# Industry 4.0

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Artificial Intelligence

Robotics

Internet of Things (IOT)

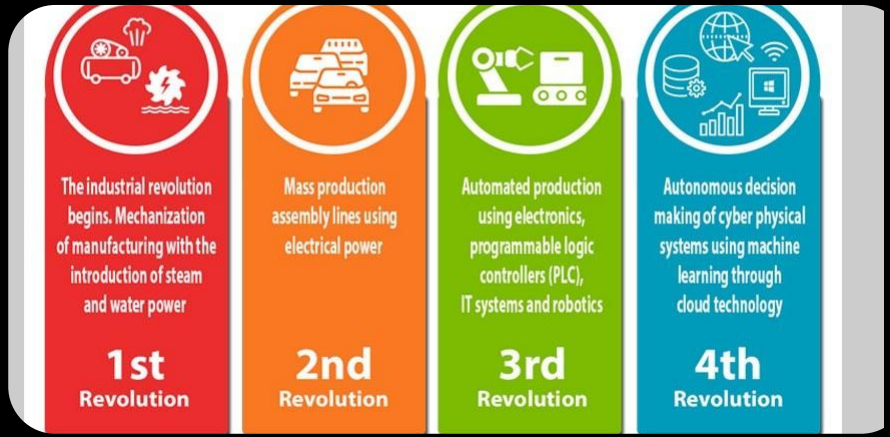
Autonomous Vwhicle

Gene Editing

Blockchain

Quantum Computing

Augmented Reality (AR) and Virtual Reality (VR)



Fusion of physical, digital and biological technologies.

# What is 4IR?

## 1st IR

➔ The First Industrial Revolution was marked by a transition from hand production methods to machines through the use of steam power and water power. The implementation of new technologies took a long time, so the period which this refers to was between 1760 and 1820, or 1840 in Europe and the United States. Its effects had consequences on textile manufacturing, which was first to adopt such changes, as well as iron industry, agriculture, and mining

## 2nd IR

➔ also known as the Technological Revolution, is the period between 1871 and 1914 that resulted from installations of extensive railroad and telegraph networks, which allowed for faster transfer of people and ideas, as well as electricity.

## 3rd IR

➔ The Third Industrial Revolution, also known as the Digital Revolution, began in the late 20th century. It is characterized by the shift to an economy centered on information technology, marked by the advent of personal computers, the Internet, and the widespread digitalization of communication and industrial processes.

# 4IR

In essence, the Fourth Industrial Revolution is the trend towards automation and data exchange in manufacturing technologies and processes which include cyber-physical systems (CPS), Internet of Things (IoT), cloud computing,cognitive computing, and artificial intelligence.

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**Convergence of Physical, Digital, and Biological:**

4IR is characterized by the seamless integration of these fields, creating new possibilities and innovations.

**Example:**

Smart cities, where IoT sensors collect data, AI analyzes it, and robotic systems interact with the environment.

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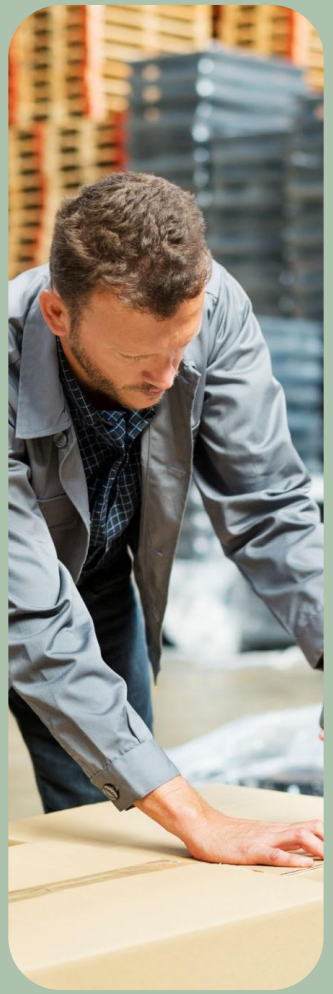
- **Artificial Intelligence (AI):** AI enables machines to learn, adapt, and make decisions without human intervention.
- **Applications:**
  - Autonomous vehicles
  - Predictive analytics
  - Personalized healthcare



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## Robotics and Automation

- **Role in 4IR:**
  Robotics is transforming manufacturing, logistics, healthcare, and more, making processes more efficient, precise, and cost-effective.
- **Example:**
  Robots in warehouses (like Amazon's fulfillment centers) and autonomous drones in logistics.

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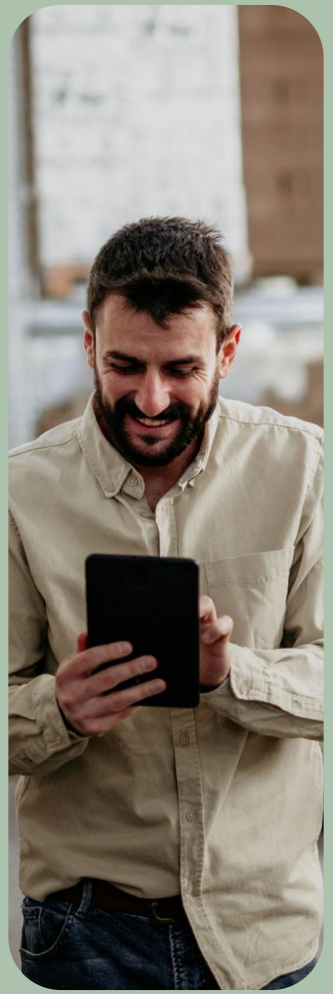
## Internet of Things (IoT)

- **Definition:**
  IoT refers to the interconnected network of physical devices that collect and exchange data.
- **Impact:**
  - Smart homes
  - Smart factories
  - Predictive maintenance in industries



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## What is 3D Printing?

The process of creating three-dimensional objects by layering materials based on digital models.

**Applications:**

- Prototyping and product design
- Medical implants
- Custom manufacturing

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## Blockchain and Distributed Ledger Technology

- **Definition:**
  Blockchain is a decentralized digital ledger that records transactions across many computers, ensuring security and transparency.
- **Applications:**
  - Cryptocurrencies (Bitcoin, Ethereum)
  - Supply chain management
  - Secure voting systems

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## Augmented and Virtual Reality

- **Augmented Reality (AR):** Overlaying digital information on the real world (e.g., smartphone apps or AR glasses).
- **Virtual Reality (VR):** Immersive, simulated environments often used in gaming, education, and training.
- **Applications:**
  - Healthcare (surgical training)
  - Education (virtual classrooms)
  - Retail (virtual shopping experiences)

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## The Impact of 4IR on Jobs

Job Displacement:

Automation and AI may replace some jobs, especially in manufacturing and routine tasks.

Job Creation:

New jobs are emerging in areas like AI development, data science, and renewable energy.

Upskilling and Reskilling:

Continuous learning will be essential for workers to adapt to new technologies.

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## Transforming Industries

Manufacturing:

Smart factories and automation are improving productivity and flexibility.

Healthcare:
AI diagnostics, robotic surgery, and personalized medicine.

Finance:
Blockchain, AI-driven financial services, and cryptocurrencies.

Retail:
E-commerce, personalized customer experiences, and automated supply chains.

## 4IR and Society

- **Social Impacts:**
  - Digital divide: Not everyone has equal access to new technologies.
  - Privacy concerns: Increased data collection and surveillance.
  - Ethical issues: AI decision-making, deepfakes, and security risks.



## Sustainability and 4IR

- **Environmental Benefits:**
  - Smart grids and energy-efficient technologies.
  - Sustainable agriculture and climate monitoring through IoT.
- **Challenges:**
  - E-waste from rapid tech innovation.
  - Energy consumption of blockchain and AI.



## The Role of Government in 4IR

- **Policy Development:**
  Governments need to regulate emerging technologies, protect citizens' rights, and encourage innovation.
- **Public-Private Partnerships:**
  Collaboration between governments, industries, and academia is crucial for advancing 4IR.



## 4IR in the Developing World

- **Leapfrogging Technology:** Developing nations skipping traditional infrastructure.
- **Access to Global Markets:** E-commerce and digital platforms connecting local businesses to global customers.
- **Challenges:** Access to technology, skills gap, and digital divide.

➔

## The Future of Work in 4IR

- **Hybrid Work Models:** Remote work and digital collaboration.
- **AI and Human Collaboration:** Augmenting human capabilities with AI.
- **Workplace Evolution:** Emphasis on creativity, problem-solving, and critical thinking.

01

**The Role of Innovation and R&D**

02

- **Research in AI & Machine Learning: Advancing capabilities of intelligent systems.**
- **Collaboration Across Industries: Open-source innovation and cross-disciplinary teams.**

03

- **Investment in Emerging Technologies: Ensuring continuous innovation for future growth.**

## Conclusion

- **Summary: 4IR is transforming every aspect of society, offering both unprecedented opportunities and significant challenges.**
- **Call to Action: Embrace technology, adapt to changes, and invest in future skills to thrive in the 4IR era.**

# References


1. McGinnis, Devon (27 October 2020). "What Is the Fourth Industrial Revolution?". *The 360 Blog from Salesforce*. Retrieved 22 January 2023
2. Marr, Bernard. "Why Everyone Must Get Ready For The 4th Industrial Revolution". *Forbes*. Retrieved 22 January 2023

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# THANK YOU

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