Developing the future of manufacturing
Industry 4.0 offers many ways to create value and remain competitive

- **Semiconductors**
  - 90% redeployment of operator Full Time Equivalent (FTE)
  - 30-50% production ramp-up through automated real-time dispatching

- **Automotive**
  - Reduced machine downtime and 10-20% quality cost reduction using real-time data analytics

- **Aerospace**
  - 4 weeks shorter LTA cycle and 2-3% higher revenue using advanced analytics to forecast demand for aircraft components

- **Consumer**
  - 20-50% reduction in inventory management cost through smart inventory and automated ordering

- **Mining**
  - 3% increase in mining yield using advanced analytics

- **Power**
  - 45% reduction in maintenance costs using predictive maintenance

- **Oil & Gas**
  - 30-50% redeployment of FTEs through digitization of oil drilling, field development, and operations

**Companies must overcome multiple challenges along the digital transformation journey**

McKinsey interviewed 400 qualified manufacturers and suppliers in four key markets (United States, Germany, Japan, and China) and found the following challenges:

- **Lack of clear vision and strategy**
  - Roughly 70% of EU companies admit to not having a systematic roadmap or toolbox for easy rollout of digital manufacturing solutions

- **Concern with regard to data management and security**
  - 18% of all EU companies have concerns over data ownership, data capturing, and ability to analyze large amounts of data

- **Difficulty managing and attracting digital talent**
  - 21% of all EU companies face a talent war as their biggest obstacle

- **To supplement new hiring, companies need to build capabilities in-house; experiential learning is the most effective way to build capabilities quickly**

**Industry 4.0**

Industry 4.0 is the new source of substantial productivity gains. "Industry 4.0" spans an exciting array of digital technologies that are set to change industrial and commercial operations beyond recognition.

By 2030, ~50 billion connected machines compared to ~1 billion people connected today

By 2025, €2.5 trillion value from IoT in Europe digitizing the industrial sector

Today, European economy operates at only 12% of the digital potential

**Source:** McKinsey analysis
The Digital Capability Center in Venice helps to create significant business impact through hands-on digital lean use cases across the value chain.

Key lean levers:
- Experience a full lean transformation journey in a quotation model office to reach better customer satisfaction
- Apply Design-to-Value and Design-to-Cost at scale to increase customer perceived value and reduce cost in manufacturing
- Optimize production planning and scheduling through lean supply chain principles
- Get efficiency improvement by applying lean principles to a model procurement office

Key digital levers:
- 3D printing prototype
- Rapid experimentation & simulation
- Product lifecycle management
- Predictive forecast
- Real-time supply chain performance & optimization
- Advanced schedule
- E-spending analysis
- Online supplier list
- E-bidding platform
- Online ordering
- Reduce manufacturing costs by applying lean principles in a discrete and continuous manufacturing line as well as in a quality control lab
- Digital performance management
- Digital quality management
- Predictive maintenance
- Energy optimization
- Increase labor productivity by leveraging man-machine separation and automation of the line
- Human-robot collaboration
- Automation of knowledge work
- Remote monitor & control
- Increase internal logistics efficiency by implementing lean principles in a model warehouse
- Warehouse automation
- Live route optimization
- Online platform of trucking fleets
- Learn how to be flexible and proactively listen to the voice of the customer
- Full product traceability
- Predictive maintenance
- Remote expert supporting

Total impact:
- Revenue increased by 5-10%
- Cost reduced by 10-30%
- Quality improved by 30-50%
- Lead time shortened by 20-50%

1 Upcoming soon.
Digital Capability Center Venice

Digital Capability Center (DCC) Venice provides a holistic solution to help you tackle real-life production challenges and try out new technologies to support your digital lean capabilities.

An innovative capability building facility founded by McKinsey and the Industrial Association of Pordenone, the DCC Venice showcases the future of Industry 4.0 and provides end-to-end training on digital lean capabilities that drive bottom-line impact.

The center organizes several lean and digital experiential trainings in different learning environments – manufacturing model factory with a quality lab, several model offices spanning different industries, and a model warehouse. This set of environments will guide you through the main steps of a lean and digital transformation and you will be able to see how lean management and digital use cases can be applied to the entire value chain.

At the DCC Venice you will be able to:

- Build a blueprint for an implementation roadmap at your company
- Experience what a digital transformation looks like on the model factory floor
- Access cutting-edge innovations through our technology ecosystem partners

The DCC Venice produces compressors commonly used in many household devices.
DCC Venice offers a world class, global curriculum covering 70+ experiential learning modules for digital lean operations

Lean & digital essentials

Lean
- Leading to see waste
- Root cause problem solving
- Standardization
- Performance management and dialogue
- Feedback and coaching

Digital
- Cybersecurity for integrated network
- End-to-end product traceability and automated flow
- Digital Transformation Program – key components and how to maximize impact

Resources
- Yield, energy, and through-put optimization

Processes
- Application of 3D printing
- Process and layout design using digital twin
- Line balancing and smart routing in real time

Asset utilization
- Predictive, remote, and self-guided maintenance
- Use of augmented reality and virtual reality support
- Automated maintenance scheduling

Quality
- Optimization of equipment working parameters
- Digital quality inspections
- Real-time adaptive quality assistance

Inventory and planning
- Intelligent material storage, autonomous vehicles, production-sequence-linked storage
- Use of end-to-end digital thread
- Production planning, scheduling and demand leveling
- Digital supply chain

Service after sale
- Change of the business model servitization and platform
- Digital Customer Relationship Management (CRM)

Management infrastructure

- Integrated digital performance management
- Digitally enabled root cause problem solving
- Digitally supported capability-building process

Mindsets, behaviors, and capabilities

- Mindset shift to enable Industry 4.0 transformation in the workplace
- Abilities to work with new digital elements, e.g., collaborative robots
- Adaptation to fast-changing environment

Our global DCC network provides a tailored capability-building support anywhere any time

Experiential learning
Hands-on exercises to learn-by-doing, that lead to higher retention

Cutting edge expertise
Distinctive and practical guidance on how to incorporate Industry 4.0 technologies in your company

Accelerated pace of learning
Digital transformation of the line in one day

Risk-free environment
Experiment without concern for impacting ongoing operations

Real production equipment
Tangible, relevant assets for observing applications of Industry 4.0 in manufacturing

Interaction with operators
Frontline operators bring to life mindsets & behaviors

Countries
- Venice
- Aachen
- Beijing
- Singapore

Partnerships
- Digital Capability Center Aachen
- Digital Capability Center Chicago
- Digital Capability Center Beijing
- Digital Capability Center Singapore
- Digital Capability Center Venice

Full-fledged production lines
- Stopwatches
- Smart, customized wristband
- Compressor
- Iced-tea Gearbox
- Gearbox
- Compressor
You and your team will be able to explore state-of-the-art business cases of digital industrial technologies
Examples of initial learning modules below; others to be added over the course of 2018

1. Digital operator assistant
   Learn how real-time, adaptive work instructions with data capture can improve quality, reduce variability and training time, and facilitate best practice sharing.
   Understand how human-robot collaboration can increase shopfloor productivity and improve value-added activities, while assuring quality and sustaining workload balancing.

2. Health & Safety 4.0
   See how to track operators around the shopfloor to favor evaluation plans, provide quick rescue and alert in case of man down.
   Discover how smart tracking can foster the monitoring of correct usage of Personal Protective Equipment on the shopfloor.
   Learn how to improve the ergonomics of the shopfloor in a real-time and objective way thanks to sensors able to capture repetitive motions and potentially painful activities.

3. Digital performance management
   Learn how performance and health data can be aggregated, analyzed, and shared in real-time to draw actionable insights and take quick fact-based decisions.
   See how root cause problem solving is boosted by advanced analytics and expertise at your fingertips on a digital whiteboard.

4. Real-time and adaptive quality management
   Experience how to create Machine-to-Machine communication between production and quality department, in order to obtain real-time feedback and automatically adjusting machine program parameters.
   Learn how to optimize the time spent in quality control lab by adaptive sampling according to trend analysis on the inspected workpieces.

5. Cybersecurity
   Experience a cyberattack on the shopfloor and touch the impact it creates.
   Learn how to define a prevention strategy leveraging the hardware infrastructure and fostering the right behaviors.
   Understand the main pillars of a structured and systematic recovery plan to react promptly to a possible hacker attack.

6. Industry 4.0 Business model
   Discover how to rethink your business model according to Industry 4.0.
   Learn how to collect data from connected products that give powerful insights on clients’ behaviors and reverse engineering opportunities.
   Get inspired on how to increase your value proposition through a real-time after sale service and a CRM monitoring all the sold goods around the world.
How the DCC can help you

The DCC offers a tailored curriculum for every level of your organization. McKinsey offers a unique choice of capability building programs at scale to support companies across all stages of their digital transformation journey.

Key takeaways from workshops

1. Understand the bottom-line impact of digital lean solutions
2. Identify which technologies are relevant to your operations and how to harness them across your value chain
3. Learn how to start, scale, and sustain your digital lean journey
4. Understand what needs to be in place in your organization to be successful

Carefully designed agendas balance theory with practical exercises

During your time at the DCC Venice, you will experience a carefully designed mix of theory training by our expert faculty and practical hands-on exercises, designed to bring what you have learned to life. We aim to ensure that all participants spend at least half their time doing, rather than listening.

<table>
<thead>
<tr>
<th>Half-day workshops for CEOs</th>
<th>1-day workshops for CxOs</th>
<th>3-day deep dive workshops</th>
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<tbody>
<tr>
<td>Create a vision for what is possible with digital and how it could enable your operations</td>
<td>Envision your company’s digital future state and begin to develop a digital transformation roadmap tailored to your business needs</td>
<td>Focus on key Industry 4.0 themes to understand the supporting technology, where it is relevant and how to implement it</td>
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Sample Digital Lean Awareness agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 am</td>
<td>Welcome and introduction to DCC Venice</td>
</tr>
<tr>
<td>08:15 am</td>
<td>Lean Calibration</td>
</tr>
<tr>
<td>09:00 am</td>
<td>Diagnosing the digital need in a lean line</td>
</tr>
<tr>
<td>10:00 am</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:15 am</td>
<td>Introduction to Industry 4.0</td>
</tr>
<tr>
<td>11:00 am</td>
<td>General digital waste walk</td>
</tr>
<tr>
<td>12:00 am</td>
<td>Lunch break</td>
</tr>
<tr>
<td>01:00 pm</td>
<td>Define a future digital state</td>
</tr>
<tr>
<td>01:30 pm</td>
<td>Observe Industry 4.0 in action</td>
</tr>
<tr>
<td>03:00 pm</td>
<td>Closing session and next steps</td>
</tr>
<tr>
<td>04:00 pm</td>
<td>Departure for Venice airport</td>
</tr>
</tbody>
</table>

Theory – Exercise ratio 50 : 50

Hands-on exercises included
We are creating and refining the digital model factory thanks to fruitful collaboration of several remarkable players.

You can gain access to a wide network of leading players spanning the digital technology and capabilities you need to foster digital transformation. At DCC Venice you can touch and feel digital use cases, meet technical players able to address the most demanding challenges, and experience an environment serving as a catalyst for the digital transformation at your site.

Select the DCC technology player

Please contact the following McKinsey experts to learn more about DCC Venice and get an individual solution to your business:

Alberto Bettoli  
Senior Partner  
Digital Manufacturing

Rainer Ulrich  
Partner  
Digital Manufacturing

Sergio Farioli  
Senior Implementation Leader  
McKinsey Implementation

Daniele Iacovelli  
Expert Associate Partner  
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