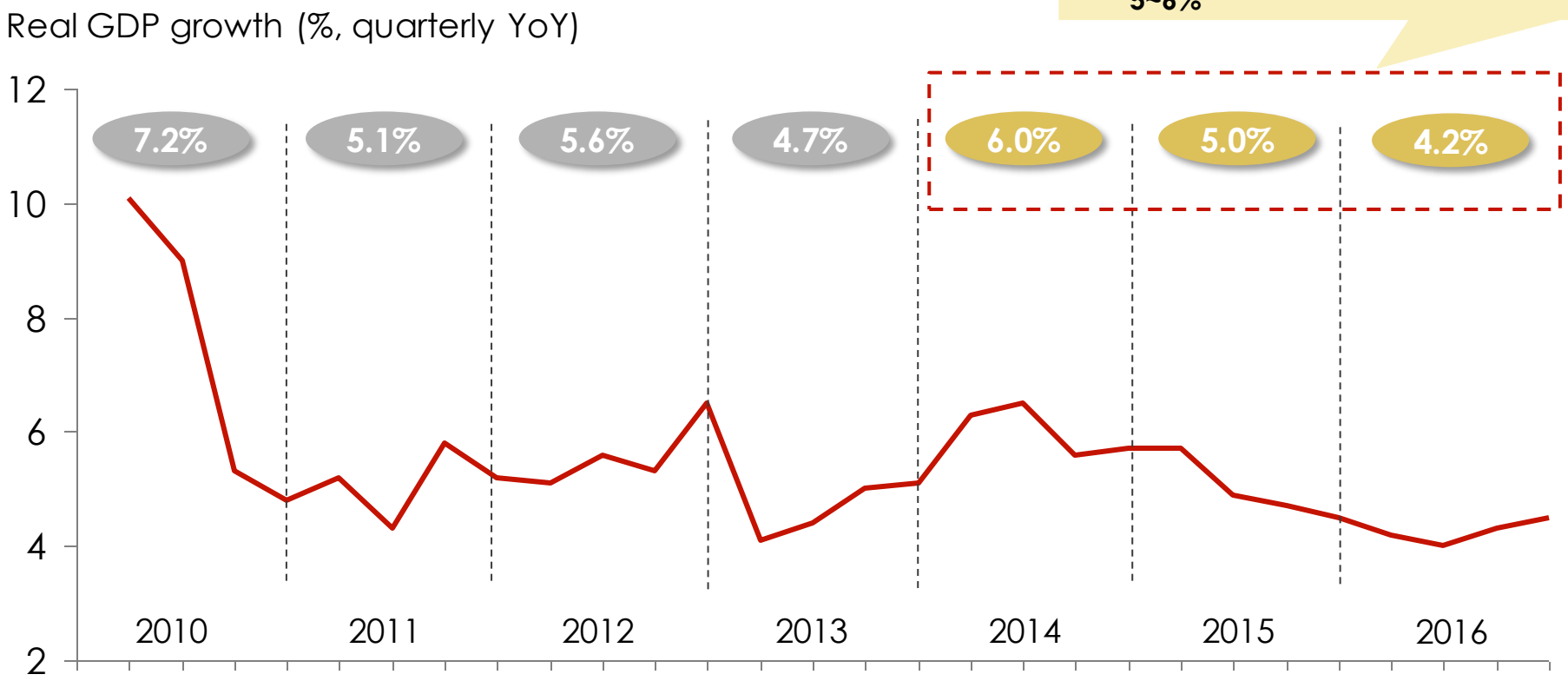
The Fourth Industrial Revolution and Its Implications

MITI Industry 4.0 Workshop
2 May 2017

The usual headline: Malaysia economic growth slowing

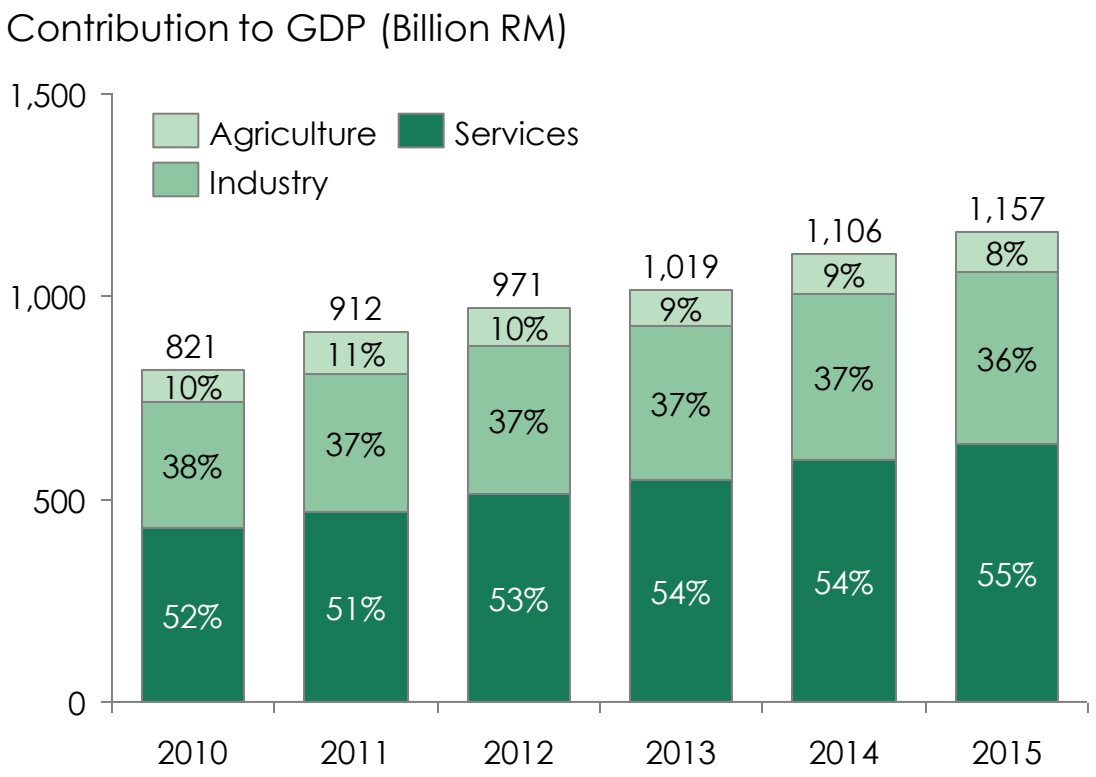
- **Slowing down of economic growth from 2014 to 2016**
- **RMK-11 GDP growth target to 2020: 5~6%**



Source: National sources/IMF via Ministry of Finance Malaysia; RMK 11

The more important headline: structural shift in economy away from Manufacturing into Services

Services have become the key driver for GDP growth



Source: Department of Statistics Malaysia, World Development Indicators

Economy increasingly "flying on one engine"

Industrial growth has slowed down to maintenance levels

Services have de-coupled and are sustaining GDP growth

Overall services slowdown can be expected, but a hard-landing less likely

Increasing pressures on Manufacturing today

1 | Productivity remains a challenge

While the manufacturing sector has relatively higher productivity compared to other sectors in the economy, **productivity growth is slowing**

2 | Comparative advantage in decline

The RCA index for Manufacturing worsening due to **eroding costs advantages** and **taxation** – with no corresponding increases in productivity

Shifting industry fundamentals

Emerging macro trends

3 | New forces re-shaping globalisation

Nature of **globalisation is shifting towards a multi-pole environment** raising questions on Malaysia's position in the global value chain

4 | Technology re-defining the industry

Rapid technology advancements at lowering costs are re-defining industry economics, modifying workforce profiles and creating new industries; Industry 4.0 taking off

Source: MCG analysis

Manufacturers cite inability to break status quo

1 | Skills development

- ~20% of manufacturers surveyed believe their **employees lack necessary skills** to improve productivity
- Another ~30% face **difficulty recruiting for the right skills**
- Many still believe that **access to foreign workers is important**

2 | Technology usage

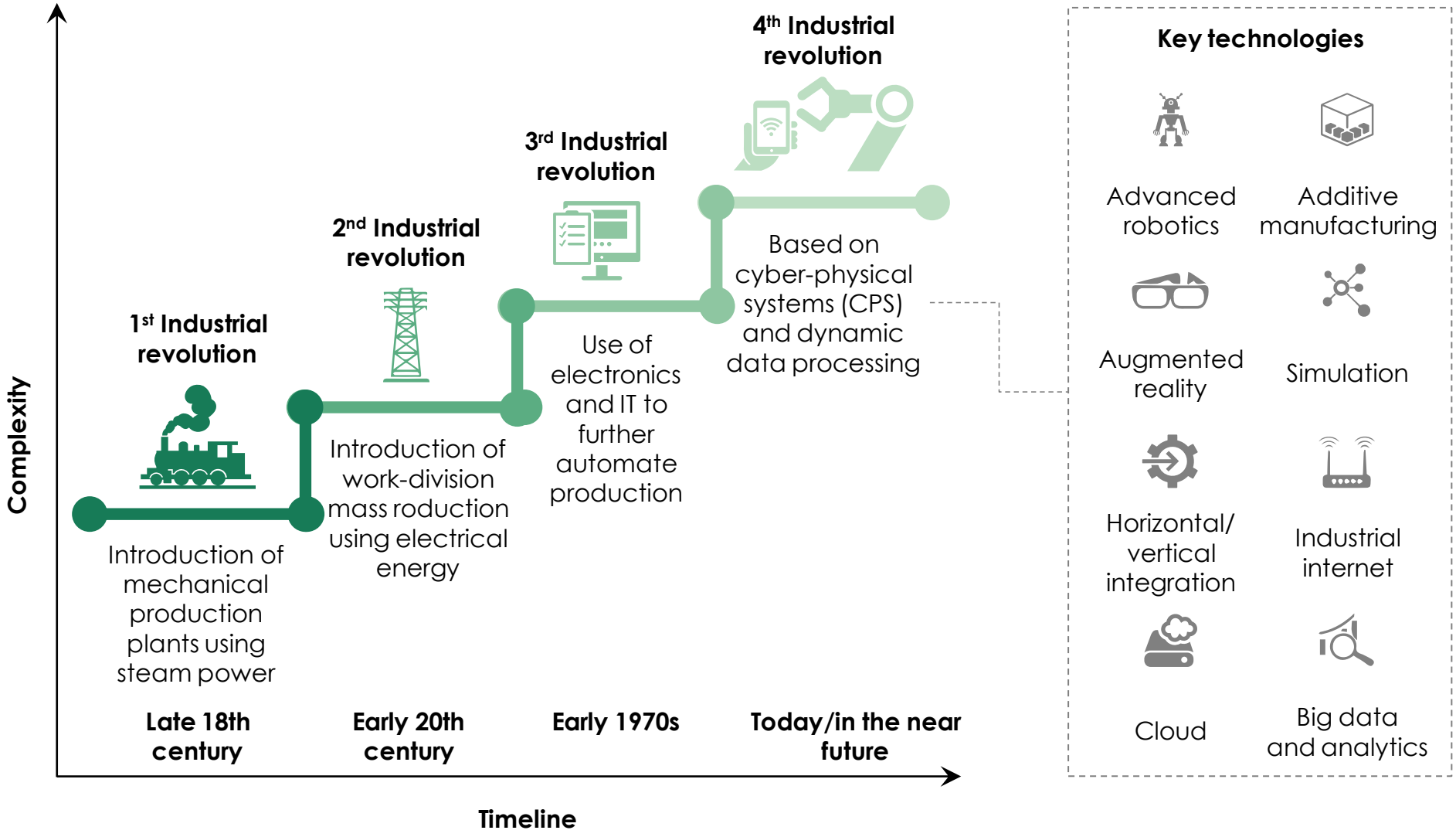
- Manufacturing sector already utilising robotics & automation
- But **widespread technology adoption still constrained** due to:
  - negative experience when investing or using tech without guidance
  - process issues to resolve and avoid automating inefficiencies
  - change management challenges/employee mindset

3 | Productivity tracking

- ~ 30% of manufacturers surveyed **do not know how to track productivity metrics**
- Respondents find **difficulty allocating time and resources** to track productivity - metrics is typically not part of formal job scope
- Respondents that track productivity have **no indication of appropriate productivity levels to target**/ access to best practices

Note: Additional factors that impact productivity as cited by industry include complex and convoluted regulations; insufficient partnerships with international partners/access to high value markets ; Source: N=1100+ respondents conducted under EPU MPB project; industry discussions

Industry 4.0 – the talk of the manufacturing town



Why now?

Digital Adoption

A. Falling prices

Industrial robots from **$550k to $20k**[1]
Sensors (3D lidar) from **$30k** to **$80**[2]

B. Increasing performance

Higher computing capacity
Efficiency of robots improving at ~5% p.a[3]

C. Simplified utilisation

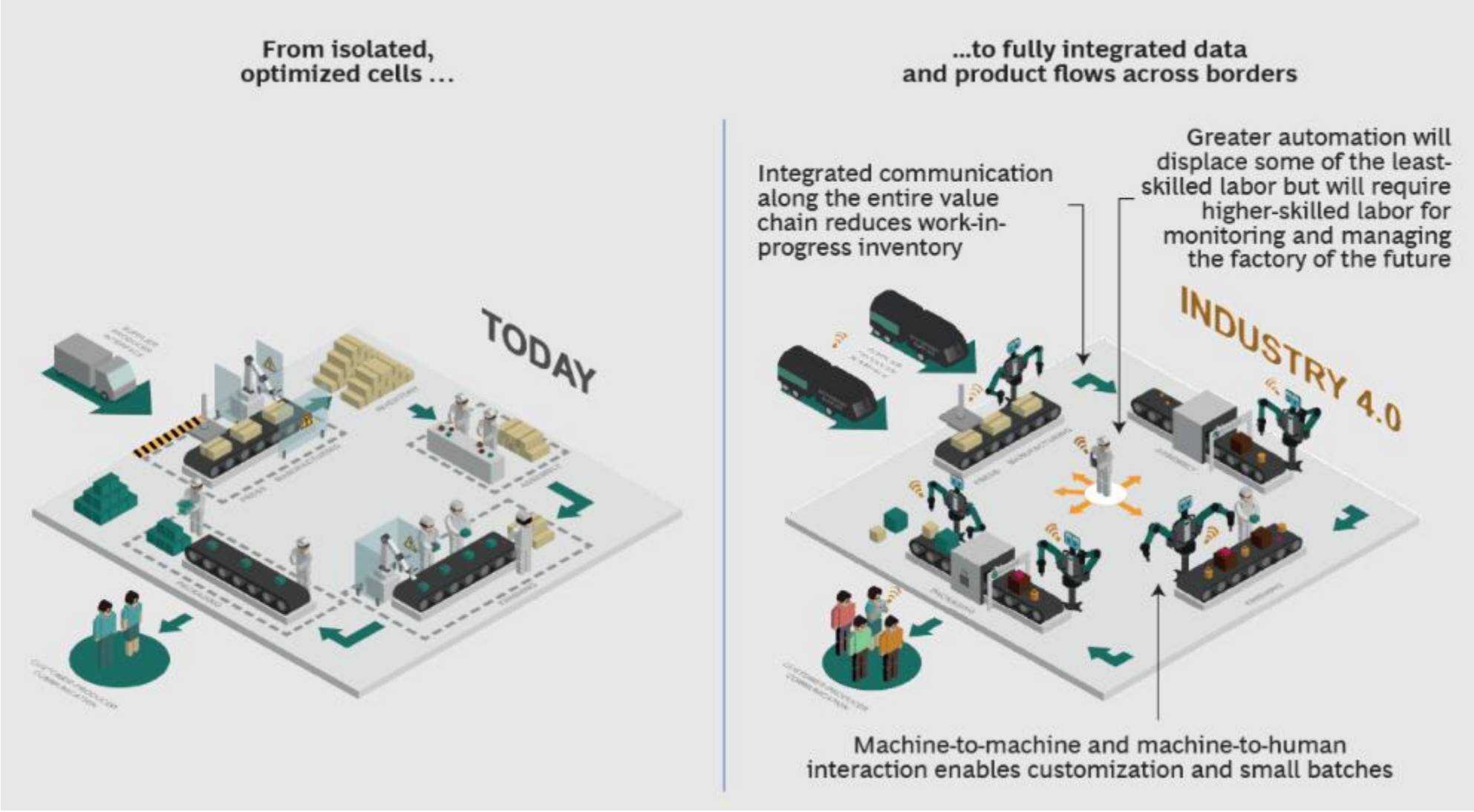
User-centric softwares, easy programmation without specific skills, better accessibility

D. Seamless integration

Single digital platform to integrate unstructured data & connect multiple systems

1. 2007 to 2014 2. 2009 to 2014 3. BCG perspectives "How Robots Will Redefine Competitiveness"
Source: DTI Digital Enterprise White Paper by World Economic Forum, BCG research and publications

Core idea of Industry 4.0:
Integrated, automated and optimised production flow



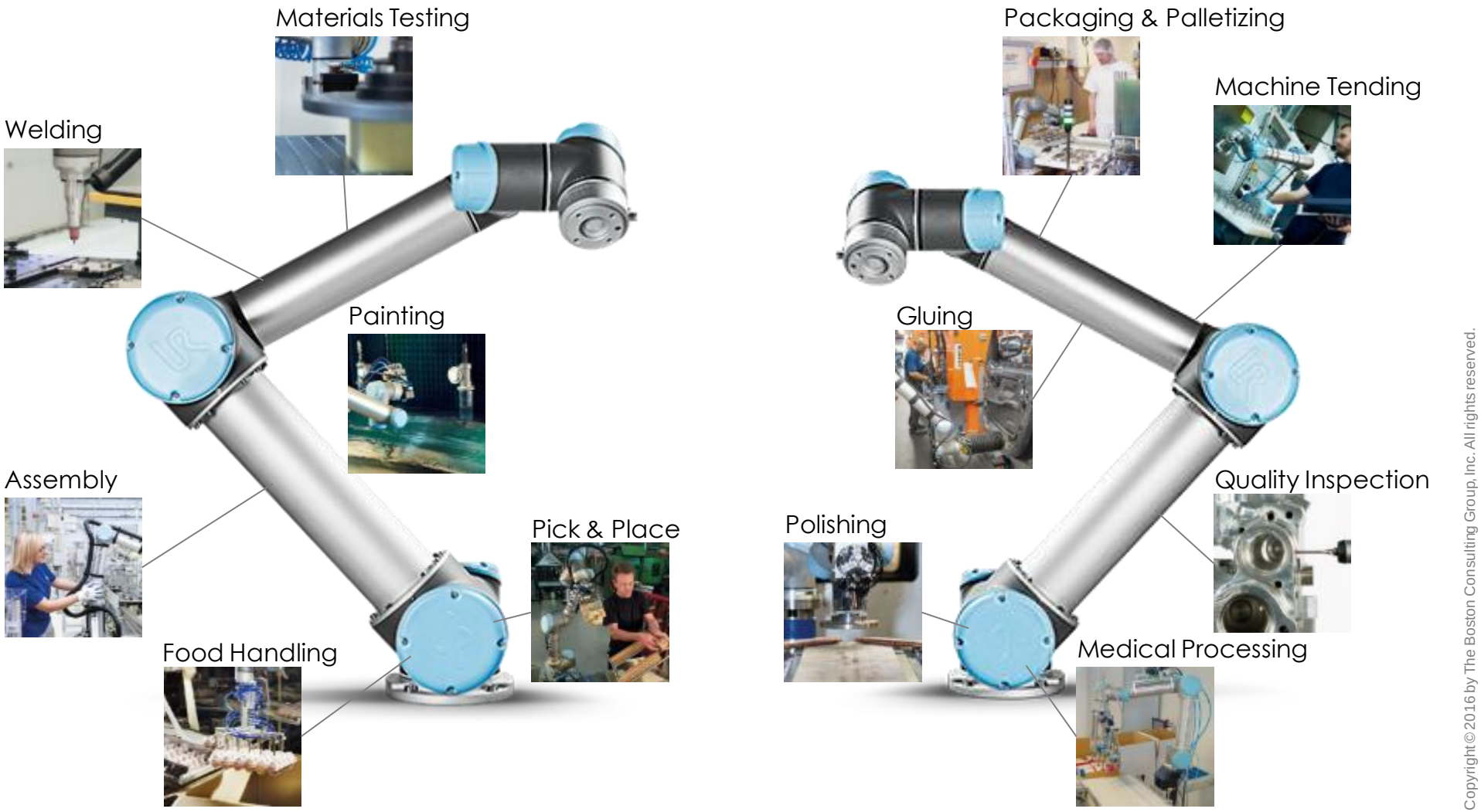
Source: BCG Report "Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries"

Robots replicate tasks in an intelligent way

Assembly line worker

Universal robot

Robots with humanoid arms can be easily programmed to automate many tasks



Under increased labour cost pressure, Chinese ICT manufacturer Wistron modernised production line with robots

Reference companies | wistron

Readily-deployable robotics increasingly affordable and within reach of SMEs

Fast set up

Average set-up time only half a day, with less than an hour needed to unpack, mount, and program the first task

Easy programming

Operators with no programming experience can quickly set up and operate robot with intuitive, 3D visualization

Flexible deployment

Moving the robot to new processes is fast and easy, giving the agility to automate almost any manual task

Short payback period

Affordable for SMEs with an average payback period of 195 days

Source: Expert discussions; IoT Analytics; BCG analysis

Several challenges on implementation

1 | AWARENESS

- To lead the transition to I4.0 requires increased **awareness, understanding of the benefits** and the development of **clear I4.0 strategies** across Industry, Government and Academia

2 | FUNDING

- Industry must develop clear **business cases for I4.0 adoption**, where early pace setters are seeing very attractive returns that can **"Fund the Journey"**

3 | SKILLS

- **Industry, Government and Academia** must come together to develop **long term strategies and policies** for how **Industry hires and retrains, academia educates** and **Government supports** in a consistent way over the long term

4 | STANDARDS

- Need to adopt new **"Digital Standards"** that are relevant and ready for implementation

5 | CYBER SECURITY

- **Rapid adoption** and leadership will **not be achieved** until Cyber security threats have been **adequately resolved** requiring further research and investment by Industry and research institutions

6 | SOCIAL IMPACT

- Commentary is mostly negative focussed on **job losses across blue and white collar workers. Conversations are required at all levels** as to how **society retrains, educates** and deals with short to medium impacts to deliver **longer term net gains**

Globally, countries are at different stages and using variety of approaches to Industry 4.0

Germany

Industrie 4.0 Platform established as a public-private central oordination model – as a focal point for all I4.0 activities

- As a hub and includes industry players /research institutions/Govt agencies
- BCG runs 3 'Innovation Centre for Operations', with best-in-class partners, providing immersive and tangible experience

China

Industry in the lead and benefiting from long-standing govt support for high-tech manufacturing

- While Govt. supports high-tech manufacturing via incentives/ designated high-tech zones…
- …specific Industry 4.0 efforts remain industry-led. Larger enterprises already aware, bringing in tech on their own

Korea

Via the Innovation in Manufacturing 3.0 initiative, driving smart factories since 2015

- Govt. plans to invest and build 10,000 smart factories by 2020
- Centres set up as collaboration between govt. and large cos. to assess SMEs and select fund and support recipients
- Large cos. (e.g., Samsung, Hyundai) to promote and nurture smart factories

SAMSUNG

UK

Early stages of deploying collaborative model, between Govt, industry and academia

- Key govt. role in fund deployment with private sector to drive way forward
- 6-mos consultation recently started for industry to develop their own roadmap
- Discussions underway to setup 'Digital Academy' (private sector collaboration)

Leading universities

Multiple technology partners

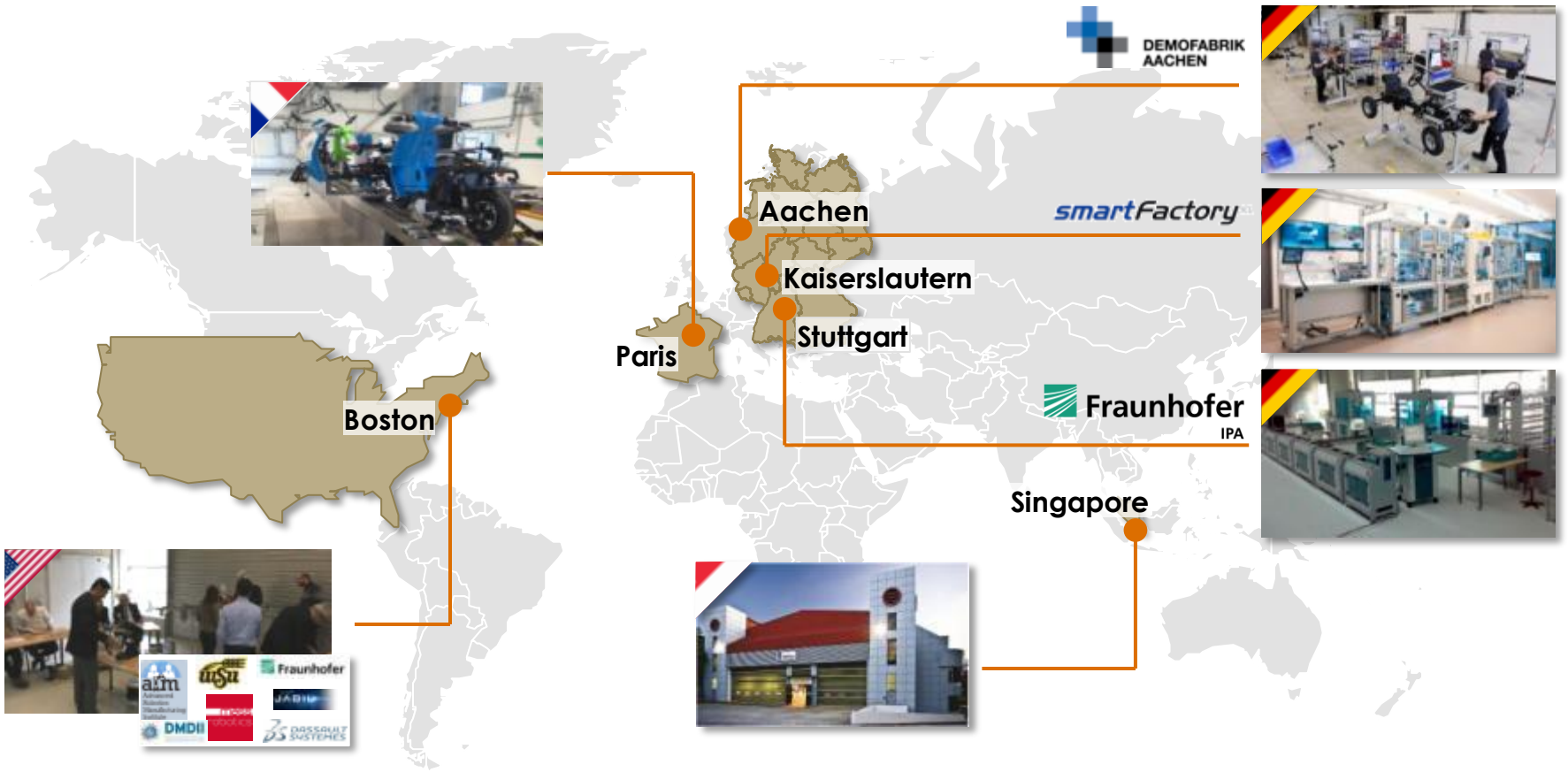
India

Efforts to set up I4.0 'Experience Centres' likely govt-led, with eventual knowledge & tech transfer

- Govt. may provide seed investment to setup centres, source tech. globally, and hire global expertise
- Intention is for the tech. assembly to eventually be transferred to India

Source: Press searches, BCG

Innovation Centres for Operations (ICOs): Make Industry 4.0 real with tangible experiences



BCG operates and supports worldwide ICOs/ model factories with best-in-class partners

Source: BCG Operations

Key capabilities at the BCG Innovation Centers for Operations (ICOs)

Access to:

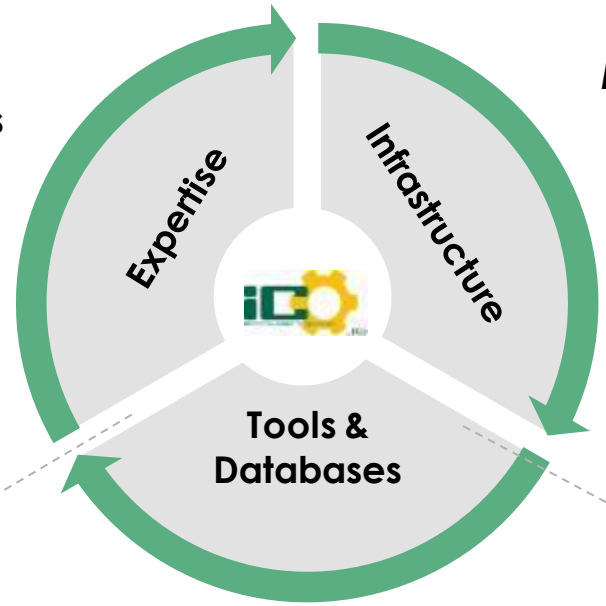
Industry and Functional Practices

>200 global partnerships with technology vendors & research institutes

End to End expertise on digital topics across sectors

>1000 digital experts and **>250 Big data scientists** globally

Digital Ventures network



Model factory – part of network of 6 factories globally

2 types of customisable I4.0 mobile lines: covering discrete & process industries, deployable at client site, customised for interactive workshops

Ready to deploy sensors

Supply Chain iLab

Health checks, diagnostics and benchmarking tools

>250 I4.0 Use cases with concrete value proof for rapid implementation

>20 Modules for Learning and Enablement

Implication for Malaysia: When done right, Industry 4.0 will have benefits holistically across the ecosystem

Industry landscape

High value-adding sectors emerging as champions of Industry 4.0 adoption

New sectors providing Industry 4.0 equipment

Company

Adoption of complex Industry 4.0 solutions by MNCs & GLCs

Reduction of operating cost for SMEs by adopting I4.0 technologies

Industry 4.0 Ecosystem

Workforce

New jobs created from I4.0

Local workforce upgraded for new jobs

Reduced need for low-skilled routine jobs

Reduced dependence on foreign labour

Government (Enabler)

Joint efforts in facilitating & supporting enterprises in Industry 4.0 adoption

Education & research centres to support workforce in Industry 4.0 adoption

SMEs stand to benefit substantially from Industry 4.0, both directly and further through partnerships

Benefits to SMEs directly

Digitised products	• Product range can be made smarter. Smart products can increase the proportion of value added from product sales to downstream services
New services and supply models	• New business models can emerge from I4.0 such as Software as a Service (SaaS) that can afford higher margins to SMEs
Lower costs	• Access to I4.0 architecture enables lower costs of production and hence higher margins

Benefits in partnership with larger companies / advisors

Access to expertise / technology	• SMEs can fill any of their own expertise / tech. gaps and differentiate, by partnering as and when needed (e.g., on making decisions on investments, on access to specific non-rival technology)
Access to platforms	• SMEs can use partnerships / align with specific platforms so as to prevent "lock-outs" and ensure demand pipeline
Access to funding	• SMEs can leverage partnerships to raise funding / share required investments

Source: BCG

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