

Wednesday 28th October

Technical Topic Webinar



Transitioning from Industry 4.0 to 5.0: A Smart Manufacturing Perspective

Presented by

Indumathi V
EIT Deputy Dean

Dr. Akhlaqur Rahman
*EIT Course Coordinator and
Lecturer*

[View Recording Here](#)

Agenda

- 1** Introduction to Industry 4.0 and IIoT
- 2** Key Components of IIoT
- 3** Industry 4.0 Case Studies for Smart Manufacturing
- 4** Imagining Industry 5.0
- 5** Summary



Indumathi V
Deputy Dean of EIT

Indu has over 17 years of experience in Engineering, Leadership and Engineering Education and is currently a PhD Student (Engineering Education).

As a passionate educator, her current PhD project focuses on using EEG brainwaves to empower student engagement and participation in the classroom.

"EIT has grown very strongly since I started at the beginning of 2019. Their innovative approach to accessible, flexible, and high-quality education is like no other in the world. The success is strongly attributed to the passionate team of lecturers and staff here at EIT."



Akhlaqur Rahman (AK), PhD
EIT Course Coordinator and Lecturer

Specialist within the Electrical and Mechatronics fields.

Received the "Swinburne Emerging Leadership Award" from Swinburne University.

AK completed his PhD in Electrical Engineering from Swinburne University of Technology in Melbourne, Australia. Before that he completed BSc in Electrical and Electronic Engineering from American International University- Bangladesh in 2012.



EIT is one of the only institutes in the world specializing in engineering.



Emerged in 2008 from sister company IDC Technologies. Since 1991, IDC's portfolio of 300 courses has been attended by over 500,000 engineers, technicians and technologists.



In 2019, EIT delivered courses to over 2,000 students globally and has alumni from 146 countries.



80 programs from professional certificates through to Australian accredited diplomas, degrees and a Doctor of Engineering.



Network of 300+ industry-based expert lecturers with applied knowledge.

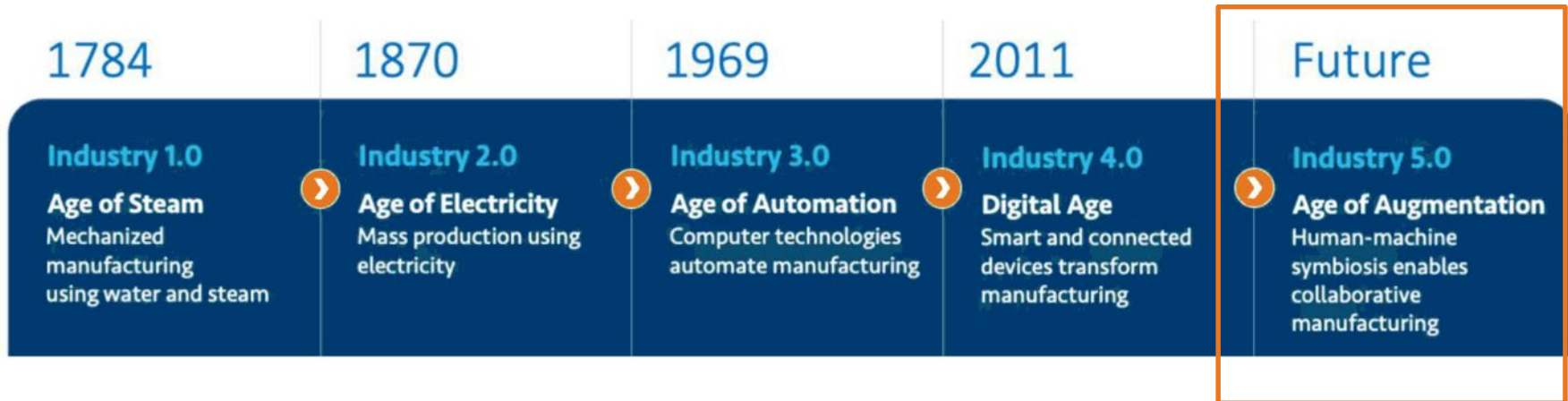


Unique methodology that makes use and state-of-the-art technologies including remote and virtual labs



Programs designed by industry experts to provide cutting edge skills valued by employers globally

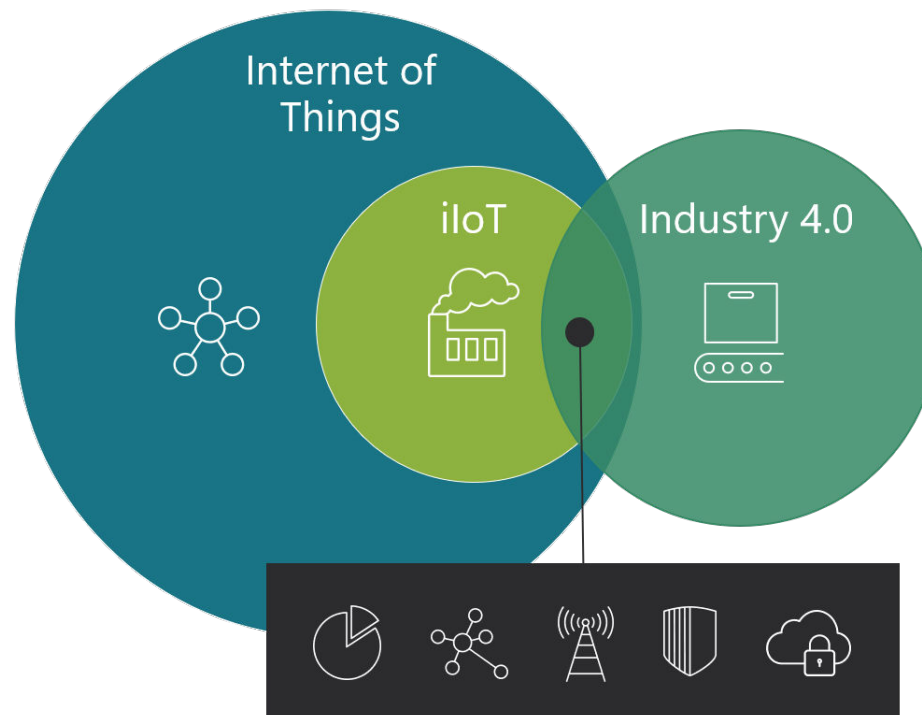
Industry 4.0 and IIoT



Making Sense of the Trends

The big picture of IoT and Industry 4.0

Internet of Things
The connection of physical objects to the internet enables them to publish and access information in mission-critical and non critical applications.

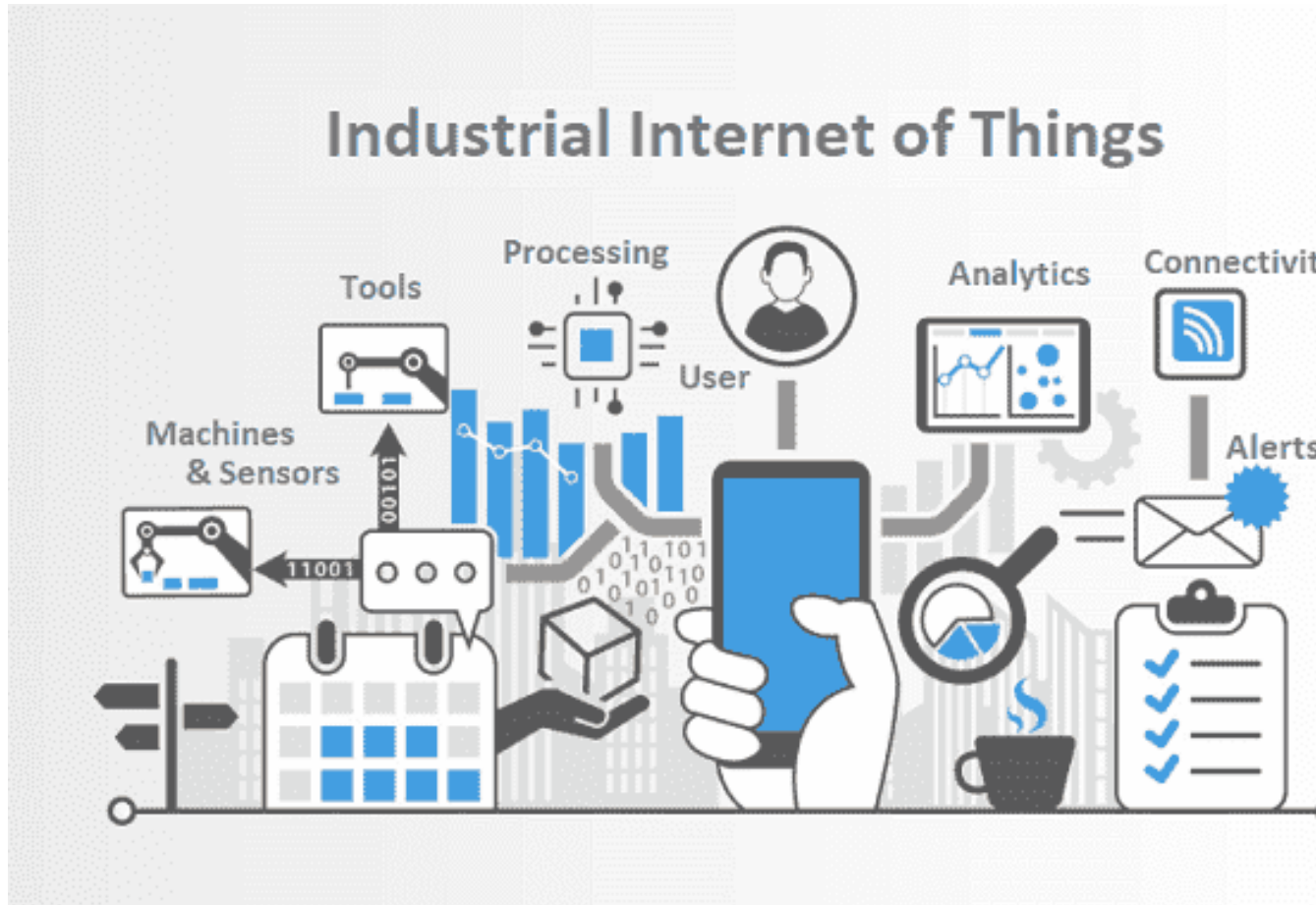


Industry 4.0
Use of cyber-physical systems to enhance and automate the value chains in manufacturing companies.

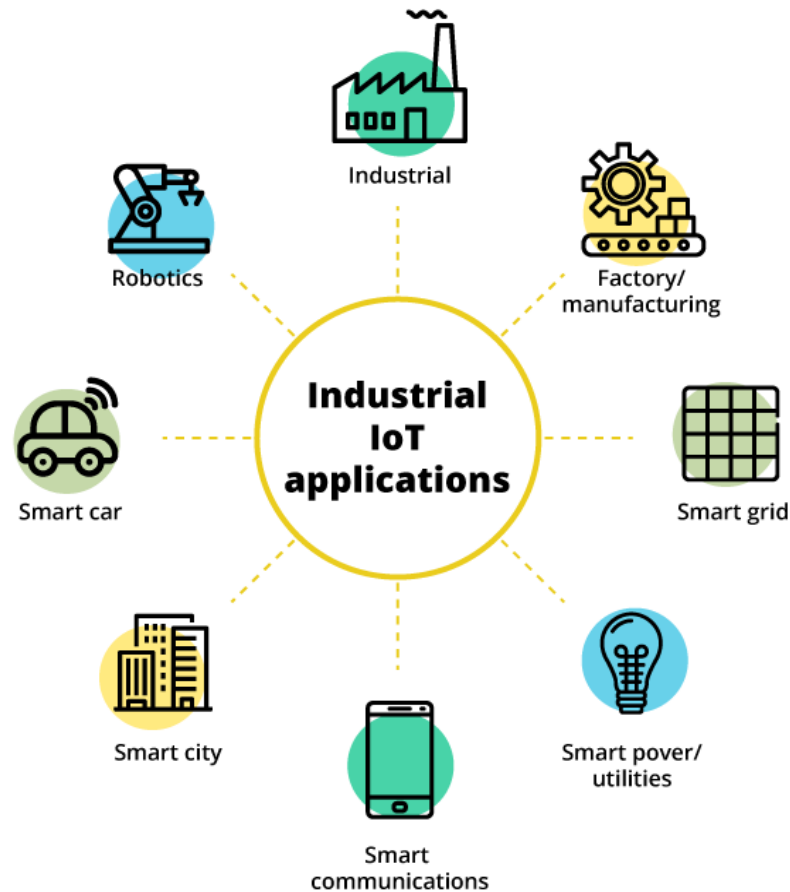
Common Concepts
Data Management,
Connectivity, Communication,
Device security, Secure Cloud

<https://medium.com/the-industry-4-0-blog/industrial-iiot-vs-industry-4-0-vs-industry-5-0-a5f9541da036>

What is IIoT?



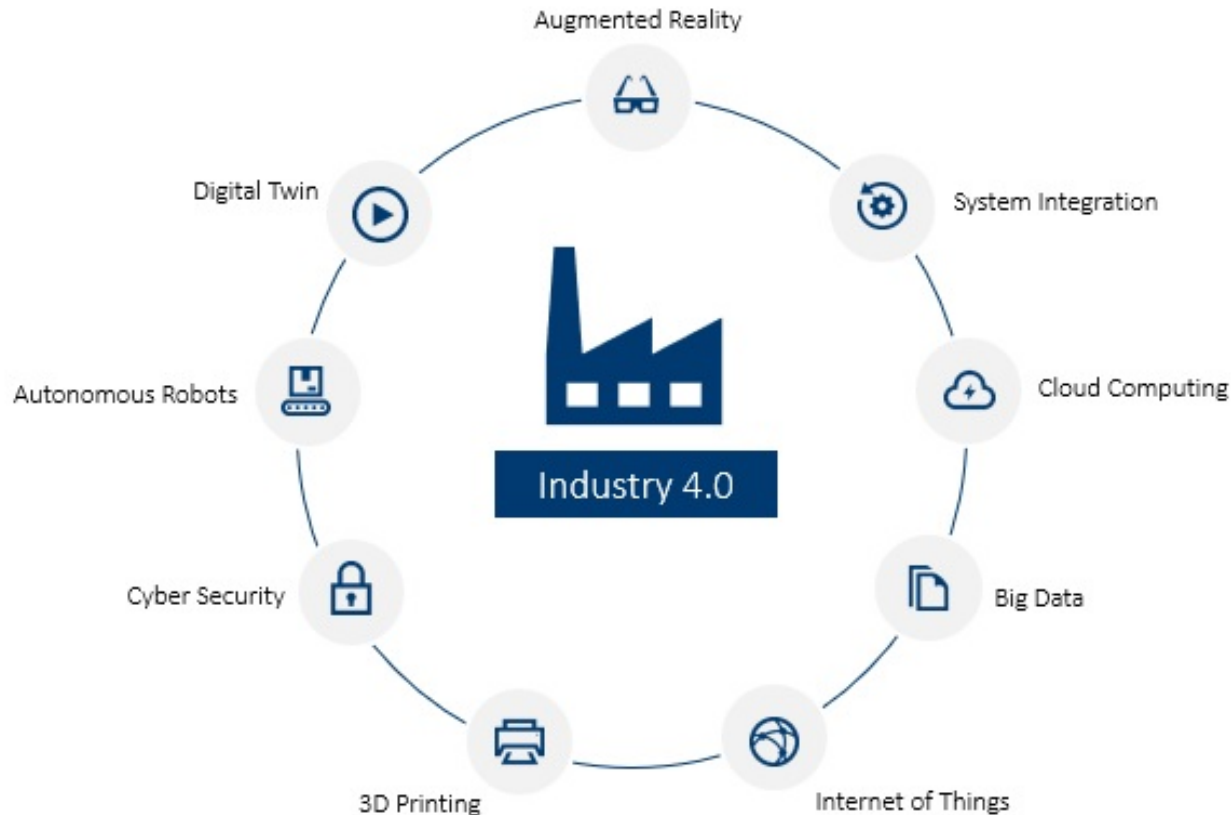
<https://www.rfpage.com/applications-of-industrial-internet-of-things/>



<https://medium.com/sciforce/how-to-recognize-industrial-internet-of-things-f27ccae1ac69>

Key Components of IIOT

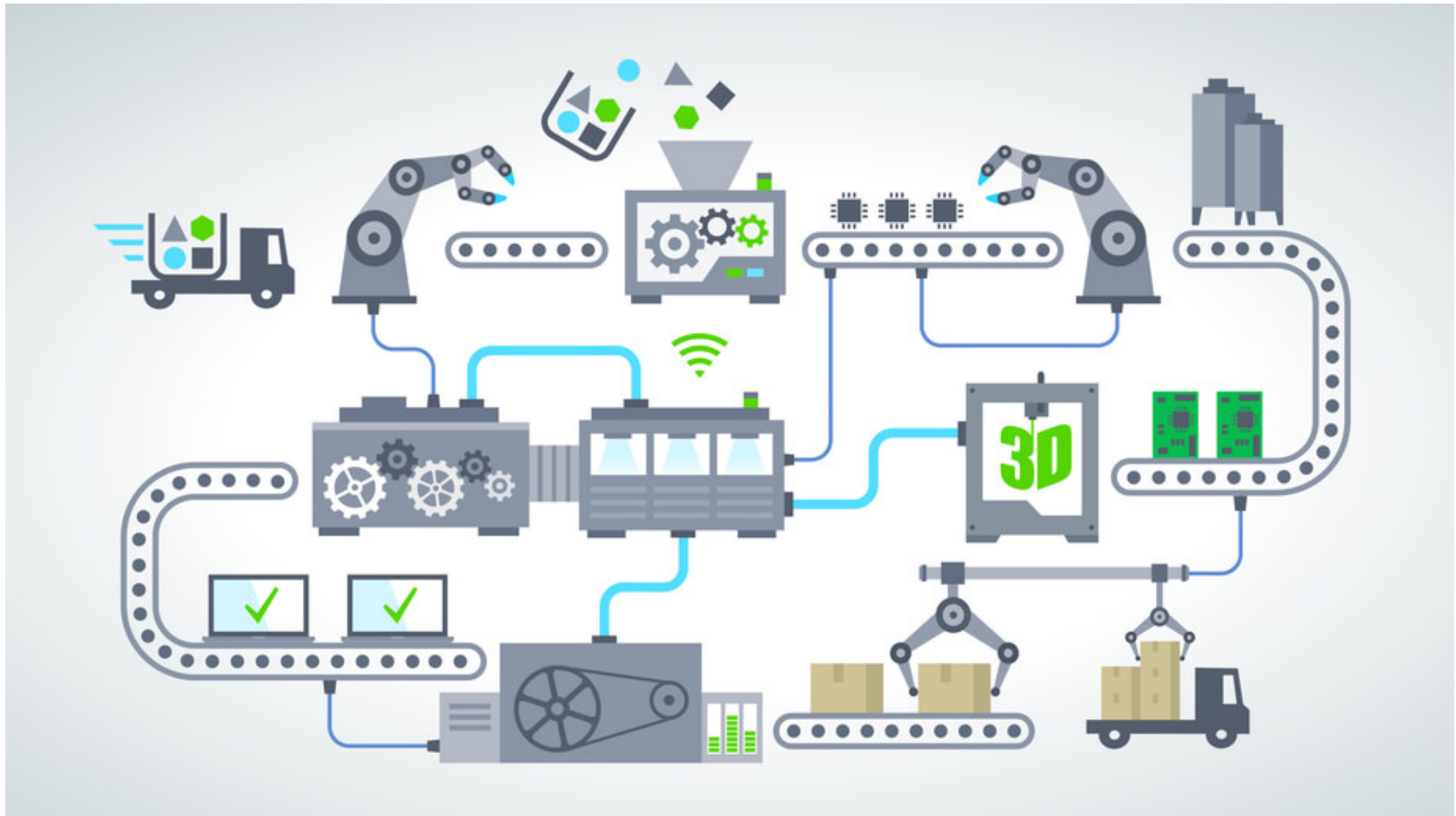
Key Components of IIoT



Industry 4.0 is the integration of these 9 pillars to create an efficient industrial ecosystem that is not just automated but intelligent.

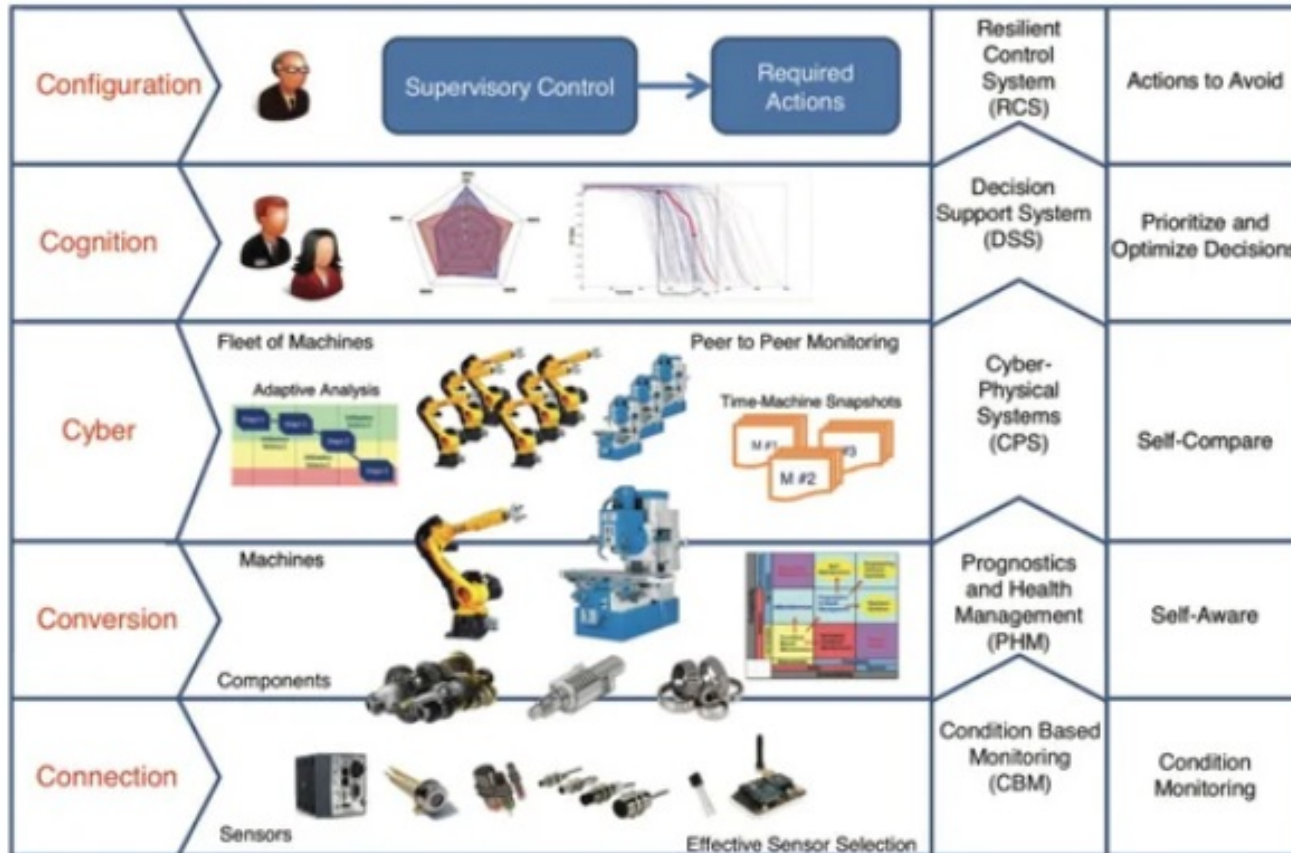
Industry 4.0 Case Studies for Smart Manufacturing

IIoT and Smart Manufacturing

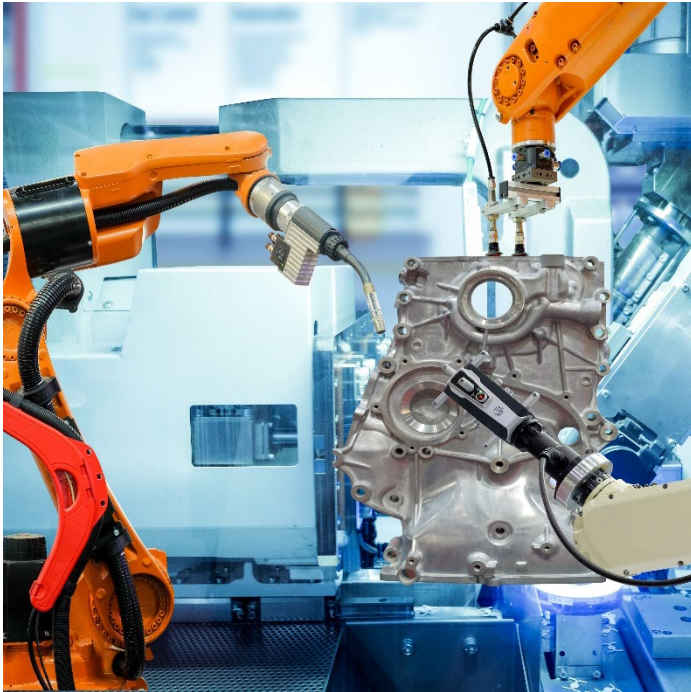


<https://www.japanindustrynews.com/2016/01/safety-measures-industrial-workplace-present-future/>

IIoT and Smart Manufacturing



<https://www.sdxcentral.com/5g/iiot/definitions/what-is-industrial-iiot-definition/>



- Scalability
- Security
- Control and Visibility
- Customer Satisfaction
- Customization

<https://gesrepair.com/industry-4-and-5/>

ABB Smart Robotics



<https://new.abb.com/control-systems/features/industrial-iiot-services-people-use-cases>

Airbus: Factory of the Future

- Digital manufacturing initiative to streamline operations and bolster production capacity.
- The company has integrated **sensors to tools and machines on the shop floor** and given workers wearable technology designed to reduce errors and bolster safety in the workplace.
- In one procedure, known as cabin-seat marking, the wearables enabled a 500% improvement in productivity while nearly eliminating errors.



Fanuc

- Robotics maker Fanuc is using sensors within its robotics in tandem with cloud-based analytics in order to predict when failure of a component such as a robotic system or process equipment is imminent.
- While predictive maintenance is a familiar concept, Fanuc has embraced it more aggressively than most.



Kuka

- German robotics specialist KUKA has an IoT strategy that extends to whole factories.
- For instance, Jeep asked the company to help build a factory that could churn out a car body every 77 seconds. The company responded by helping the company build an **IoT-enabled factory** with hundreds of robots linked to a private cloud.
- The plant can produce more than 800 vehicles each day.



Rio Tinto

- The British/Australian mining conglomerate launched an innovative automated mining initiative in Pilbara, a remote region in Western Australia with deep reserves of iron ore.
- Driverless trucks and trains haul ore away from the mining sites while an **autonomous drill technology** enables a remote worker to oversee multiple drills from a single console.

Rio Tinto

- Driverless ships may be in its future as well. The company has a control center complex in Perth that connects to its mines as well as its rail and port operations, where engineers, analysts, programmers and technicians remotely guide mining operations.



Shell

- Named the most innovative oil and gas company in a survey from Rigzone in 2016, Shell reports that its smart oil fields can obtain 10% more oil and 5% more gas than traditional fields.
- The company links its high-tech wells with fiber-optic cable that allows remote employees to monitor operations remotely.
- The company recently launched a **digital twin initiative** for an offshore rig in the southern North Sea.



Manufacturing predicted to spend \$197 billion on IoT solutions in 2019

Predicted spend on IoT solutions in 2019, by industry (\$ billion)

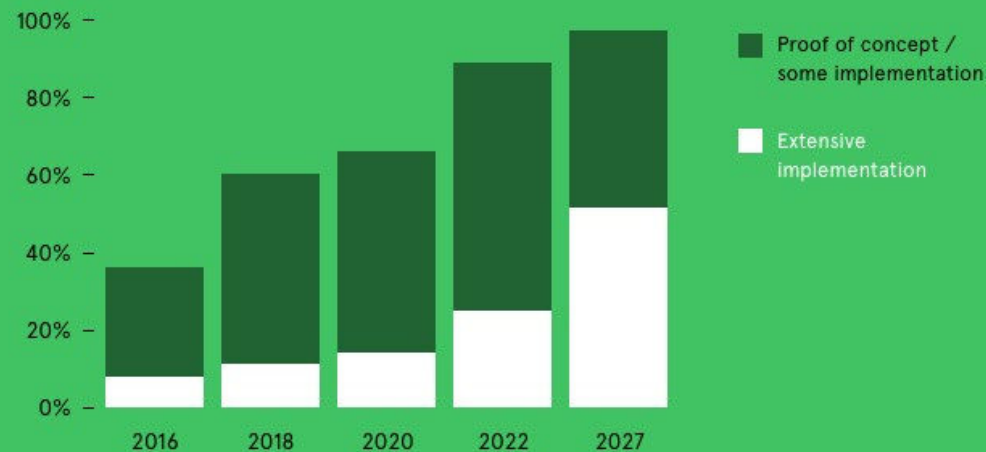


Source: IDC, Internet of Things Spending Guide, January 2019

AVNET ABACUS

More than 80% of industrial companies expect to implement IoT projects by 2022 and over 95% by 2027

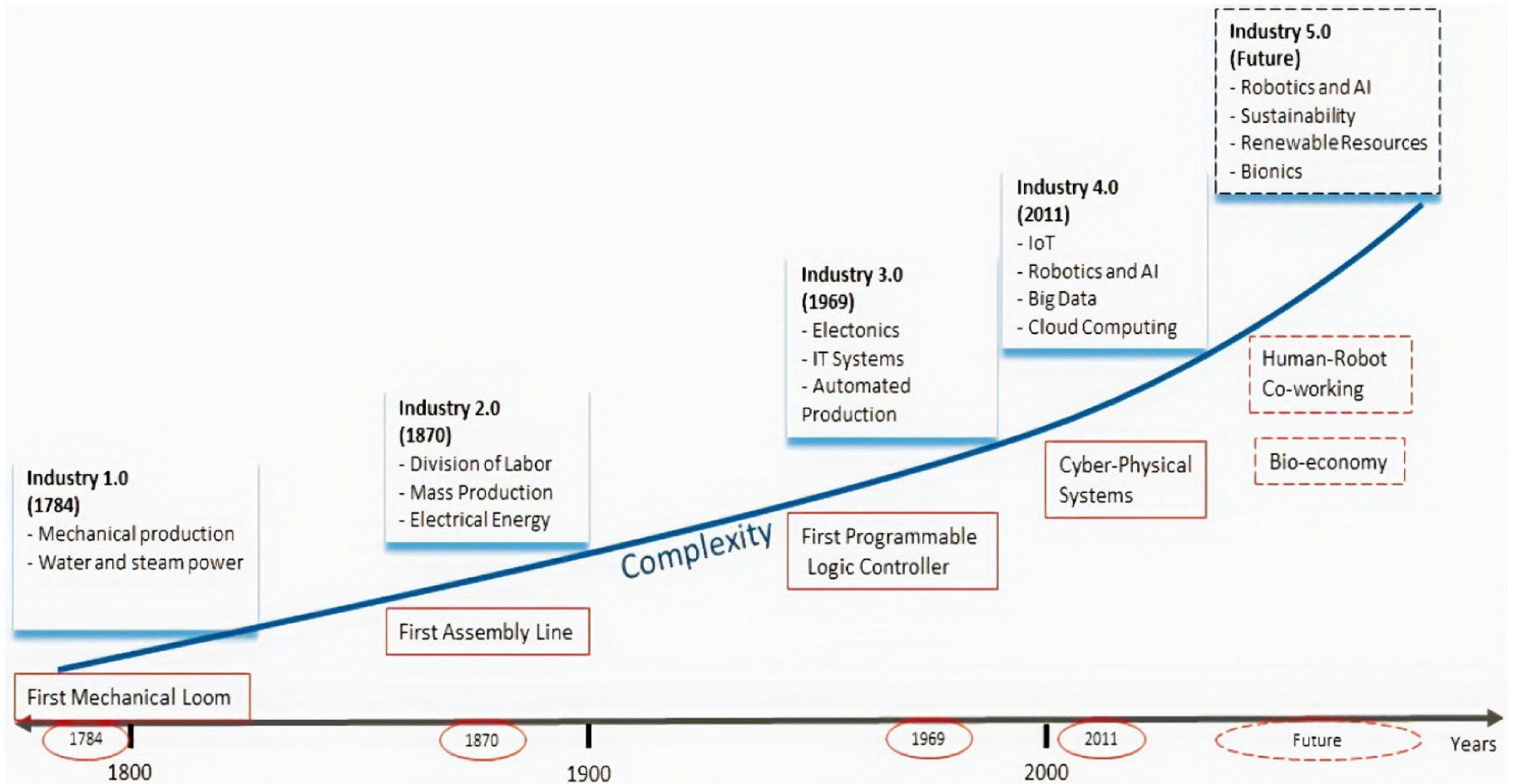
The IoT outlook for the future



Source: Bain & Company, IoT Customer Survey, 2018

AVNET ABACUS

Imagining Industry 5.0



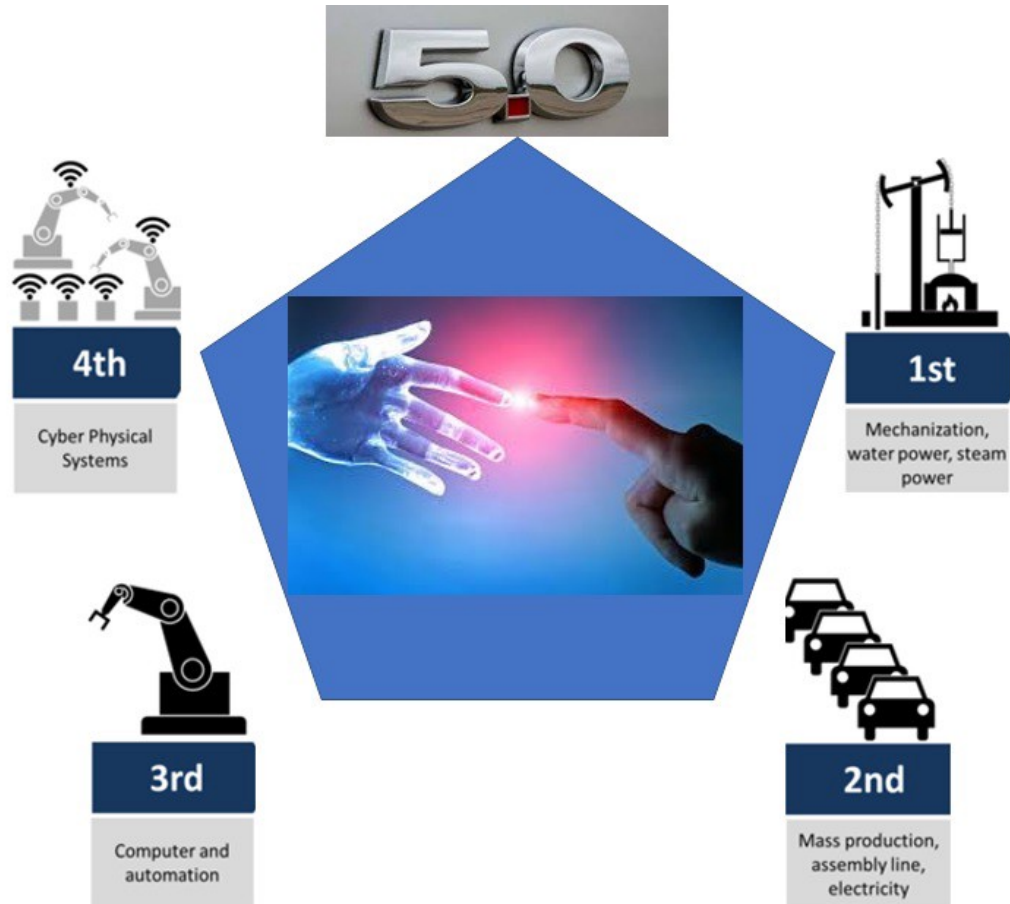
Industry 4.0 vs Industry 5.0

Table 1. A Comparison of Industry 4.0 and Industry 5.0 Visions

	Industry 4.0	Industry 5.0 (Vision 1)	Industry 5.0 (Vision 2)
Motto	Smart Manufacturing	Human-Robot Co-working	Bioeconomy
Motivation	Mass Production	Smart Society	Sustainability
Power Source	Electrical power Fossil-based fuels Renewable power sources	Electrical power Renewable power sources	Electrical power Renewable power sources
Involved Technologies	Internet of Things (IoT) Cloud Computing Big Data Robotics and Artificial Intelligence (AI)	Human-Robot Collaboration Renewable Resources	Sustainable Agricultural Production Bionics Renewable Resources
Involved Research Areas	Organizational Research Process Improvement and Innovation Business Administration	Smart Environments Organizational Research Process Improvement and Innovation Business Administration	Agriculture Biology Waste Prevention Process Improvement and Innovation Business Administration Economy

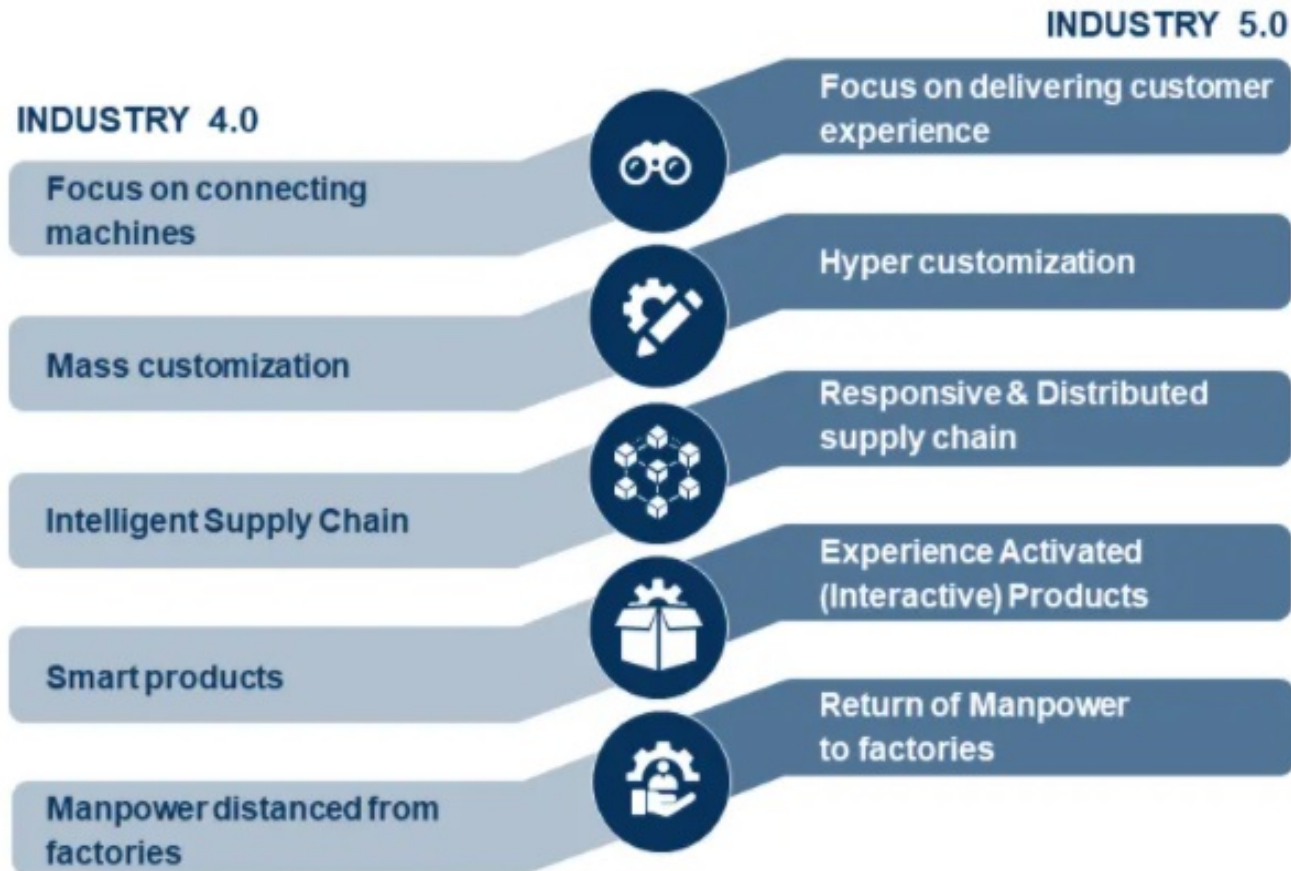
****Industry 5.0 is still not fully standardized yet, and therefore it is still open to individual interpretation and suggestion****

Transition from Industry 4.0 to 5.0



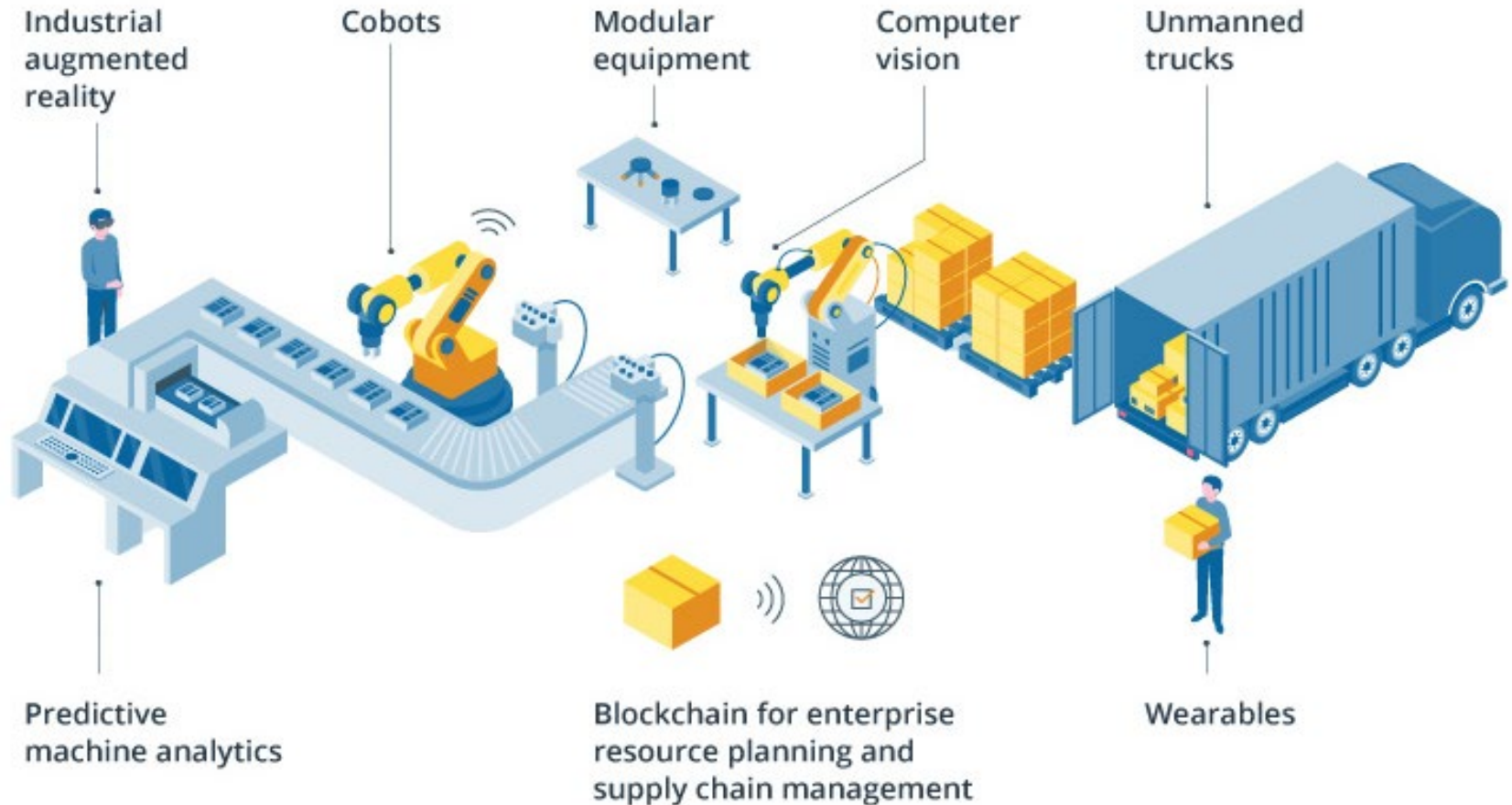
<https://michael-rada.medium.com/industry-5-0-definition-6a2f9922dc48>

Transition from Industry 4.0 to 5.0



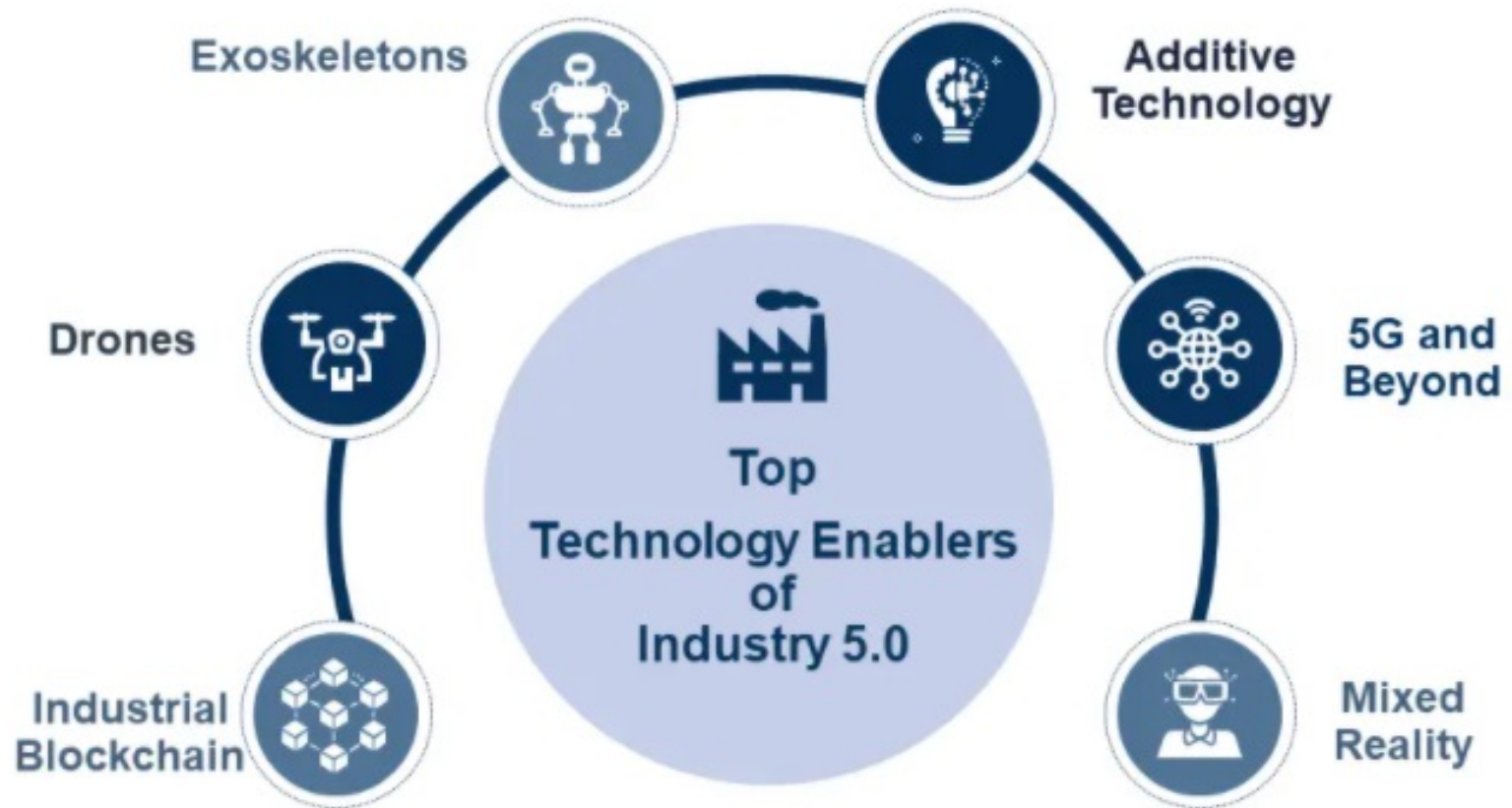
<https://ww2.frost.com/frost-perspectives/industry-5-0-bringing-empowered-humans-back-to-the-shop-floor/>

Industry 5.0 Plant Layout



<https://www.intellias.com/industry-5-0-announcing-the-era-of-intelligent-automation/>

Pillars of Industry 5.0



<https://ww2.frost.com/frost-perspectives/industry-5-0-bringing-empowered-humans-back-to-the-shop-floor/>

Collaborative Automation



<https://www.controleng.com/articles/collaborative-robot-optimization-with-ai-for-safer-manufacturing-during-covid-19/>

<https://www.raconteur.net/manufacturing/manufacturing-gets-personal-industry-5-0/>

Mixed Reality

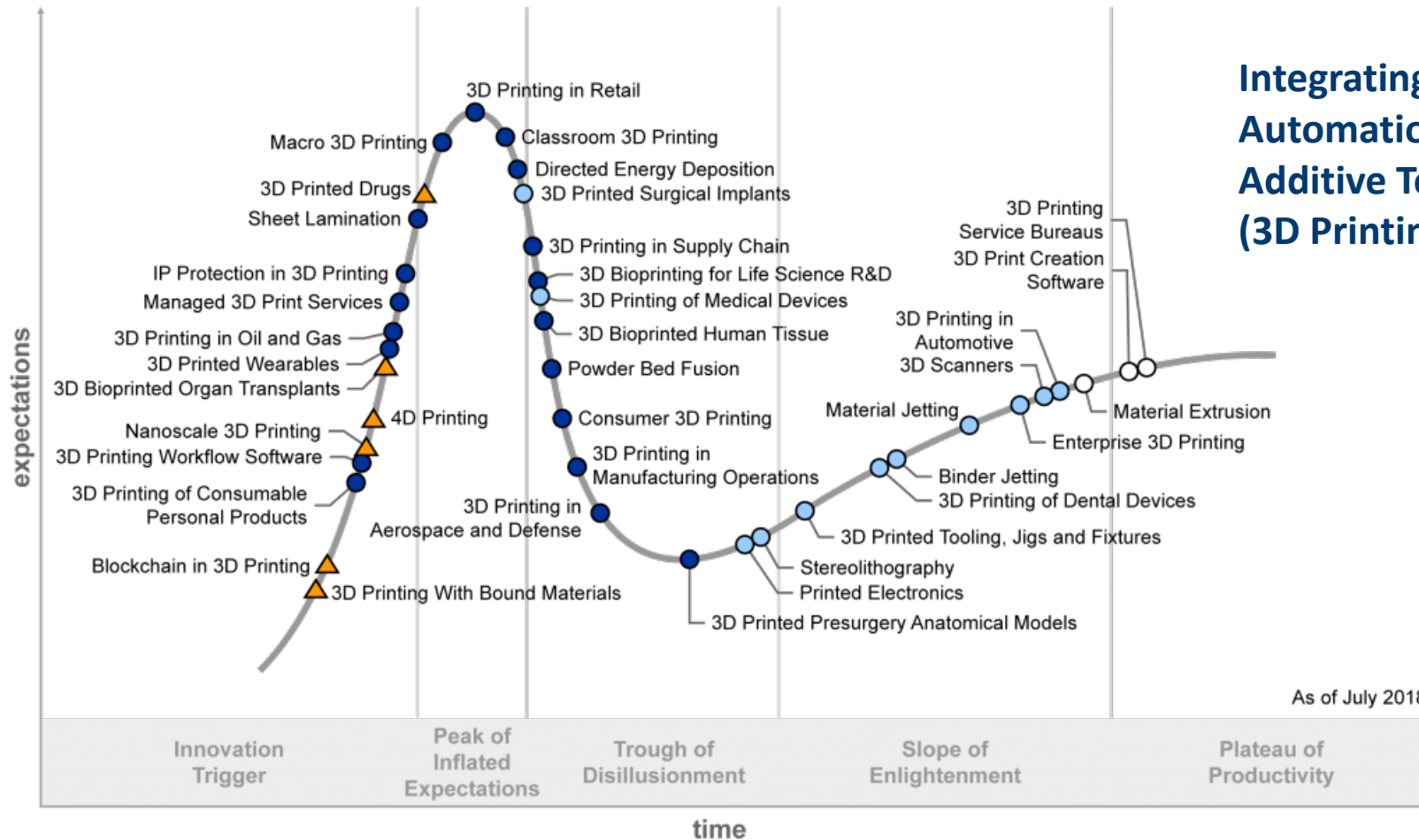


<https://www.forbes.com/sites/timbajarin/2019/09/23/the-real-significance-of-ar-vr-and-mixed-reality/#1978eae6d80>

<https://www.avrspot.com/5-ways-augmented-reality-enhancing-industrial-production/>

Key Enablers for Industry 5.0

Integrating Automation with Additive Technology (3D Printing)



Plateau will be reached:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ⊗ obsolete before plateau

© 2018 Gartner, Inc.

<https://cpoinnovation.com/industry-5-0-capabilities/>

Industrial Drones



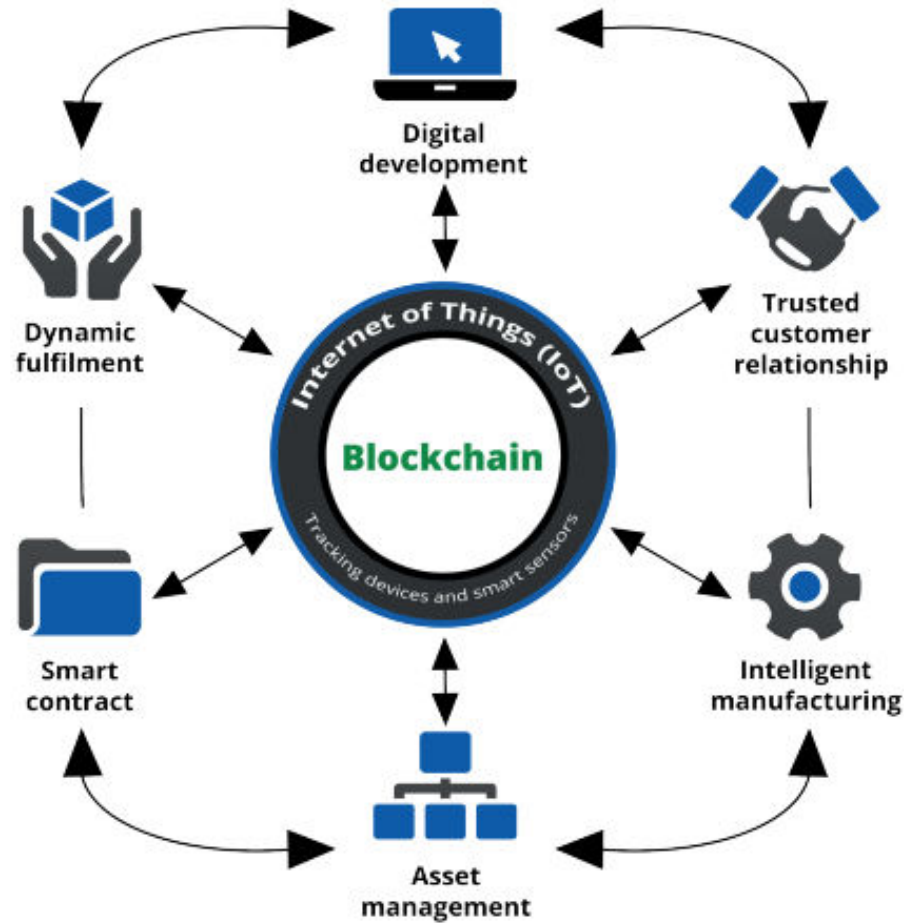
Exoskeletons



<https://roboticsandautomationnews.com/2020/02/22/bics-powers-first-intelligent-exoskeleton-with-global-connectivity/30309/>

<https://www.wsj.com/articles/industrial-exoskeletons-give-workers-a-lift-11547730001>

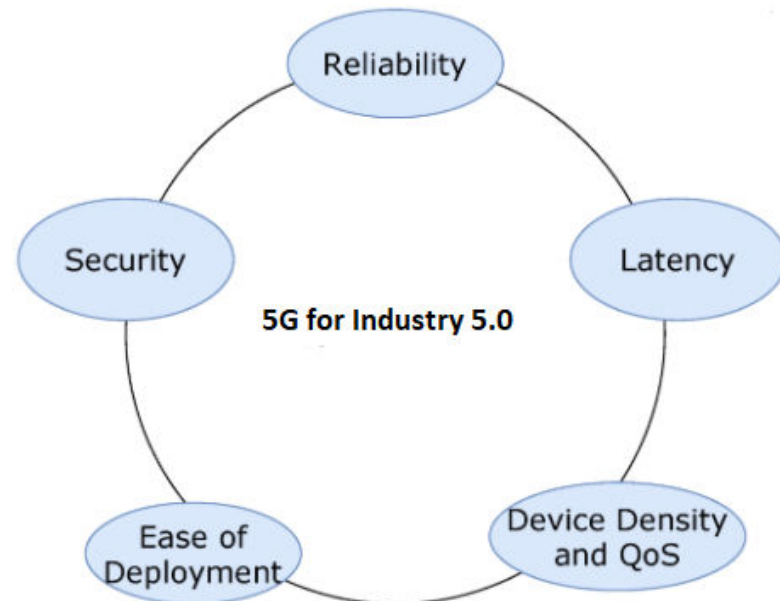
Blockchain



Digital Supply Chain

5G Technology

Inclusion of 5G in industrial operation will bring the following benefits:



Summary

Summary



<https://enterpriseiotinsights.com/20190814/channels/reader-forum/enterprises-industry-5g-reader-forum>

To receive your certificate from attending this webinar. Please email dean.s.mackay@eit.edu.au



Contact Us

www.eit.edu.au
www.oncampus.eit.edu.au

Head Office

1031 Wellington Street West Perth
Perth, WA
6005

PO Box 1093 West Perth WA 6872

Phone

Inside Australia: 1300 138 522
Outside Australia: +61 8 9321 1702

Email

eit@eit.edu.au