Industry 4.0 at McKinsey’s model factories

Get ready for the disruptive wave
Industry 4.0 is a confluence of disruptive digital technologies that are set to change the manufacturing sector beyond recognition: driven by the astonishing rise in data volumes, computational power, and connectivity; by the emergence of advanced analytics and business intelligence capabilities; by new forms of human-machine interaction, such as touch interfaces and augmented-reality systems; by improvements in the transfer of digital instructions to the physical world, such as in advanced robotics and 3-D printing.

To capture emerging opportunities and keep pace with the rapidly advancing technological frontier, industrial players need to act in three dimensions:

- Reach the next horizon of operational effectiveness
- Adapt business models to capture shifting value pools and
- Build foundations for the organization’s digital transformation by developing digital capabilities, enabling collaboration in the ecosystem, managing data as a valuable asset, and coming to grips with cybersecurity.

In the realistic, hands-on production environments of our digital model factories, we will accompany you on your digital journey – across all stages, from interactive training in a digital diagnostic, through to an evaluation of your digital solutions, through to the process of building your organization’s digital capabilities.
Industry 4.0 is currently hyped in the media, and long-term implications and impact are still not fully appreciated.

Interest in Industry 4.0 is rising exponentially month by month. For instance, the share of Google searches for “Industrie 4.0” relative to total searches has shot up in recent years.

That said, few truly appreciate the enormous long-term potential that is waiting to be unearthed, or indeed, the far-reaching implications of Industry 4.0 initiatives for production systems.

Google Trends graph for “Industrie 4.0” in Germany

1 Google Trends gives an estimate about search trends (number of queries for key word/total Google search queries)

Industry 4.0 is disrupting the value chain and requiring companies to rethink their way of doing business

Digital technologies are disrupting the manufacturing value chain.

In response, long-established companies are mobilizing in an attempt to turn the tables: many look to reach the next horizon of operational excellence by leveraging emerging technologies directly (e.g., advanced analytics, additive manufacturing, advanced robotics). Others are trying to develop new business models in a bid to capture shifting value pools (e.g., new factory models, virtual supplier marketplaces).

Combined, these efforts will almost inevitably lead to a complete transformation of the entire organization for most contenders.
Industry 4.0 – disruptive technologies will demand intense capability building

The fast-approaching digital transformation will involve an array of technologies that promise to reshape the way things are made. To get the most out of Industry 4.0 technologies, companies will have to invest heavily in building capabilities in at least four dimensions.

**Data, computational power, and connectivity**
- Big data/open data
- Internet of things/M2M
- Cloud technology

**Analytics and intelligence**
- Digitization and automation of knowledge work
- Advanced analytics

**Human-machine interaction**
- Touch interfaces and next-level GUls
- Virtual and augmented reality

**Conversion to the physical world**
- Additive manufacturing (i.e., 3-D printing)
- Advanced robotics (e.g., human-robot collaboration)
- Energy storage and harvesting
Data-driven improvements have to consider technology and people process

In the digital world, you firstly need to deploy advanced technology to seek out relevant information in the giant data lakes by identifying promising patterns. Next, you have to synthesize the information culled to derive insights relevant to your business. And then, you have to leave the sphere of technology and take into account the human factor – especially as you move on to the business of deriving and implementing action plans, tracking progress, and changing the way your people work.

**Technology driven**

- **Data**
  - Translate and connect

- **Insight**
  - Identify value driver
  - Derive action plan

- **Impact**
  - Track progress and financials

**People driven**

- **Action**
  - Information
To identify the right opportunities for your industry, McKinsey developed a Digital Compass to identify most promising Industry 4.0 opportunities.

Over the years, we have worked on many client projects focused on Industry 4.0 and have harvested masses of relevant data for our benchmark database. Drawing on this powerful combination of experience, knowledge, and insights, we have built a Digital Compass that will help you identify the most promising opportunities – along all links of your supply chain – allowing you to make informed decisions on which tasks to prioritize.

10 - 40% reduction of maintenance costs\(^7\)

20 - 50% reduction in time to market\(^7\)

Forecasting accuracy increased to 85+\(^5\)

Costs for quality reduced by 10 - 20\(^6\)

Costs for inventory holding decreased by 20 - 50\(^5\)

Productivity increase by 3 - 5\(^1\)

30 - 50% reduction of total machine downtime\(^2\)

45 - 55% increase of productivity in technical professions through automation of knowledge work\(^4\)

1 Client experience
2 McKinsey analysis
3 Maintenance, repair, and operations
4 Cf. McKinsey Global Institute: Disruptive technologies
5 McKinsey analysis
7 Cf. McKinsey Global Institute: Big data: The next frontier for innovation, competition, and productivity

SOURCE: McKinsey
We developed our model factories to help you on your digital journey.

America
1. MCC Atlanta
2. DMDII Chicago

EMEA
3. CC Karlsruhe
4. CiP Darmstadt
5. MCC Munich
6. AM MF Erlangen
7. DLH Aachen
8. LEF Venice

Asia
9. DLH Singapore

New in 2016
Our distinctive digital offerings on capability building

Digital manufacturing

Our digital model factories offer you the opportunity to work through all elements of an Industry 4.0 transformation in a realistic, hands-on manufacturing environment – from the diagnostic phase, through to the evaluation of digital solutions, through to the process of building up your organizational capabilities.

Digital warehouse operation

In our model warehouse, you will experience firsthand the impact of Industry 4.0 on conventional warehouse processes. Our faculty of experts will support your efforts to build capabilities in Industry 4.0 warehouse automation technologies.

Additive manufacturing

In a realistic environment, you will experience state-of-the-art additive manufacturing (AM) technologies, from design through to printing and post-processing. In collaboration with PARTNER, McKinsey experts will work with you through all elements of AM operation.

Opening 2016
Some impressions on realized use cases

**Digital quality management**

**Digital poka yoke**

**Predictive maintenance**

**Variability monitoring on workstation level**
Key contacts

Erhard Feige
Practice Manager
EMEA Learning Factories
Hamburg
Specialized in lean manufacturing, green, quality, and digital manufacturing

Markus Hammer
Senior Expert
Vienna
Specialized in green and lean manufacturing, and digital manufacturing

Rainer Ulrich
Senior Expert
Stuttgart
Specialized in pharma, lean manufacturing, quality, and digital manufacturing

Daniele Iacovelli
Expert Associate Principal
Hamburg
Specialized in Industry 4.0 and digital performance management

Jörg Bromberger
Senior Practice Manager
Berlin
Specialized in additive manufacturing and digital manufacturing
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Please feel free to contact us for more information:
EMEA_modelfactory@mckinsey.com
www.capability-center.mckinsey.com