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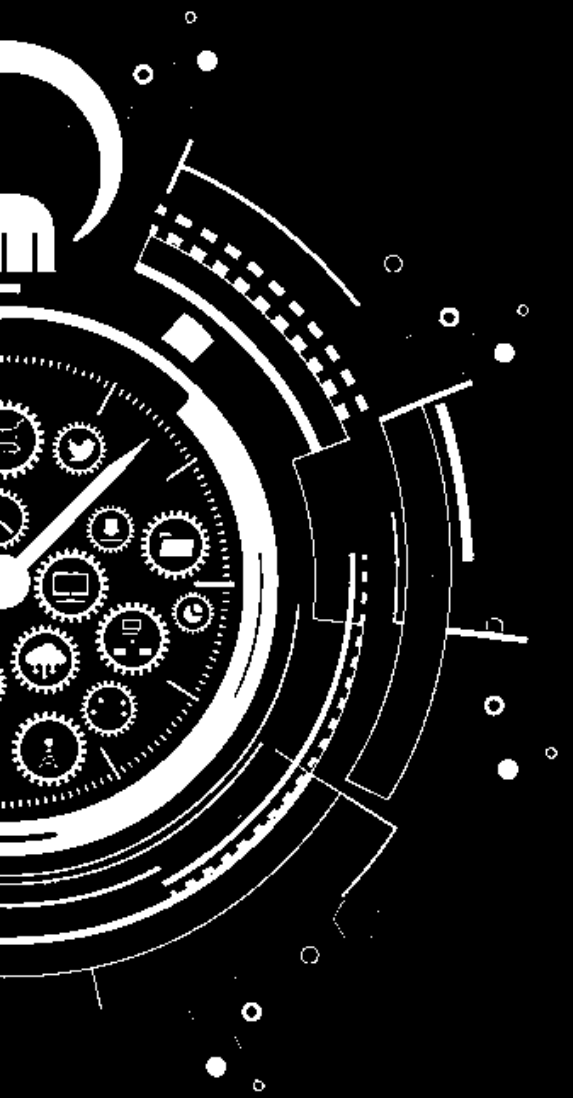
Global Manufacturing Industry Landscape

Tim Hanley, Deloitte Global Leader, Consumer & Industrial Products Industry group

2017 Manufacturing Forum. 17 October 2017. Perdue University

What we will cover

- Global manufacturing competitiveness
- China and India manufacturing landscape
- Advanced technologies
- Future of work



Global manufacturing competitiveness

Global CEOs rank manufacturing competitiveness

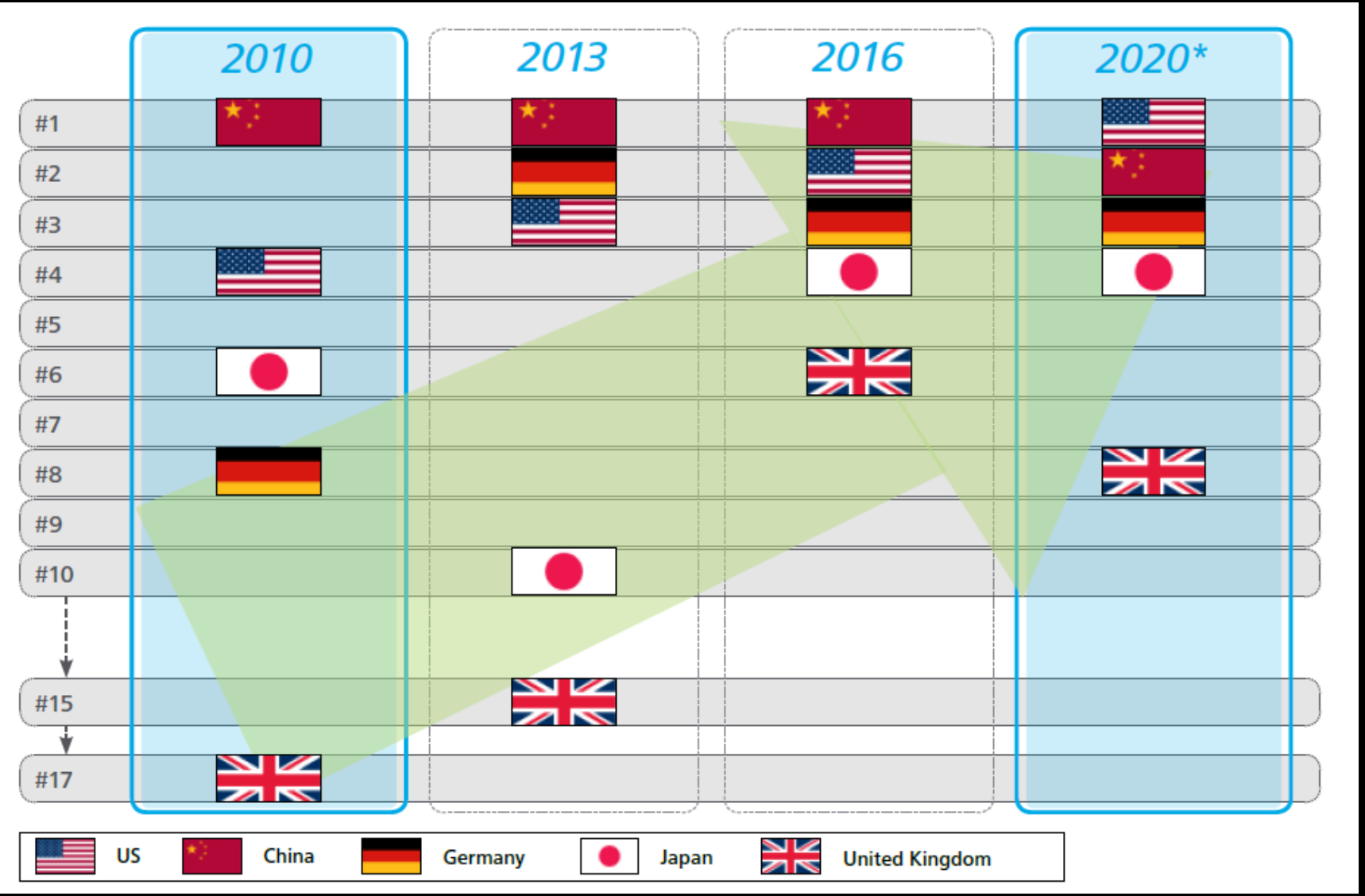
US is expected to take over the top spot from China by 2020

2016 (Current)		
Rank	Country	Index score (100=High) (10 = Low)
1	China	100.0
2	United States	99.5
3	Germany	93.9
4	Japan	80.4
5	South Korea	76.7
6	United Kingdom	75.8
7	Taiwan	72.9
8	Mexico	69.5
9	Canada	68.7
10	Singapore	68.4
11	India	67.2
12	Switzerland	63.6
13	Sweden	62.1
14	Thailand	60.4
15	Poland	59.1
16	Turkey	59.0
17	Malaysia	59.0
18	Vietnam	56.5
19	Indonesia	55.8
20	Netherlands	55.7

2020 (Projected)			
Rank	2016 vs. 2020	Country	Index score (100=High) (10=Low)
1	(▲ +1)	United States	100.0
2	(▼ -1)	China	93.5
3	(⟷)	Germany	90.8
4	(⟷)	Japan	78.0
5	(▲ +6)	India	77.5
6	(▼ -1)	South Korea	77.0
7	(▲ +1)	Mexico	75.9
8	(▼ -2)	United Kingdom	73.8
9	(▼ -2)	Taiwan	72.1
10	(▼ -1)	Canada	68.1
11	(▼ -1)	Singapore	67.6
12	(▲ +6)	Vietnam	65.5
13	(▲ +4)	Malaysia	62.1
14	(⟷)	Thailand	62.0
15	(▲ +4)	Indonesia	61.9
16	(▼ -1)	Poland	61.9
17	(▼ -1)	Turkey	60.8
18	(▼ -5)	Sweden	59.7
19	(▼ -7)	Switzerland	59.1
20	(▲ +3)	Czech Republic	57.4

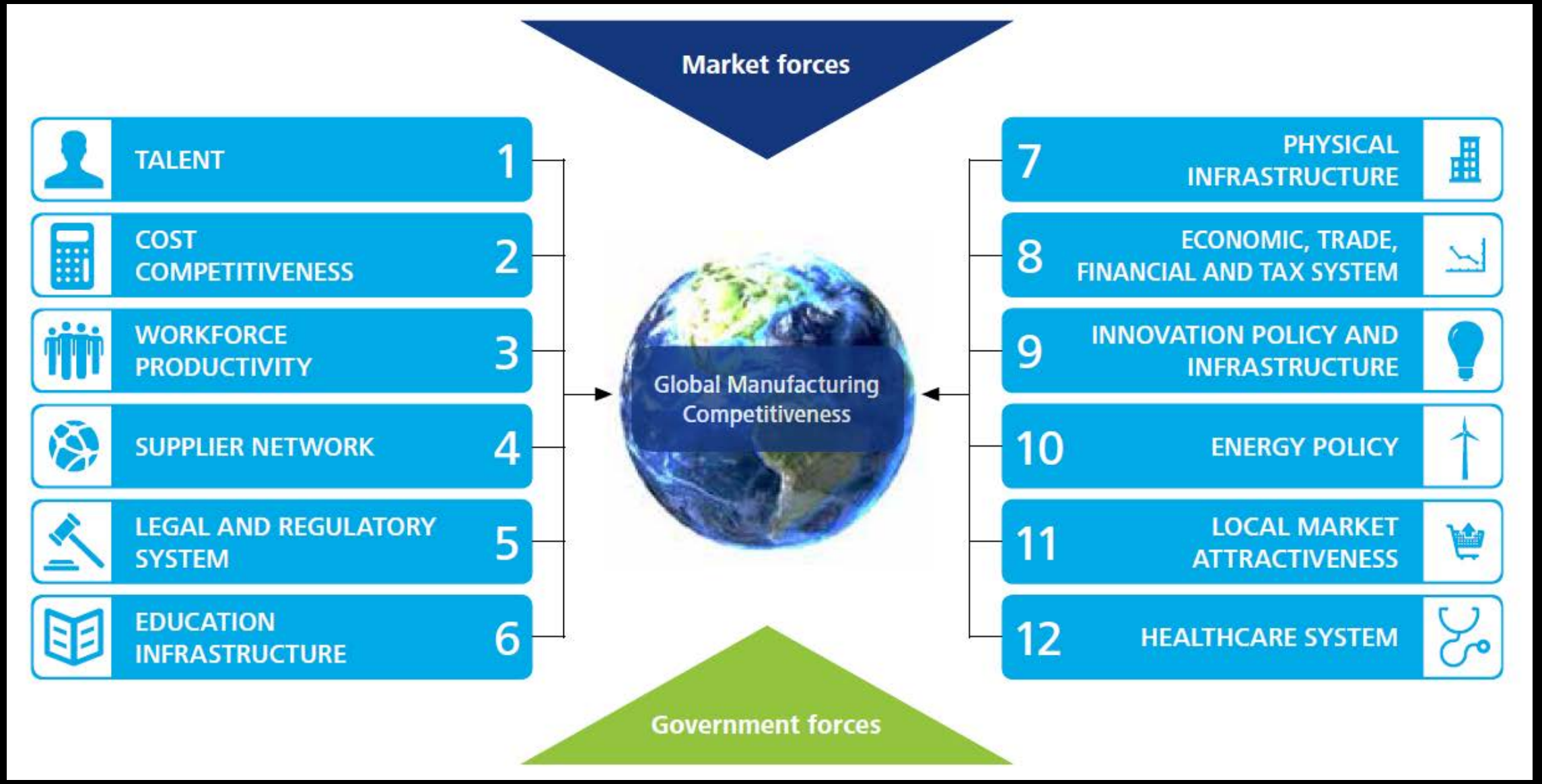
Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2016 Global Manufacturing Competitiveness Index

Shift to higher value, advanced manufacturing



Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2016 Global Manufacturing Competitiveness Index

What drives manufacturing competitiveness?



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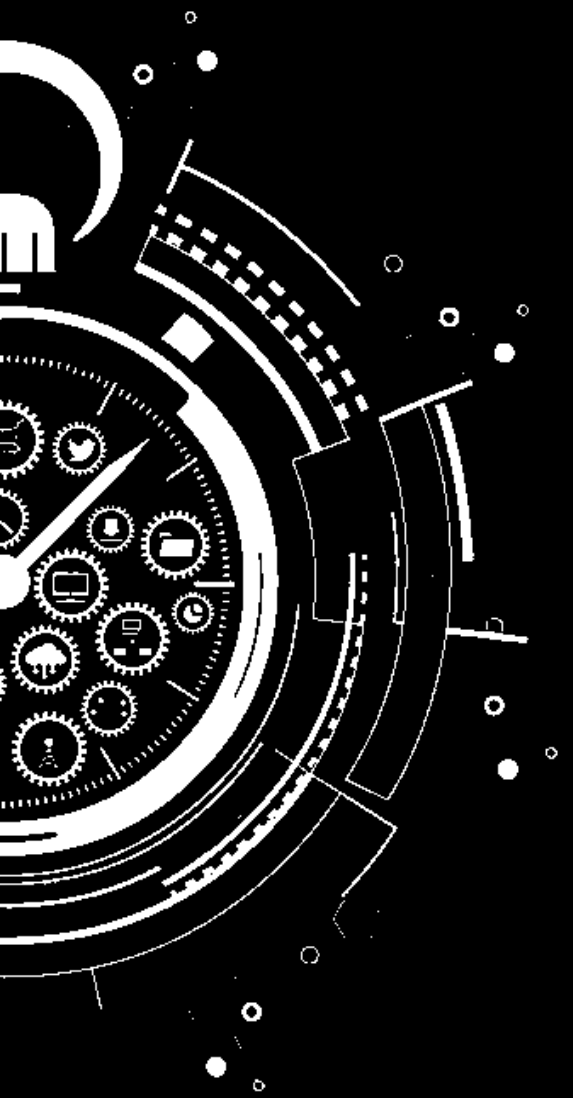


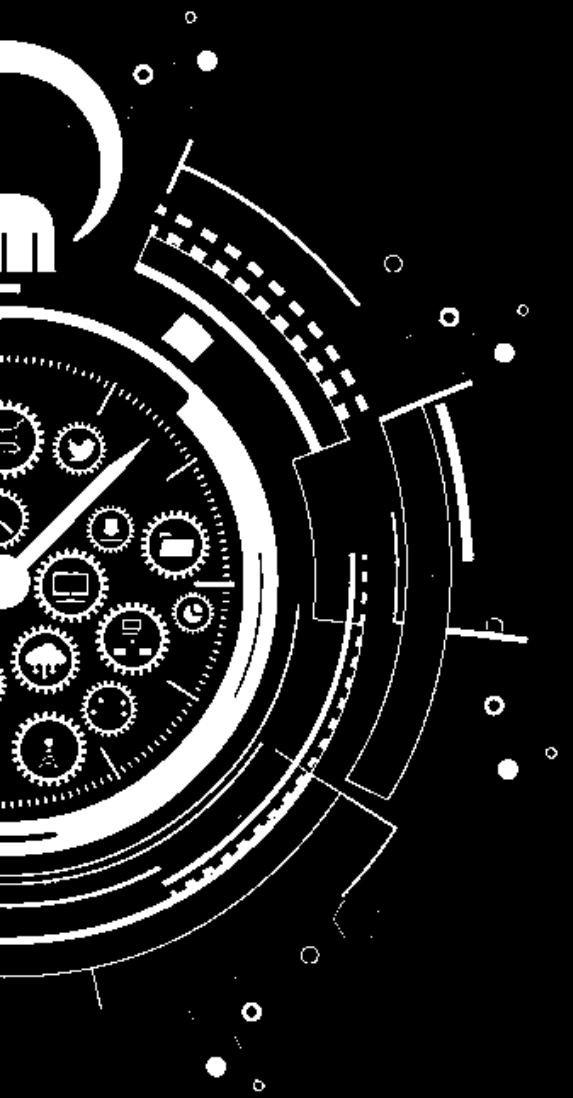
China and India

China is transforming into a digital powerhouse

- Made in China 2025
- IoT industry growing over 25%, est. $142 Billion in 2016
- Ambition to lead the world in artificial intelligence (AI) by 2030
- 68,000 Chinese robots sold in 2016, 26.7 percent of the global market

India landscape

- By 2050, India’s economy the world’s second-largest, behind China
- Made in India to improve manufacturing competitiveness
- Smartphone manufacturing on the rise - 1500 mobile phone, ecosystem factories by 2020
- Electric cars only by 2030
- New ‘future-ready’ Industrial Policy



Advanced technologies

Shifts driving Industry 4.0

Digital-Physical Link

- **Additive Manufacturing (3D Printing)** becomes cheaper, more available and relevant for new materials
- **Next-generation of robots** that are intelligent, adaptive, connected and collaborative with humans

Human-Machine Interfaces

- Mass adoption of **advanced user interfaces** (touchscreens, wearables…)
- Introduction of new technologies and application in **Virtual and Augmented Reality**

Analytics and Artificial Intelligence

- Breakthroughs in **Artificial Intelligence** and **Machine Learning**
- Sophisticated and rapidly-developing **algorithms leverage increased accessibility** to quality data

Data Creation, Storage and Connectivity

- Sharp fall in the prices of **data storage, computing power and bandwidth**
- Massive advancements in **cloud-based** computing platforms
- **Sensor prices** continuously dropping

Cheaper

Faster

Smarter

Advanced technologies offer manufacturers opportunities to grow and improve their operations

Grow

Products

- Adding intelligence to existing products
- Creating new data products and services
- New product possibilities through I4M tech

Customers

- Marketing and selling products
- Aftermarket experience
- Dealer integration

Engineering

- Reducing “idea to market” time
- Linking design with product intelligence
- Improving engineering effectiveness

Operate

Planning

- Demand sensing and planning
- Supply planning and supplier integration
- Outbound network optimization

Factory

- Enhancing capability effectiveness
- Production asset intelligence
- Activity synchronization and flow

Support

- Creating leverage for technical talent
- Customer configuration knowledge
- Support optimization

Which advanced technologies will we see?

Ranking of future importance of advanced manufacturing technologies by US CTOs

Advanced Manufacturing Technologies	US	China	Europe
Predictive analytics	1	1	4
Smart, connected products (IoT)	2	7	2
Advanced materials	3	4	5
Smart factories (IoT)	4	2	1
Digital design, simulation, and integration	5	5	3
High performance computing	6	3	7
Advanced robotics	7	8	6
Additive manufacturing (3D printing)	8	11	9
Open-source design/Direct customer input	9	10	10
Augmented reality (to improve quality, training, expert knowledge)	10	6	8
Augmented reality (to increase customer service & experience)	11	9	11

US: Predictive Analytics, Smart Products (IoT), and Advanced Materials are considered most promising

China: Prioritizing Predictive Analytics to close the gap with the US and creating competitive advantage through HPC

Europe: Integrated priorities very much aligned with "Industry 4.0" paradigm, creating closed loop design/build process

(Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2016 Global Manufacturing Competitiveness Index)

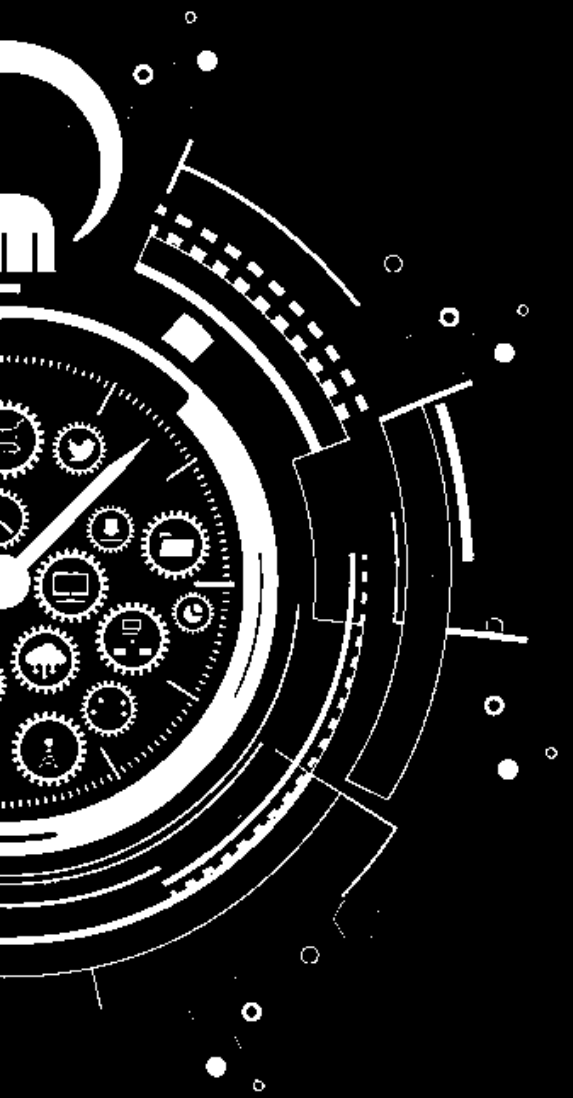
10 Lessons learned working with manufacturers

Strategic deployment of digital technologies

1. Understand your advantage in the ecosystem
2. Be cautious in asset-centric thinking
3. Identify the key data elements to own
4. Consider option value & ability to scale
5. The make versus buy decision still applies

Implementation of digital technologies

6. Think ahead in pilot selection and development
7. Develop a clear strategy and roadmap
8. Eliminate notions of tech and infrastructure
9. Speed matters
10. Leadership from the top



Future of work

Advanced technologies will increase the skillsets required

...and potentially drive companies to explore different talent models

As Skill Requirements Increase, More Manufacturing Jobs Go Unfilled

(WSJ, Sep 2016)

New Manufacturing Jobs Require New Manufacturing Skills—It's That Simple

(AutoDesk, May 2017)

Automation Will Lead To Collaboration Between Man And Machine

(Forbes, Jul 2017)

A Robot Can Be a Warehouse Worker's Best Friend

Companies are racing to develop 'collaborative' robots, which are relatively cheap and can boost employees' productivity

(WSJ, Aug 2017)

Trends

- Aging population
- Shortage of manufacturing talent
- Exponential technologies
- Gig economy / open talent
- Rapid product cycles

This next industrial revolution is about the combination of man & machine, not the replacement of one for the other.

Future of work – “Augmented workforce”

41 percent

Number of companies fully implemented or made significant progress to adopt cognitive and AI technologies within their workforce

34 percent

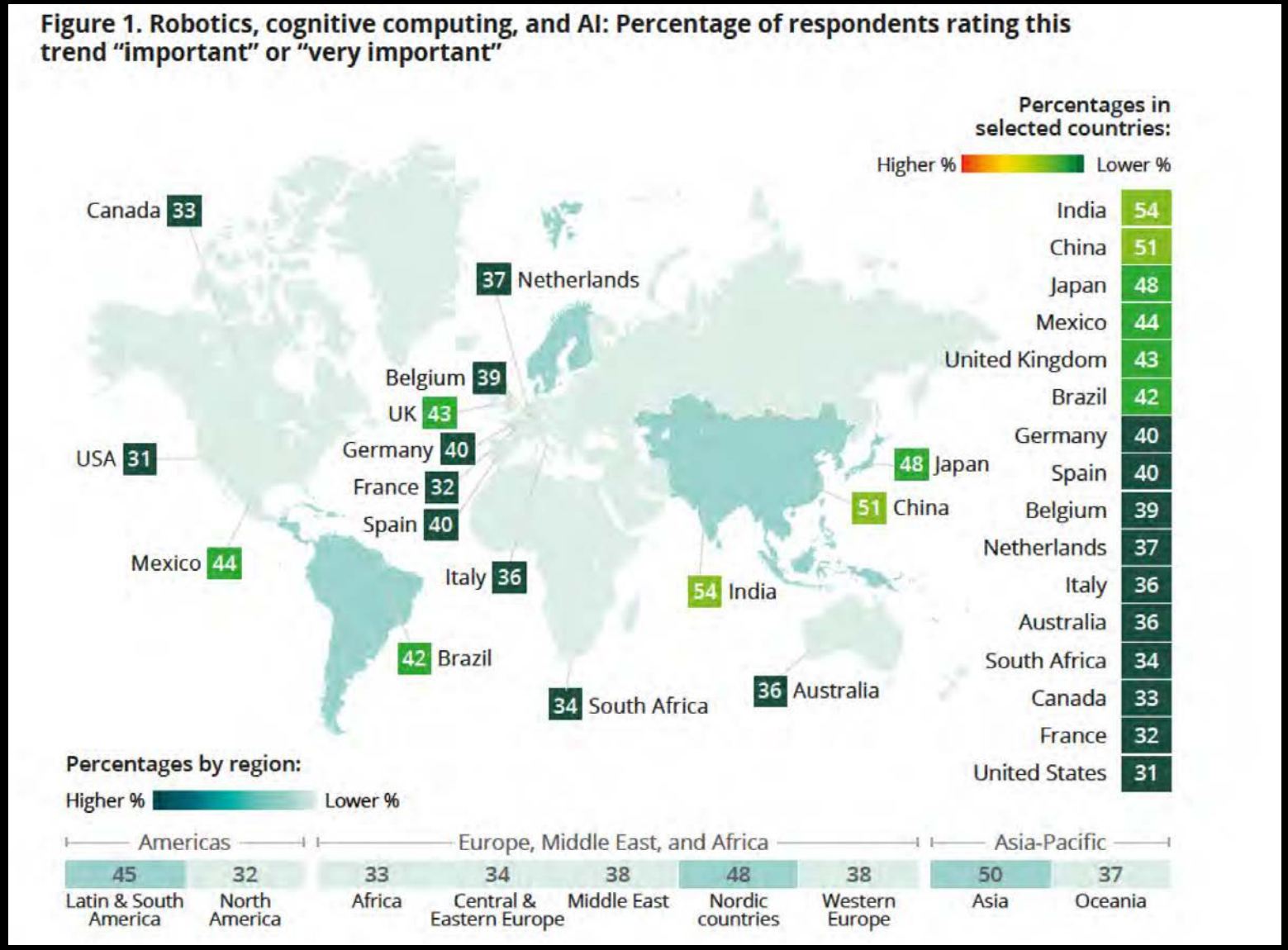
Number of companies in the midst of pilot programs

17 percent

Number of global executives say they are ready to manage a workforce with people, robots and AI working side by side

Source: Deloitte Global Human Capital Trends 2017. Rewriting the rules for the digital age

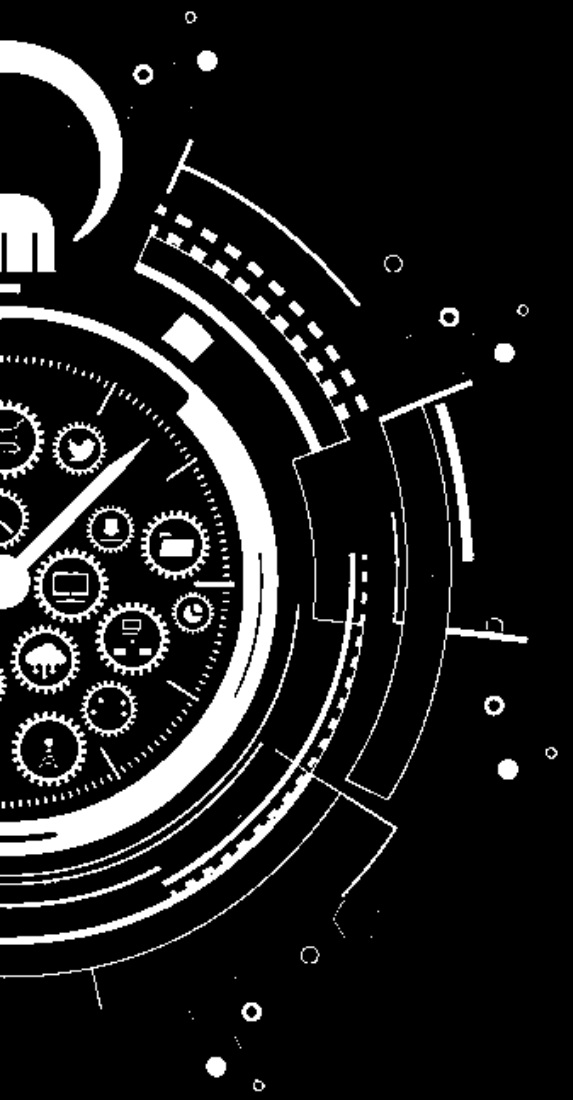
Robotics, cognitive computing and artificial intelligence (AI)



Source: Deloitte Global Human Capital Trends 2017. Rewriting the rules for the digital age

Closing remarks

- Nations are competing to upgrade their manufacturing industry. US expected to be the most globally competitive manufacturing country by 2020.
- China and India markets continue to offer significant opportunities.
- How are you strategically deploying advanced technologies to grow or improve your operations?
- What does your future talent model look like? How can cognitive and AI technologies benefit your business?



Questions?

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