

# High Value Manufacturing

## Changing Skills Landscape

*“Supporting the development of a UK pipeline of well trained people with skills aligned to future manufacturing technologies”*

1 April, 2019

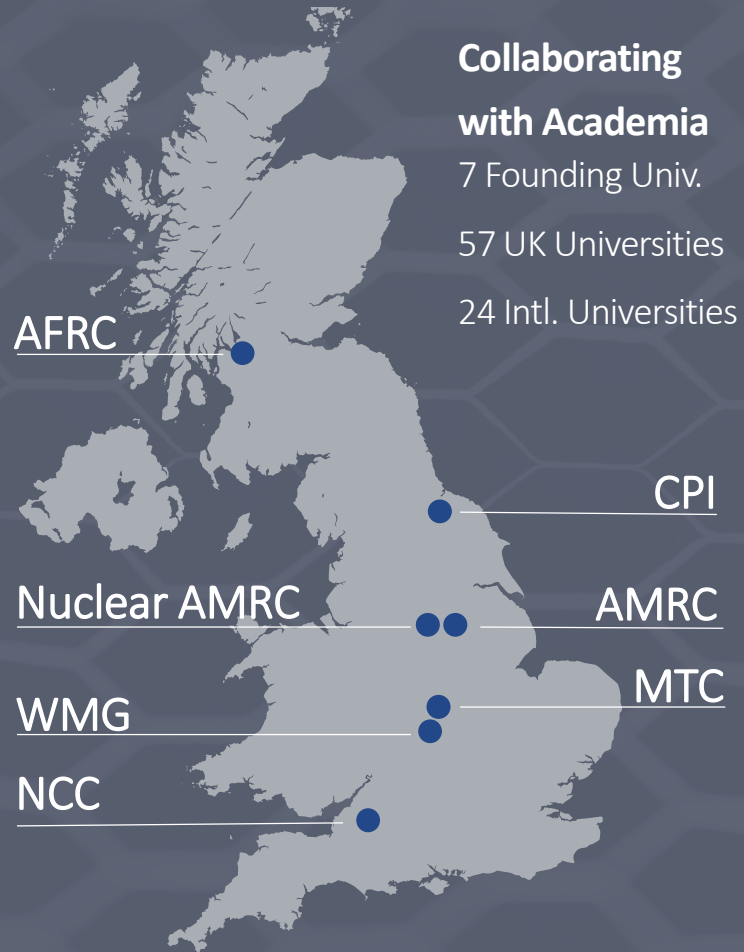
# High Value Manufacturing

## Changing Skills Landscape

*HVMC –*

*“Supporting the development of a UK pipeline of well trained people with skills aligned to future manufacturing technologies”*

# HVMC What we are – Where we are – What we do



**Collaborating  
with Academia**  
7 Founding Univ.  
57 UK Universities  
24 Intl. Universities

## Driving growth in HV manufacturing:

- Help companies of all sizes and all sectors
- Reduce the risks of innovating
- Have expert engineers, scientists, technicians
- Provide leading edge **OPEN ACCESS** equipment
- Link to UK's best relevant research knowledge
- Foster an environment of collaboration and open innovation - even among competitors
- Work across sectors / technologies / supply chains
- Support implementation and technology insertion
- Create and disseminate knowledge
- Provide Strategic Leadership – 'the go to place'

**HVMC's Mission** - to grow manufacturing's contribution to the UK's economy

# Changing skills landscape for high value manufacturing



1. Future Manufacturing Roles and Skills
2. Impact of Data / Digital
3. Change and Talent
4. Summary of Key Points

Background of recent International Study on Innovation and Workforce Development

..... personal views and subject to ever increasing change!

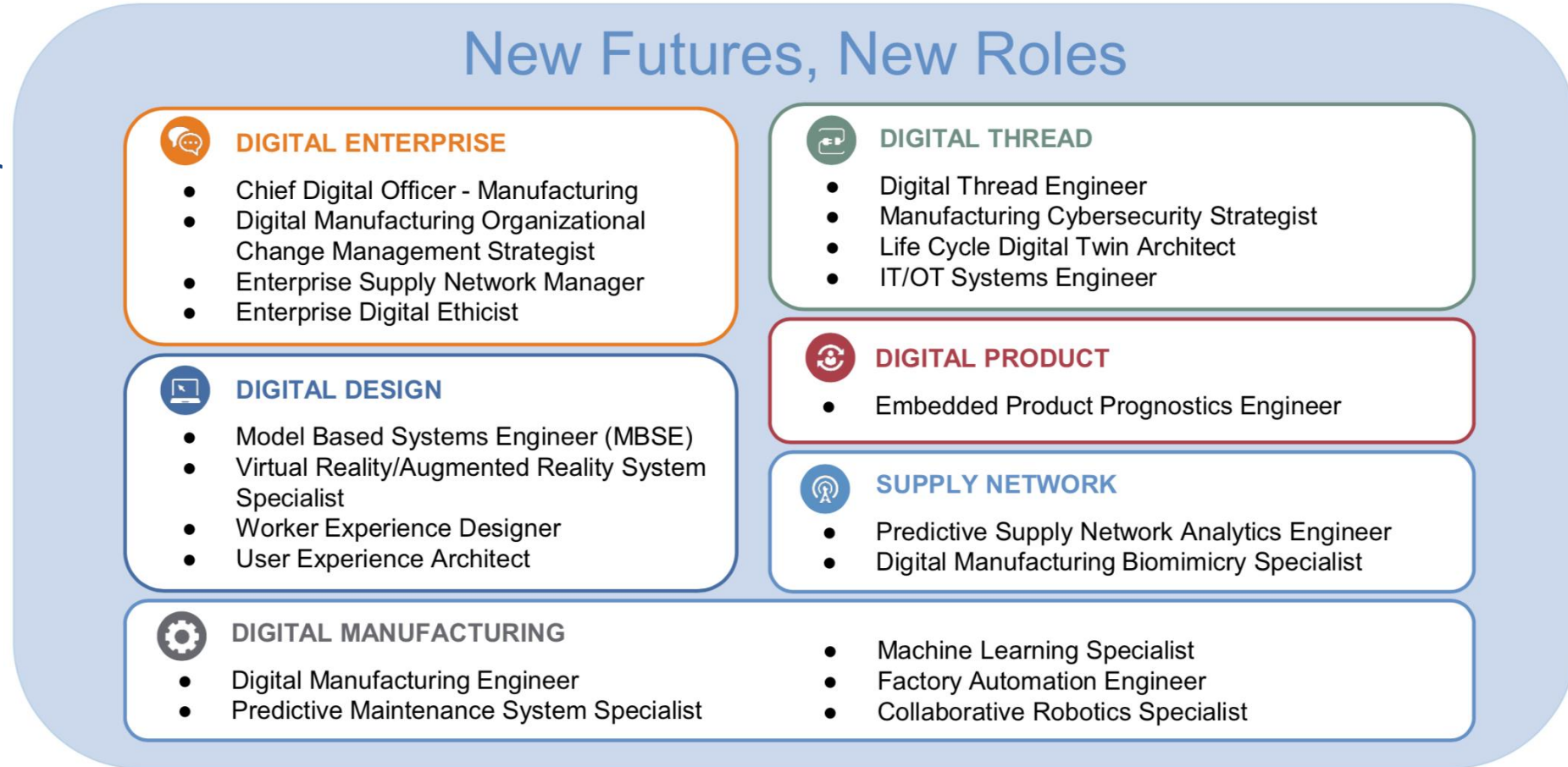


# Manufacturing Roles – USA Digital Taxonomy



- Digital taxonomy of jobs  
*(available to [download](#))*
- Compiled with Manpower Group

*Identified 165 potential roles such as Lifecycle Digital Twin Architect and Data Management Analyst that are critical to the success of digital manufacturing.*

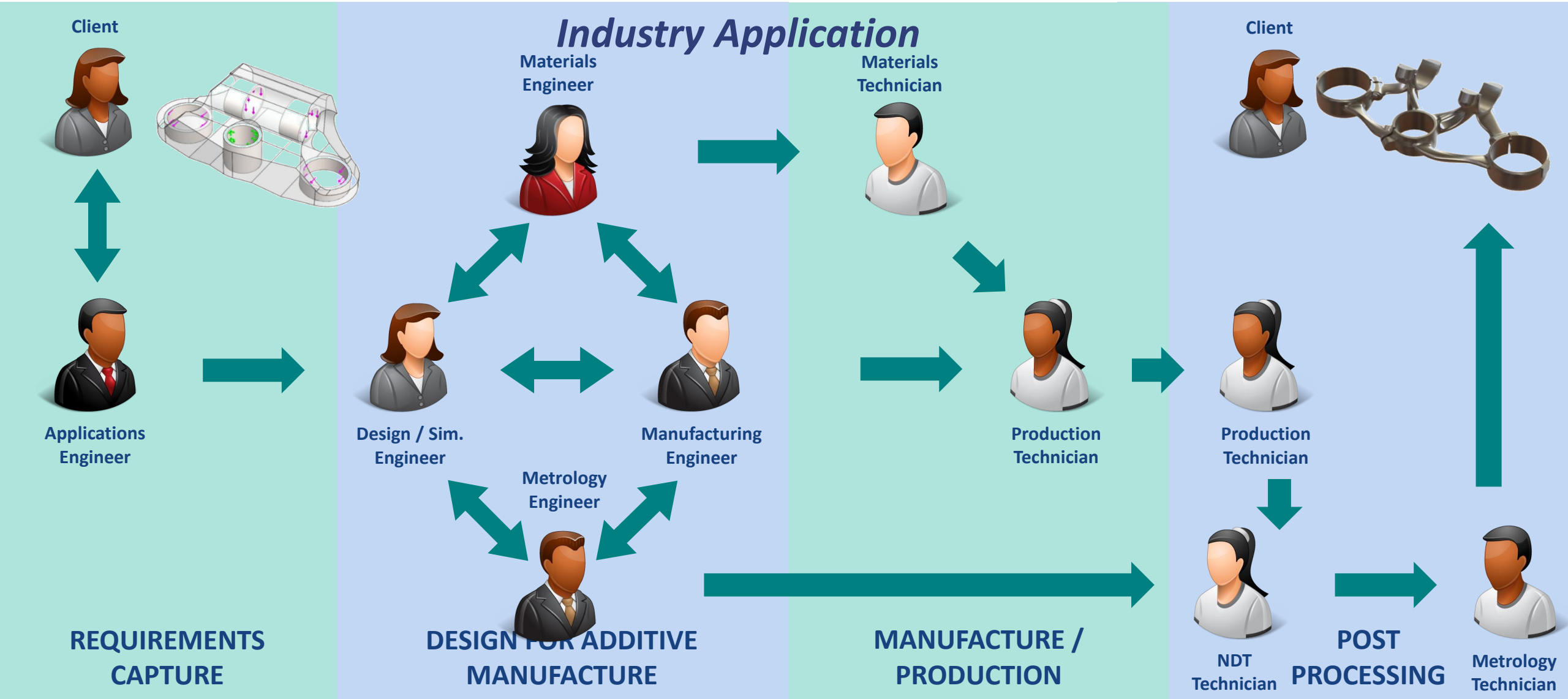


*More than manufacturing, and digitally connected across enterprise and supply chain*



*Roles and opportunities change with each new technology*

# MTC – New Roles for Additive Manufacturing





# Manufacturing Skills – Singapore ‘Upskilling Series’

Targeted at those keen to either gain a basic understanding or deepen their skills in these emerging areas

SkillsFuture Series comprises training programmes across Basic, Intermediate and Advanced Levels

Shared delivery of courses with young learners



Artificial Intelligence, Internet of Things (IoT) (Applications and Platforms), Machine Learning, Cloud Computing, Data Mining, Data Visualisation and Coding

Encryption Technologies, Cyber Intelligence and Cyber Risk Management, Cyber Incident Investigation, Cyber Compliance



Electronic Technologies (e.g. web, e-payment solutions), Geospatial Technology, Supply Chain Management, Security Systems, Digital Marketing

Start-Up, Technopreneurship, Financing, Platform Models, Business Models, Going Global, Product/Market Development, Sustainable Growth



Industrial Internet Of Things (IOT), Additive Manufacturing, Robotics and Automation

*New disciplines and subjects – many may not be in current qualifications*

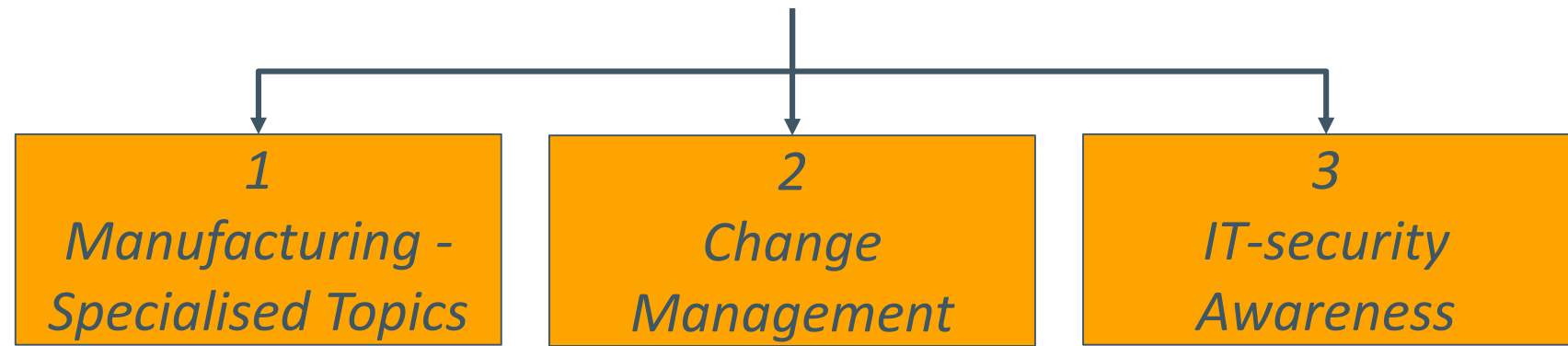


# Germany – view from Mittelstand Manufacturing

PLATTFORM  
**INDUSTRIE 4.0**



New Skills (Learning) Required



*Secure understanding of manufacturing is fundamental to I4.0 adoption*



# Future technologies and business skills

## Business Processes

**Manufacturing Fundamentals**  
*'Education'*

- Product and Process design
- Modelling and simulation
- Lean approach
- Data capture, validation and analysis
- Product and process verification
- Systems Integration
- *Others*

Using Data

- Analytical methods
- Gathering / validating
- Problem solving

## Emerging Manufacturing Technology

**New knowledge, - established and future processes**  
*'Application'*

Advanced Machining & Manufacturing	Mechatronics, Automation & Robotics	Joining, Inspection & Integrity	Composites Materials & Manufacture	<i>Others</i>
Additive Manufacture	Metrology	<i>Probable Future</i> Energy Storage Systems    Power Electronics    Etc..		

**Greater use of data and digital tools:**

- As demand changes to future technology applications
- Work place learning becomes data driven with more digital tools

## Business Management

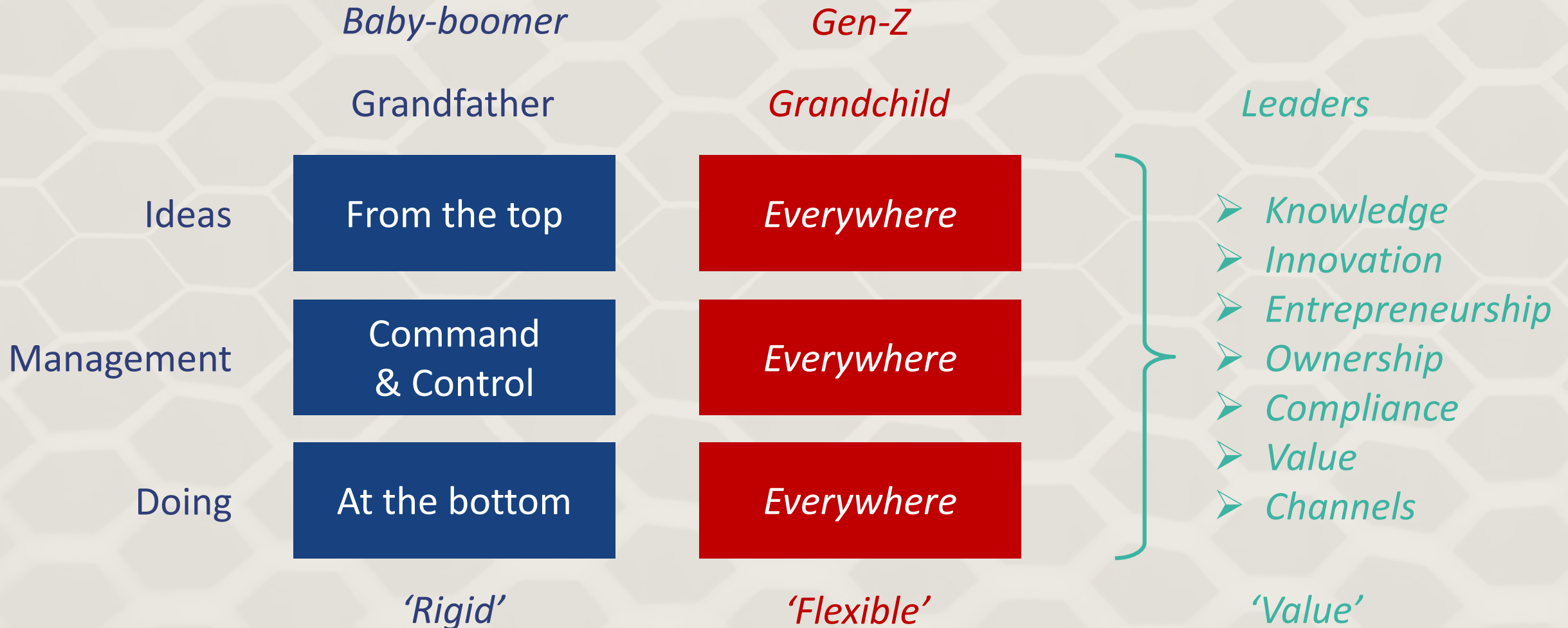
**Innovation and Delivery**  
*'Exploitation'*

- Leadership and Entrepreneurship
- Organisation development
- Cyber security and communications
- Productivity and competitiveness
- Supply chain management
- Finance

Data Management

- Security
- Communication
- System learning (AI)

# Leadership in the future manufacturing landscape



*Extracting value from, not controlling change will become a key manufacturing skill*

# Changes in the manufacturing skills landscape?

- A. More than manufacturing, and digitally connected across enterprise and supply chain
  - *Wider skill sets are essential to secure successful manufacturing outcomes*
- B. Roles and opportunities change with each new manufacturing technology
  - *“63% of Gen-Z will perform jobs that do not exist yet” (But evolution, not revolution)*
- C. New disciplines and subjects – many may not be in current qualifications
  - *Pace of change faster than education and training systems’ reaction to need*
- D. Secure understanding of manufacturing is fundamental to I4.0 adoption
  - *The principles of manufacturing change slowly and underpin successful digital change*
- E. Increased transferability (technology, sector and business) of digital-related skills
  - *More opportunity, less stability, talent as an asset*
- F. Extracting value from, not controlling change will become a key manufacturing skill
  - *Manufacturing – people, processes, products, all traditionally seek stability*