McKinsey&Company

LEAN CONTINUOUS FACTORY

@ McKinsey Capability Center Atlanta

Turning continuous operations into
a competitive advantage

The efficiency imperative

To deliver the next step change in operational productivity, companies will need to make broad and deep changes across their operations.

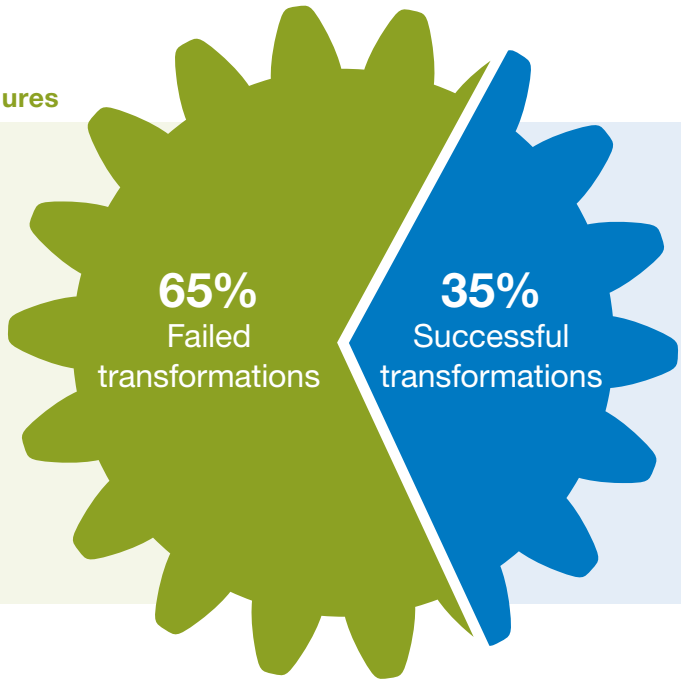
Does your organization have the capabilities to make that happen?

Only one-third of companies achieve truly sustainable transformations

When companies embark on efforts to transform, too many find it difficult to sustain their initial performance improvements over the long-term. Among the organizations that succeed, **the biggest differentiator** is the way they **develop the skills and capabilities of their people.**

Factors contributing to failures

1. Not enough leadership capacity
2. Lack of capabilities and knowledge
3. Poor accountability and performance dialogues
4. Misalignment of aspirations across organization



Factors key to success

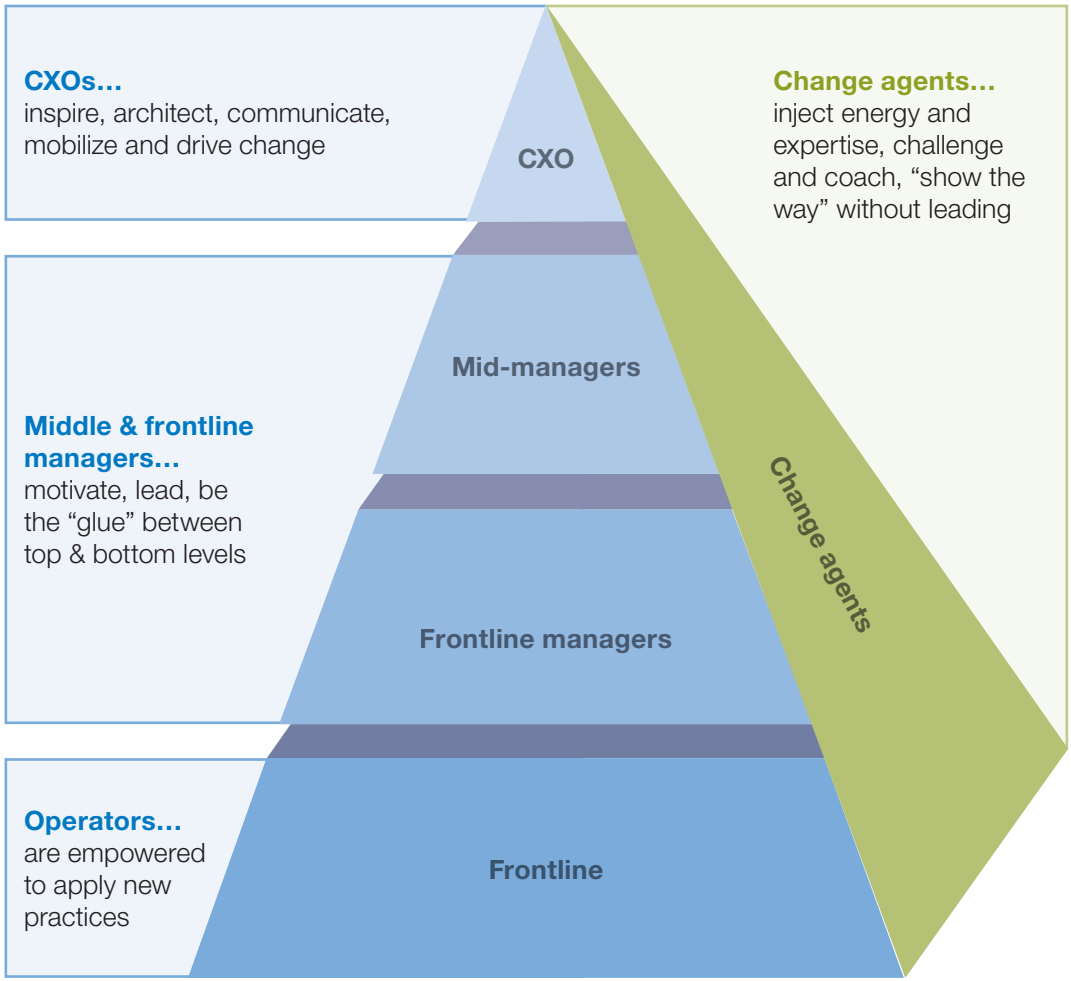
1. **Technical system:** Lean toolbox
2. **Mindsets and behaviors:** "Lean Academy" to transfer and scale Lean skills
3. **Management infrastructure:** Lean KPIs and performance dialogues

The most effective transformations use a holistic approach in their capability-building efforts. They focus as much on fostering the right attitudes and culture as on the implementation of the technical tools needed to find and capture improvement opportunities. They embed their commitment to improvement into their company-wide performance management systems.

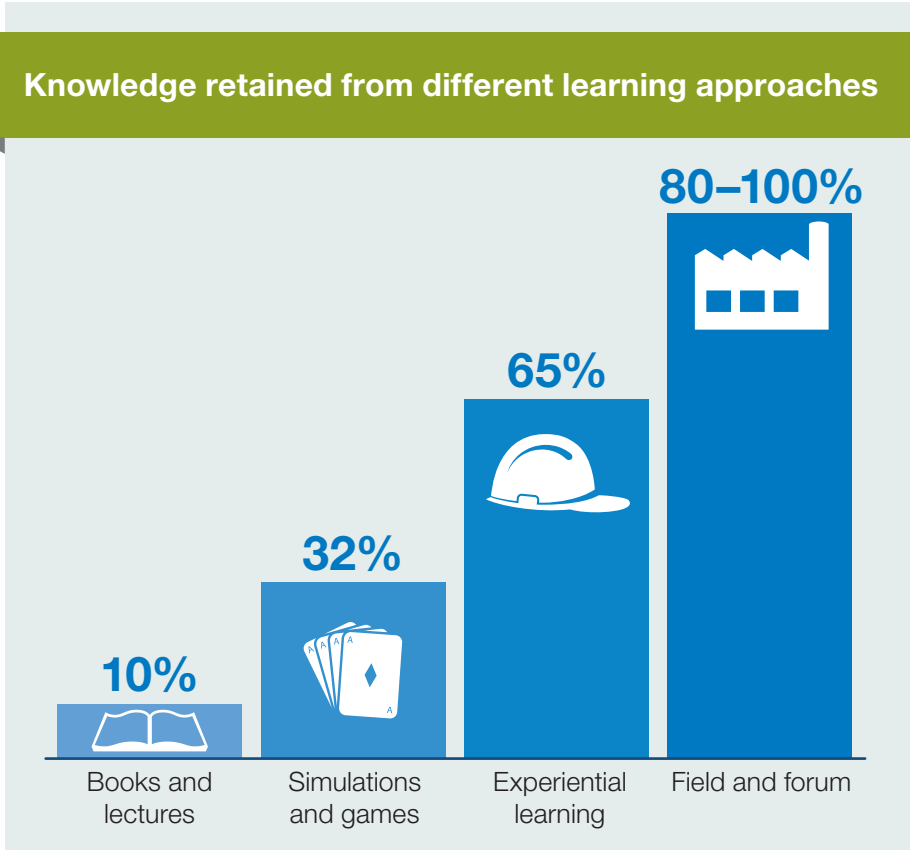
Source: McKinsey Quarterly Transformational Change Survey 2010; n=2661 interviews

Success requires new capabilities at every level of the organization

One of the principle challenges in transformation efforts is ensuring that the right skills and attitudes are **developed in all layers of the organization,** from senior management to the front line. The best companies make holistic capability building a priority, tailoring their training and coaching efforts to the specific needs and motivations of each part of the business.



Capabilities are best developed in an experiential environment



Adults learn best in an environment that offers them a rich, interactive experience and the freedom to experiment and make mistakes without risk. Dedicated experiential learning facilities provide the ideal combination of real manufacturing issues and opportunities with the flexibility and freedom to fail. Experience shows that not only do people learn faster in such environments, but they also remember more and are better prepared to apply what they learned when they return to their everyday roles.

Source: Whitmore: Coaching for performance, 2002; McKinsey interviews

The McKinsey Lean Continuous Factory offers optimal learning conditions for resource productivity capabilities

Experiential learning
A risk-free environment to build and test improvement ideas

Widely relevant production line
Production line with both continuous and discrete process steps

Cutting-edge expertise
Distinctive, cutting edge and practical expertise including lean operations toolkit

Expert faculty
A pool of local and global experts and coaches

Comprehensive curriculum
Targeted courses that draw on more than 50 modules

Our dedicated **Lean Continuous Factory** at the McKinsey Capability Center in Atlanta **is the perfect environment in which to develop the capabilities needed** to transform lean continuous operations. Equipped with real manufacturing equipment and capable of running both continuous and discrete production operations, the model factory offers a comprehensive, flexible curriculum, supported by a faculty of deeply experienced practitioners. The facility is part of McKinsey's global network of model factories.

The Lean Continuous Factory's genuine production experience provides real insights into resource productivity and lean improvement opportunities

The Lean Continuous Factory isn't a game or simulation. It is a real production environment, using real manufacturing machinery and industrial control technologies. The equipment installed at the factory has been carefully selected to encompass both continuous processes, like heat exchangers and pumps, and discrete operations, like grinding and separation. The facility can be used to develop skills in lean continuous operations and resource productivity. Training participants use the facility to **identify sources of waste, implement and test improvement ideas**, calculate the resulting savings and sustain those results by building an effective continuous improvement infrastructure.

A. Control Room
The line is centered around a control room to monitor production and detect variability that cannot be detected visually on the line

B. Filtration & water treatment
Reverse osmosis membrane
Over-specification

C. Water heating
In-line gas heater

D. Learning station
Pumps
Right-size the equipment

E. Operators
Labor savings

F. Separation
Vibratory separator
Scrap and rework

G. Grinding
Hammer mill
Speed losses

H. Drying
Oven
Scrap

I. Reaction catalyzed by agitation & heat
Steam-heated reactor
OEE and yield

J. Equipment
Capital savings

K. Sterilization and cooling
Heat exchangers
Heat integration

L. Final product storage
Holding tanks
Quality

M. Steam
Boiler
Transport losses

N. Compressed air
Compressor and air drier
Maintenance

O. Cooling fluid
Chiller
Overproduction

Directly relevant training for a broad range of industries

Open-pit mining

Example key challenges:

- Understanding the energy intensity of each step in the process and the influence operators have on energy consumption
- Managing variability in mining process steps and the resulting migration of the bottleneck to different points in the value chain

How the Lean Continuous Factory can help:

- Proprietary toolkit to help quantify energy used at each value-adding step and how performance can be improved through changes in operator behavior
- Simulating variability and bottleneck migration, the impact on total throughput, and learning approaches to increase stability and apply stochastic modeling techniques

Mineral benefication

Example key challenges:

- Understanding optimal load points in grinding and milling to maximize energy efficiency
- Using a control room to effectively manage performance
- Lacking rigor in the use of SOPs

How the Lean Continuous Factory can help:

- Load and energy consumption analysis to help optimize grinder load points
- Control room performance management tools and capabilities
- Effective use of SOPs and ways to ensure their use

Oil & Gas Pharmaceuticals Metals Glass Paper & Pulp

The equipment, process steps, improvement tools and techniques taught at the Lean Continuous Factory are directly applicable to **real operational issues** in a large number of industries. Participants in a wide array of continuous and discrete production processes will immediately **recognize the opportunities they see** in the model factory environment and will quickly understand how they can apply the same change techniques in their own facilities.

Chemicals

Example key challenges:

- Utilizing a control room environment to monitor production and energy use
- Optimizing yield

How the Lean Continuous Factory can help:

- Factory control room demonstrates best practice and allows experimentation in a risk-free environment
- Hands-on production environment in which to experiment with the balance between yield, throughput, and resource constraints

Food processing

Example key challenges:

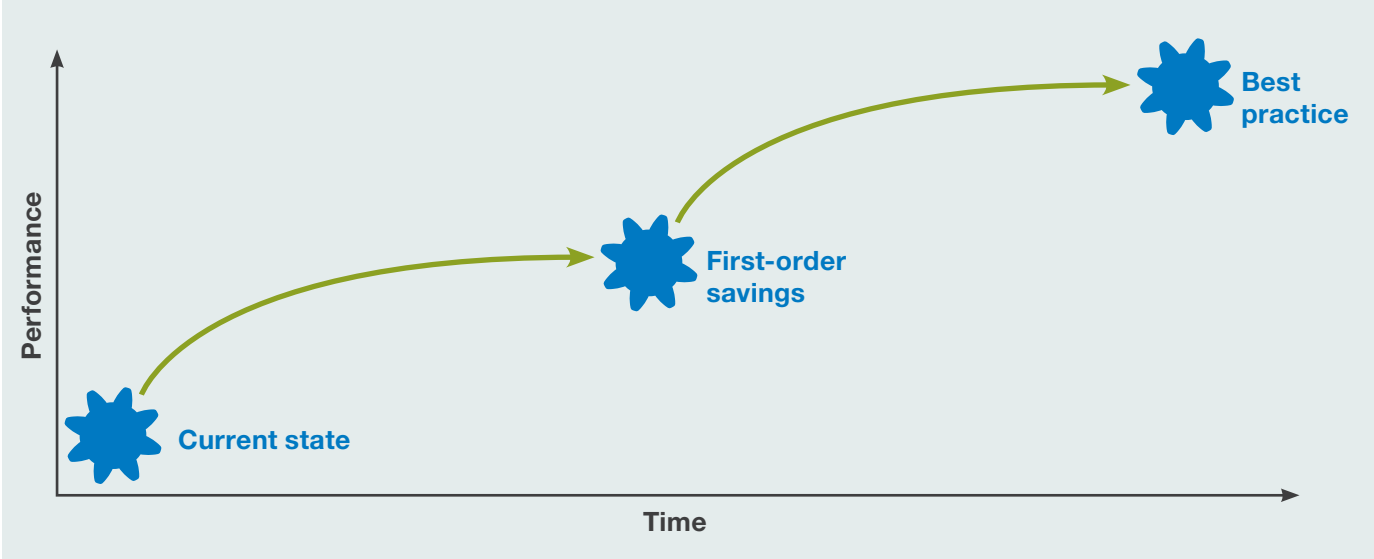
- Maintaining quality in compliance with standards
- Minimizing water usage while maintaining operational standards

How the Lean Continuous Factory can help:

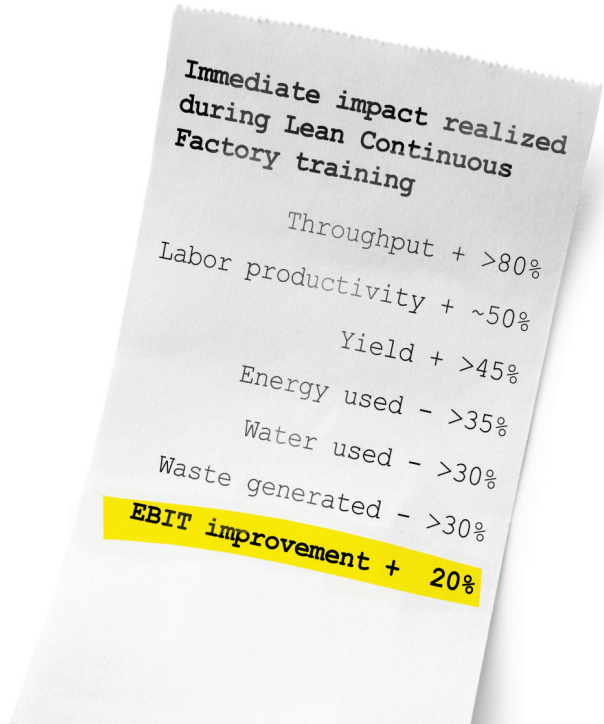
- Process and quality control monitoring to understand cost effective ways of maintaining quality
- Proprietary toolkit to analyze and minimize water consumption

Power Generation | Waste Treatment | Automotive & Assembly | Aerospace & Defense

Watch the transformation physically unfold, yielding significant improvements in just one day

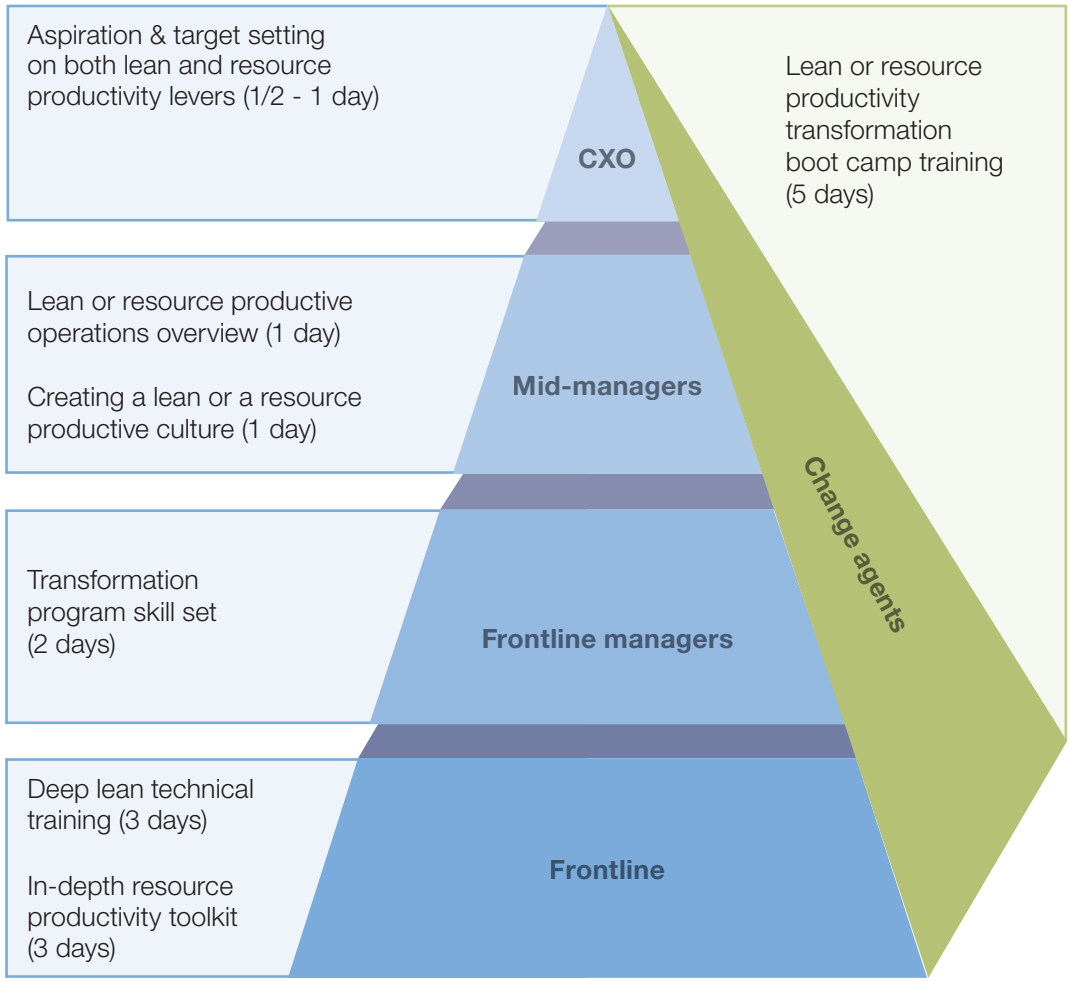


The production line at the Lean Continuous Factory **physically transforms**, changing the equipment layout and production process used from an initial, sub-optimal state to best practice. This change can take place in as little as a day. A phased transformation process, with the capture of initial savings followed by a leap to best practice, encourages participants to **push the boundaries of their thinking**. The Lean Continuous Factory demonstrates real, significant, and tangible improvements of key performance metrics within the course of a workshop, whether one day or one week.



A tailored curriculum for every level of your organization

A resource productive transformation makes different demands on different parts of the organization. The Lean Continuous Factory offers **a comprehensive set of training programs tailored to meet these varied needs**. Such courses range from half-day introductions on lean operations for senior leadership, to five-day intensive lean transformation boot camps for dedicated change agents.



Fully customizable content from a choice of 50+ modules

Every company is different, and the capability requirements for each stage of an organization's transformation journey depend upon the nature of its manufacturing processes, workforce and culture. In recognition of this, Lean Continuous Factory **courses can be fully customized** to suit the specific needs of our clients. A choice of more than fifty separate learning modules, covering the complete transformation process, means that participants can always **focus on what matters most to them.**

Lean Continuous Operations	
L1	Key to successful transformations
L2	Learning to see
L3	Value stream mapping
L4	Labor productivity
L5	Overall equipment effectiveness (OEE)
L6	Quick changeover
L7	Standard work
L8	Maintenance and reliability
L9	5S
L10	Quality
L11	Design for value

Resource Productivity	
R1	Learning to see resource waste
R2	Resource loss framework
R3	Resource value stream mapping
R4	Loss bridge
R5	Load curve
R6	Temperature mapping
R7	Network map and loss analysis
R8	Resource life cycle analysis
R9	Machine system analysis
R10	Cost curve
R11	RedE - quantification of levers
R12	Design for resource productive systems

Management Infrastructure	
H1	Transformation design
H2	Performance management
H3	Performance dialogues
H4	Visual management
H5	Metrics & targets
H6	Skills matrix & training plans
H7	Problem resolution process
H8	Root cause problem solving
H9	Continuous improvement

Mindsets & Behaviors	
H10	Understanding mindsets & behaviors
H11	Influencing mindsets & behaviors
H12	Introduction to organizational health
H13	Coaching and feedback
H14	Change story
H15	Personal leadership in a transformation

Carefully designed agendas balance theory with practical exercises

Example Course: Aspiration and Target Setting Workshop	
Introduction and scene setting	8:00
Lean transformation change framework	8:45
Break	**9:15**
Technical system – Learning to see and waste walk	9:30
Technical system – Overall Equipment Effectiveness (OEE)	10:45
Lunch with gallery walk	**12:00**
Management Infrastructure – Performance Management	12:45
Management Infrastructure – Making change stick	2:00
Break	**3:15**
Mindsets, Behaviors & Capabilities – Leading change	3:30
Applications to your organization	4:30
Conclusion and wrap-up	5:30

Hands-on exercises included

Theory – Exercise ratio 50 : 50

During their time at the Lean Continuous Factory, participants experience a carefully designed mix of theory training by our expert faculty and practical hands-on exercises, designed to bring what they have learned to life. These trainings range from half-day to 5-days depending organizational needs. We aim to ensure that all participants spend at least **half their time doing, rather than listening.**

Accessible, relevant and directly applicable learning

Since the launch of our first Model Factory in 2007, McKinsey's experiential learning facilities have grown to become an indispensible part of our offering to clients world wide. **Thousands of individuals from more than 150 different companies have participated in courses**, with many clients returning again and again as they expand their capability building efforts and roll out programs across their organizations.

Model factory attendees range from C-level executives of Fortune 500 companies to frontline operating teams. Regardless of their degree of prior experience, or the duration of the courses they attend, participants consistently praise their model factory experience for the accessibility and relevance of the content covered. **These participants leave the model factory inspired to start making immediate, lasting improvements in their own facilities.**

Expert faculty with deep industry experience

Training at the Lean Continuous Factory is delivered by a select group of McKinsey personnel. Our faculty are drawn from a wide range of backgrounds from all around the world. What they have in common is deep experience in performance and productivity transformations, together with a passion for efficiency and sustainability issues. **Their knowledge** of the challenges and potential pitfalls **of real-word productivity improvement initiatives is unsurpassed.**

Richard Sellschop

Richard is a leader in McKinsey's Operations practice, .bringing deep expertise in lean operations. Richard has helped manufacturing clients transform their operations, especially in the basic materials industries.

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Robert Mathis

Robert is leading McKinsey's North American Resource Productive Operations practice. He has served Automotive & Assembly clients across the globe on topics ranging from quality management to strategy to product development.

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Jonathan Tilley

Jonathan brings deep expertise accumulated over 25 years of operations experience. Jonathan has led transformations across Consumer Electronics, Aerospace, Automotive, Pharmaceuticals, and Oil & Gas industries.

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Amy Radermacher

Amy is a Knowledge Expert in the Resource Productive Operations practice. She supports clients with her broad experience with resource productivity methodology & tools. Amy was extensively involved in the build up of the Lean Continuous Factory.

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Markus Hammer

Markus has helped clients across industries with his deep knowledge of resource productive operations and passion for capability building. He has designed and implemented resource transformation programs with impact ranging from 10 to 30%.

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Les Kalman

Les has designed and performance transformation programs across a variety of industries. In the last three years, Les has concentrated his work in continuous process environments. Les comes to McKinsey with 10 years of operations experience.

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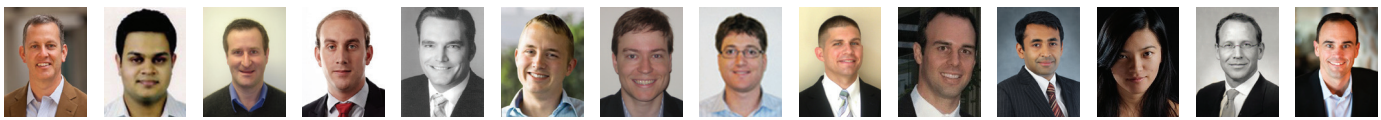

Reach out to the faculty
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