



Hyderabad: Center for the Fourth Industrial Revolution

For Prelims: World Economic Forum (WEF), Fourth Industrial Revolution, Big data, Cybersecurity, Internet of things (IoT), Xenobots, Pacemaker, Microplastics, Energy Transition Index, Global Competitiveness Report, Global Gender Gap Report.

For Mains: Applications of Fourth Industrial Revolution(4IR), Challenges Associated with 4IR.

Why in News?

Recently, the [World Economic Forum \(WEF\)](#) has chosen Hyderabad, Telangana for establishing its **Center for the Fourth Industrial Revolution** (C4IR).

- The **C4IR Telangana** will be an **autonomous, non-profit organisation** with a thematic focus on healthcare and life sciences.

What is the Fourth Industrial Revolution?

- **About:**
 - It is **characterised by the use of technology to blur the boundaries** between the **digital, physical, and biological worlds**, and is **driven by data**.
 - Key technologies include cloud computing, [big data](#), autonomous robots, [cybersecurity](#), simulation, additive manufacturing, and the [internet of things \(IoT\)](#).
 - The term **4IR** was coined by Klaus Schwab, executive chairperson of the WEF, in 2016.
- **Major Examples of its Application:**
 - **Pacemaker:** The **pacemaker** is a near-perfect example of the ongoing **fourth industrial revolution (4IR)**.
 - The **four wireless sensors of the pacemaker** monitor vitals such as **temperature, oxygen levels and the heart's electrical activity**.
 - The device then analyses the vitals and decides when to pace the heart and at what rate. **Doctors can wirelessly access the information** on a tablet or smartphone.
 - **Xenobots:** [Xenobots](#), which are less than a millimetre long, are known to be the first **living robot**, were created in 2020 from the stem cells of the **African clawed frog** and can be programmed using **artificial intelligence**.
 - It has a reproductive ability demonstrated in October 2021 by a team of US scientists.
 - When the researchers put the xenobots into a **petri dish**, they were able to gather hundreds of tiny stem cells inside their mouths and **create new xenobots a few days later**.
 - Once perfected, **xenobots could be useful for tasks like cleaning up [microplastics](#)** and regrowing or replacing dead cells and tissues inside human bodies.
 - **Smart Railway Coaches:** In **November 2020**, the **Modern Coach Factory (MCF)** at Raebareli, Uttar Pradesh, rolled out **smart railway coaches** that are fitted with a **battery of sensors** to provide a comfortable experience to passengers.

- The **sensors monitor odour levels in toilets**, check if the doors are safely closed, avoid fire outbreaks and stop **unauthorised travel using CCTV cameras** with face recognition capabilities, among other technologies.

▪ **Challenges Associated with 4IR:**

- **Job Displacement:** As automation and artificial intelligence become more prevalent, there is a concern that **many jobs will be replaced by machines**, leading to widespread job loss and unemployment.
- **Privacy Concern:** The increasing connectivity of devices and systems in Industry 4.0 increases the **risk of cyber-attacks**, which can have significant consequences for both businesses and individuals.
- **Ethical Concerns:** As artificial intelligence and automation become more advanced, there are also **concerns about ethical issues such as accountability, bias, and transparency**.
- **Lack of Digital Infrastructure:** Not all countries have the digital infrastructures for Industry 4.0, leading to **digital divide** and uneven economic growth.

What are the Other Industrial Revolutions?

- **First Industrial Revolution (1800s):** It used water and steam power to mechanise production. Example: **Steam engine**.
- **Second Industrial Revolution (early 1900s):** It used **electric power to create mass** production. Example: **Electricity**.
- **Third Industrial Revolution (late 1900s):** It used electronics and information technology to automate production. Example: **Computer and Internet**.

UPSC Civil Services Examination Previous Year Question

Q. “The emergence of the Fourth Industrial Revolution (Digital Revolution) has initiated e-Governance as an integral part of government”. Discuss. **(2020)**

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