4.0 project.

It reflects the necessary steps that need to be taken to achieve the Industrie 4.0 goals and is the foundation for the project plan. The roadmap offers the ability to refine the Industrie 4.0 vision and set milestones, and is the base for change management within the organisation.

Based on the roadmap, a first 'proof of concept' can be performed, to minimise any doubts about technical feasibility and offer insights into the technical potential of the solution. Simultaneously processes have to be redesigned and the change management element can then begin.




## 3.5 IMPLEMENTATION

This phase is characterised by the realisation of the digital roadmap. All stakeholders pursue the same objectives already agreed. Agile project management is essential to incrementally reach the pre-defined goals.

Knowledge transfer is essential in this phase of the project and can be facilitated by different workshops, trainings and hackathons. Everyone affected by the changes should be taken into account, to prevent or minimise change resistance within the organisation.

Key customers are involved in this step, serving as flagship projects to raise the visibility of new technologies and business models.

**REPLY** specialises in the design and implementation of solutions based on digital media and new communication channels. Through its network of highly specialised companies, Reply partners with major European corporations in the telecoms and media, industry and services, banking and insurance, and public administration sectors, to devise and develop business models built on the new paradigms of big data, cloud computing, digital media and the Internet of Things.
Reply's services include: Consulting, Systems Integration and Digital Services.

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