Why AI in Manufacturing?

- **Artificial Intelligence** is not just a technology but is increasingly being part of our daily lives.

- Manufacturing is an important driver for **societal well-being**: how can AI enhance that role?

- **Understanding the potential of AI** - its implications to organisations and its applications - is becoming increasingly relevant for many citizens, companies, and governments.

2020 WORLD MANUFACTURING REPORT:

Manufacturing in the Age of Artificial Intelligence
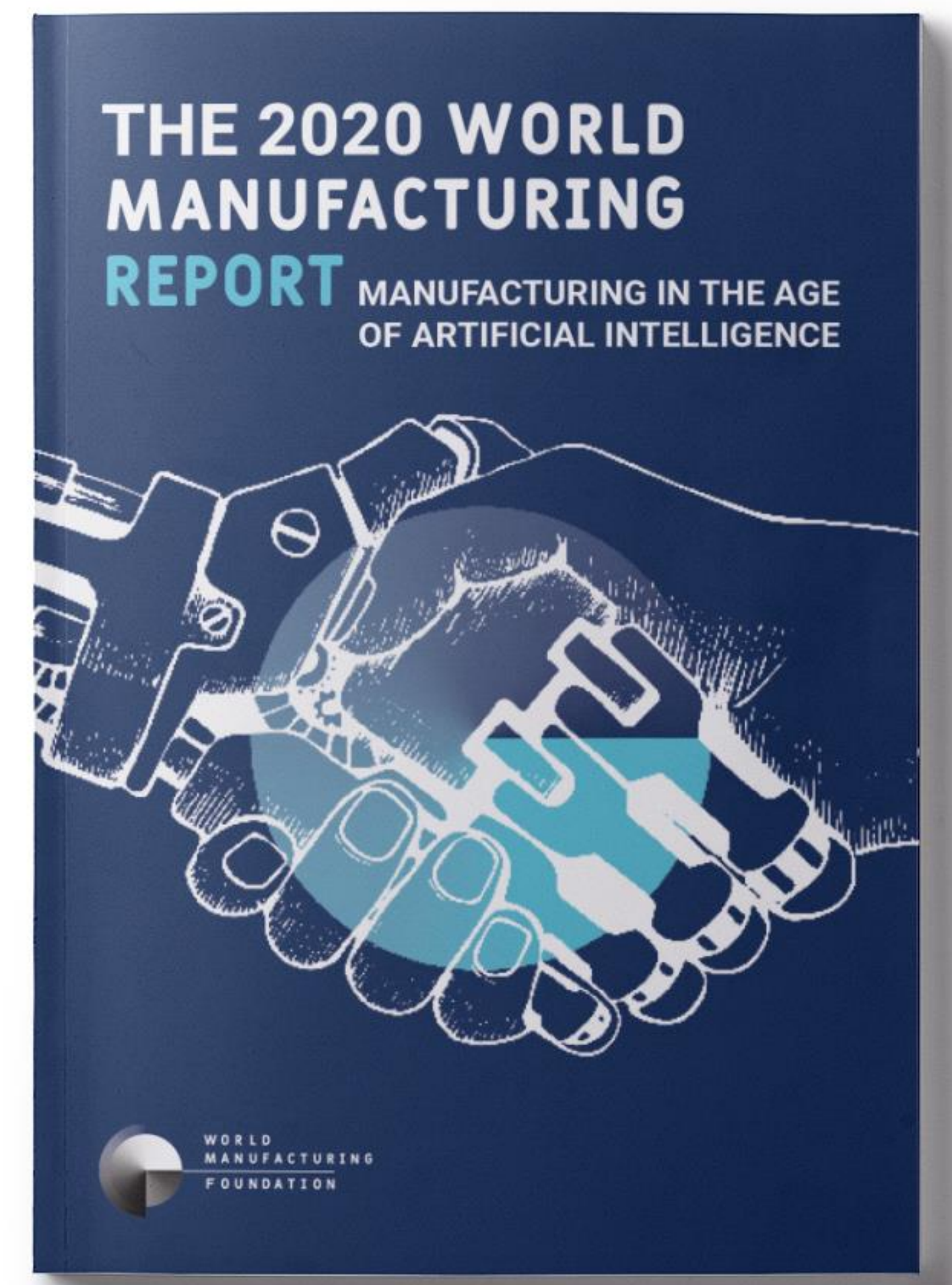
+50 CONTRIBUTORS

+30 NATIONALITIES

42% Companies and Industrial Associations

41% Academia and Research
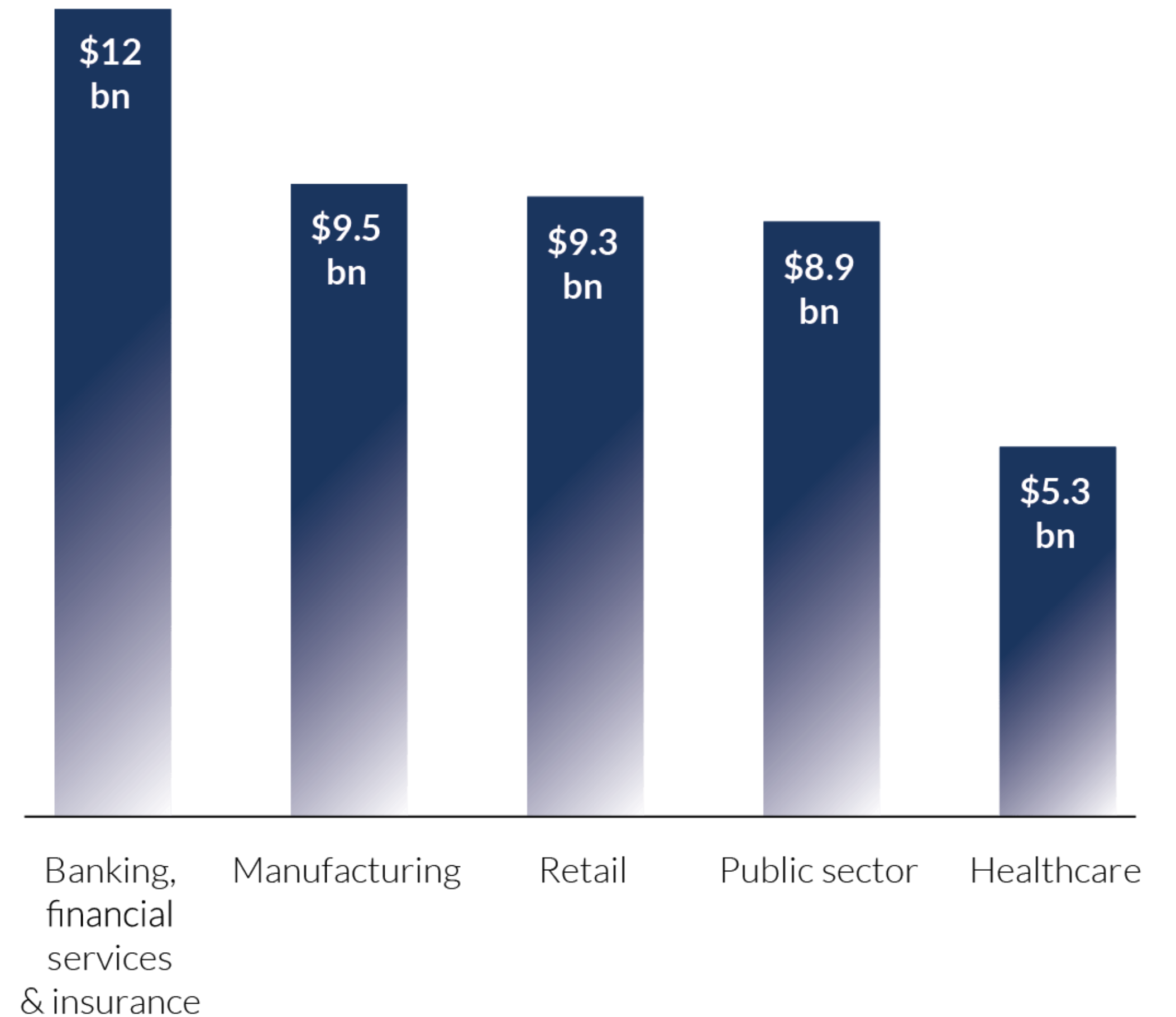
9% Government

8% NGOs, International Organisations, and others

AI in Manufacturing is increasing in relevance

Projected AI spending by industry (2021)
(Source: Atos)

Banking, financial services & insurance	Manufacturing	Retail	Public sector	Healthcare
$12 bn	$9.5 bn	$9.3 bn	$8.9 bn	$5.3 bn

World Manufacturing Forum 2020
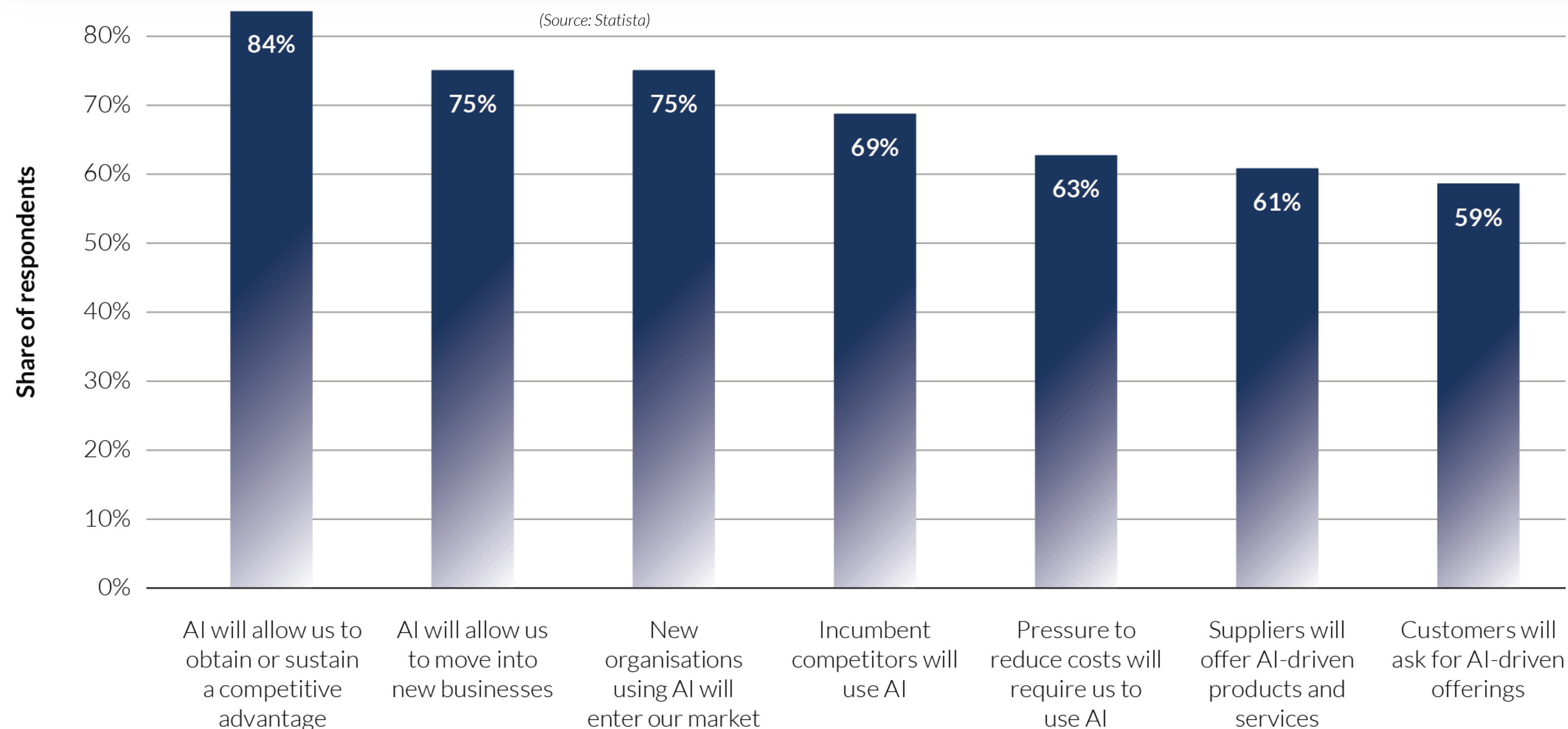
Companies are increasingly adopting AI to drive competitive advantage

Business organisations' reasons for adopting AI worldwide

(Source: Statista)

World Manufacturing Forum 2020

Key fields for AI adoption

(Source: 2019 Deloitte survey on AI adoption in manufacturing)

Smart production
51%

Products and services
25%

Business operation and management
8%

Supply chain
8%

Business model decision-making
4%

No adoption/plans
4%

Companies are increasingly adopting AI to drive competitive advantage

World Manufacturing Forum 2020

Barriers remain and are holding back companies from adopting AI

Barriers to AI adoption
(Source: MAPI Foundation)

| Barrier	Percentage
Lack of data resources needed to enable AI solutions	58%
Uncertainty about how to implement AI solutions to solve specific challenges	52%
Lack of sufficient workforce digital skills to develop and/or implement AI solutions	47%
Lack of interoperability between equipment that precludes data integration needed to support AI applications	47%
Skepticism about achieving sufficient ROI from investments in AI solutions	40%
Unaware of how to define what AI skills we need	34%
Lack of sufficient financial resources to support requisite investments	31%
Lack of senior leadership buy-in for AI solutions	21%
Concerns pertaining to cybersecurity risks	21%
Unsure of our ability to determine whether candidates have the skills needed to be successful in our environment	5%
Fear that automation solutions may lead to job loss	3%
Other	3%
None of the above	5%

World Manufacturing Forum 2020

How can AI transform Manufacturing?

AI applications in manufacturing

(Source: World Manufacturing Foundation)
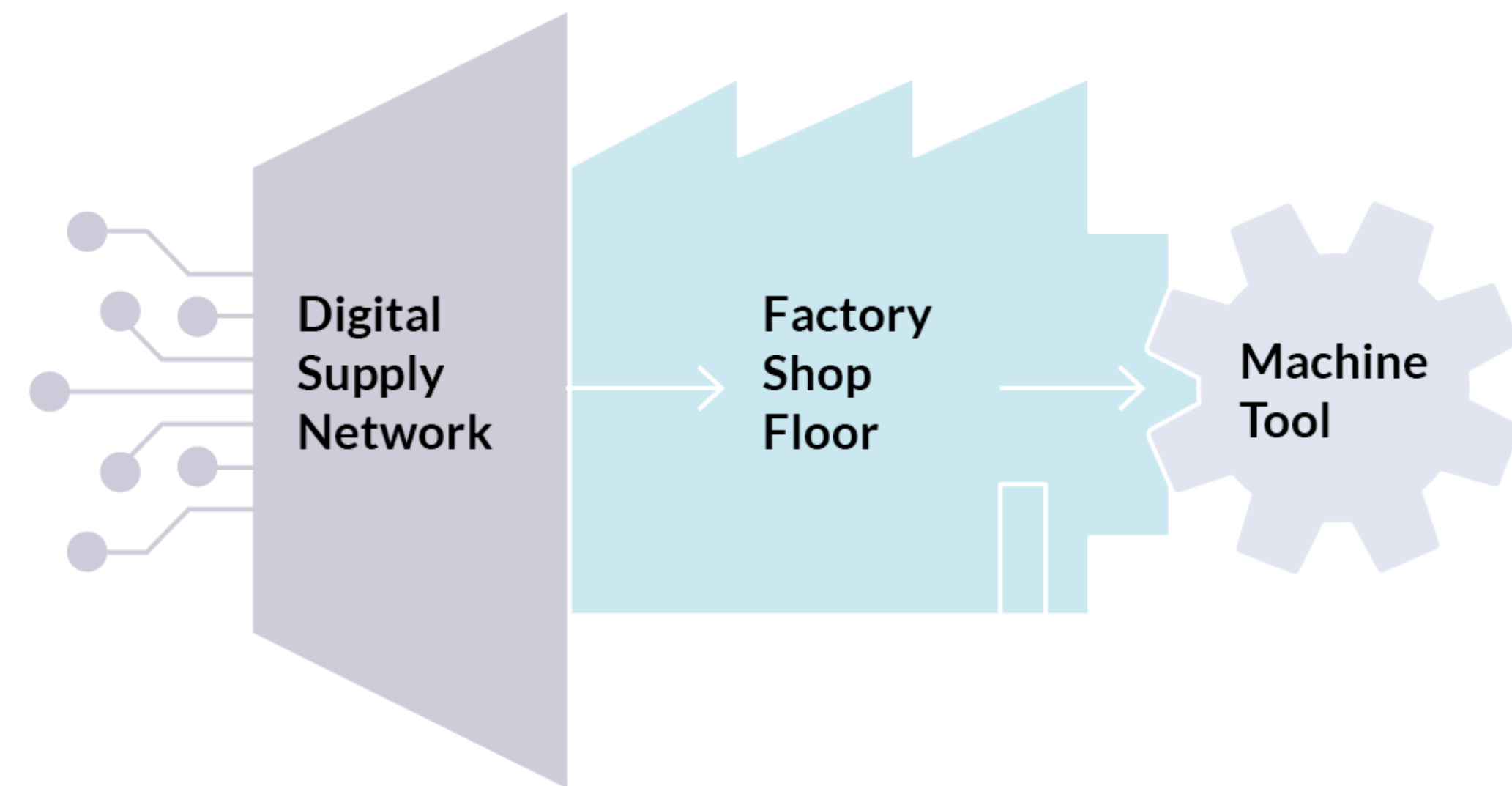
Core capabilities targeted at each level

(Source: World Manufacturing Foundation)

	DSN	Factory	Machine
resilience	●		
agility	●	●	
risk	●		
flexibility	●	●	
quality		●	●
dynamics		●	
safety		●	●
efficiency			●
adaptability			●

Digital Supply Network Level

• **Demand Forecasts and Synchronized Planning**

• **Automated Warehouse Management**

• **Automated Design and Development**

• **Connected Services**

Factory Shop Floor Level

- **Energy Efficiency**

- **Product and Process Quality**

- **Scheduling Optimisation**

- **Robotics**

- **AI that Enhance the Abilities of the Human Operator**

Machine Tool Level

- **Automated Quality Inspection, Monitoring, and Control**

- **Data-Driven Tool Wear Models**

- **Predictive Maintenance**

- **Overall Equipment Effectiveness and Energy Efficiency**

# Key Recommendations
by the World Manufacturing Foundation

# 3 Implement Ethical Considerations throughout the AI Life Cycle
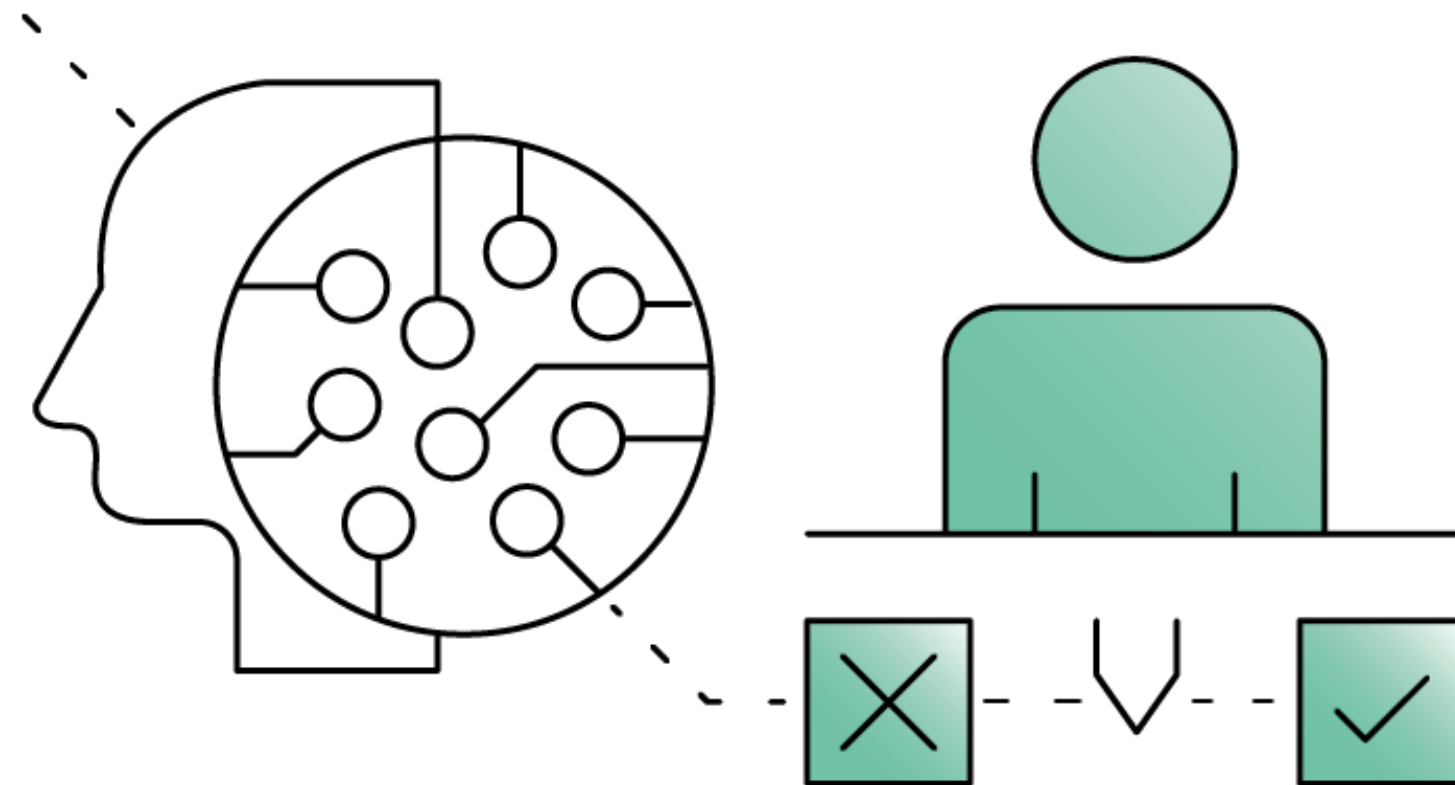
- Consider ethical implications in the ideation, development and implementation of AI projects

- Ensure that AI systems do not discriminate

- Promote interdisciplinary teams working in AI projects

4 Ensure Data Quality, Privacy and Availability
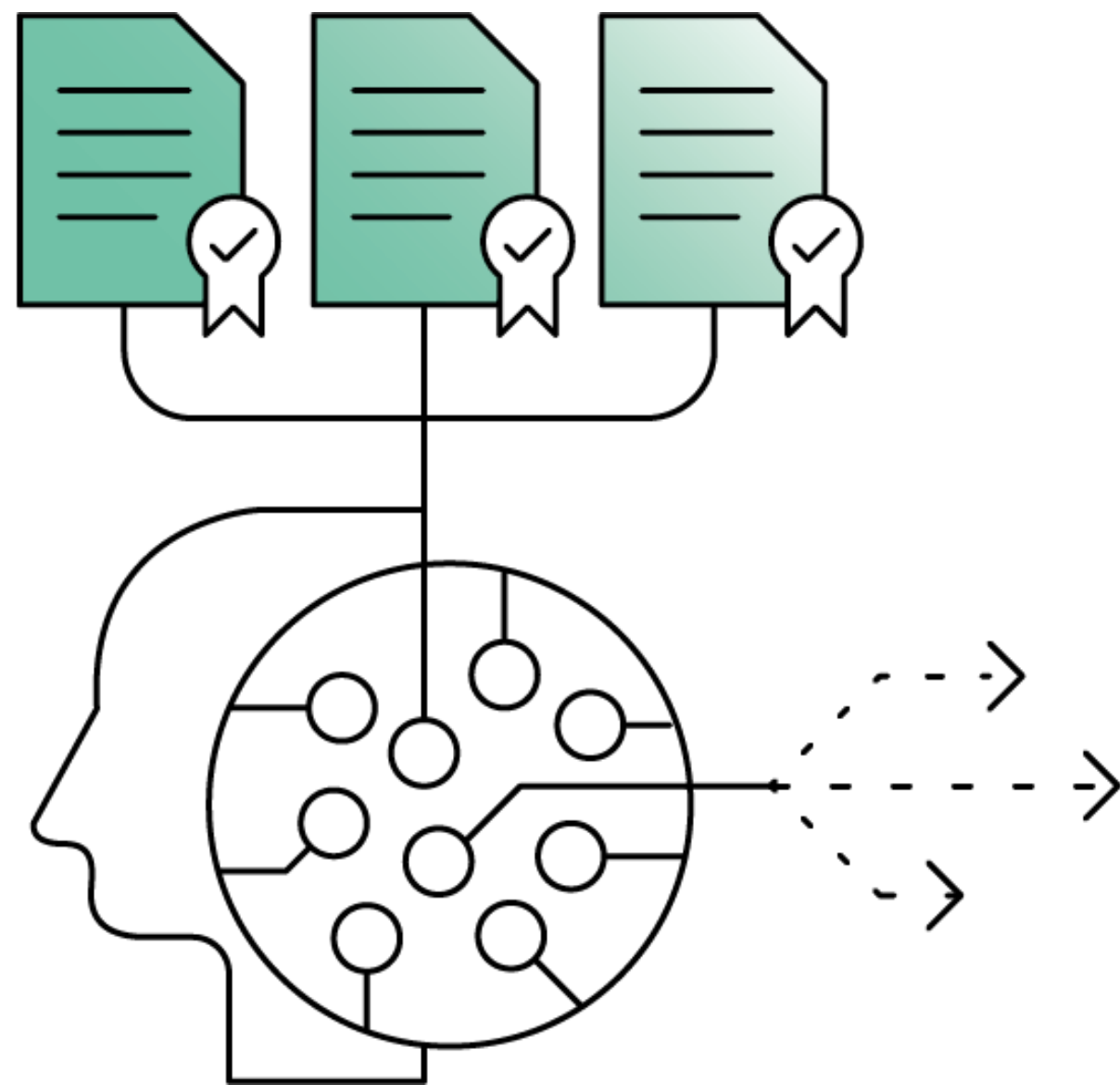
- Ensure data accuracy and completeness

- Promote responsible data collection and management practices

- Explore new ways of trusted data sharing

**5** **Put Humans at the Centre of AI Work Environments**
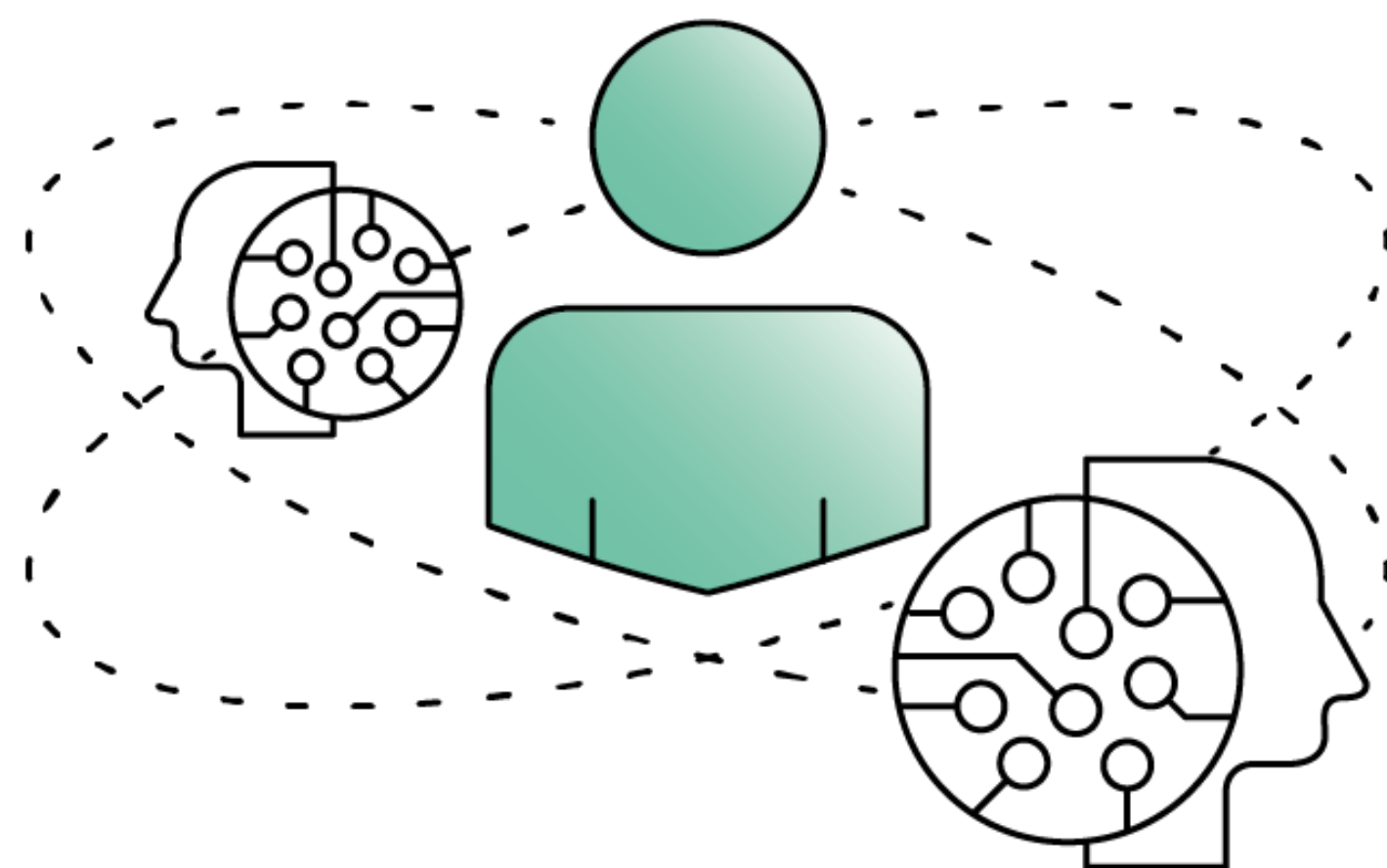
- Prepare workers psychologically for a future with AI

- Empower humans to enhance AI capabilities and vice versa

- Increase acceptance by making AI explainable and transparent to workers

10 Implement Standards, Policies, and Regulations to Guide a Sustainable AI Adoption
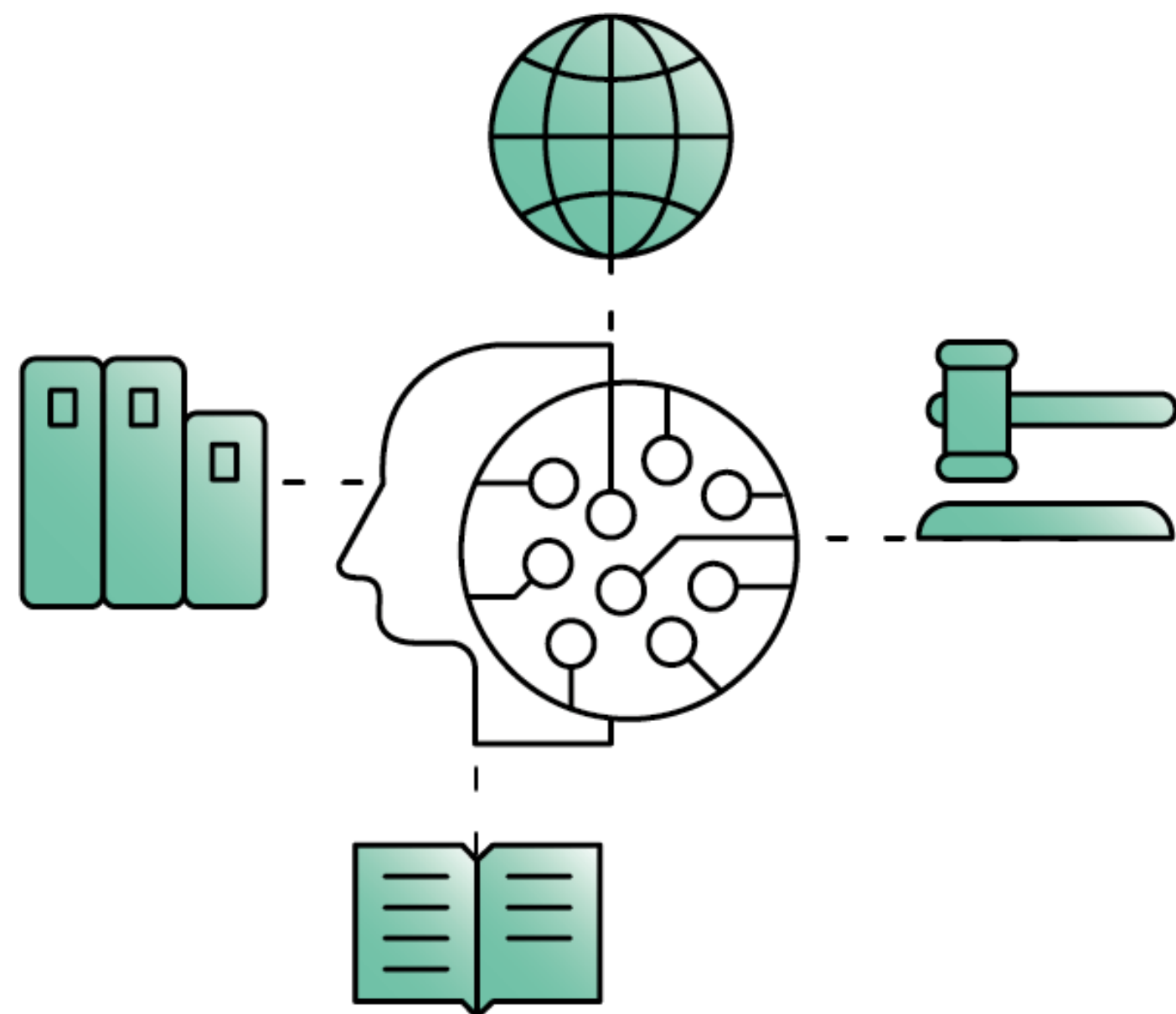
- Evolve standards, policies and regulations to fast-changing developments in AI

- Develop over-arching principles or guidelines that can be adopted in policy formulation globally

- Establish standards to guide the development of trustworthy AI systems
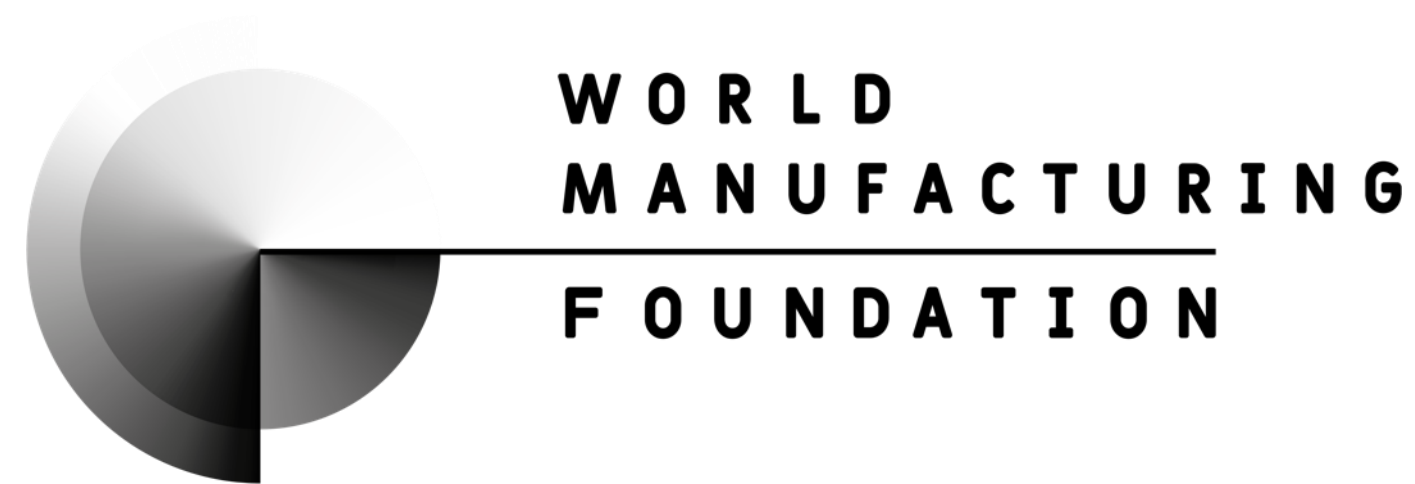
2020 World Manufacturing Report

Manufacturing in the Age of Artificial Intelligence

https://worldmanufacturing.org/report/report-2020/

Marco Taisch
Scientific Chairman, World Manufacturing Foundation

World Manufacturing Forum 2020