



General Studies-3; Topic: Science and Technology- developments and their applications and effects in everyday life.

Fourth Industrial Revolution

Introduction

- On May 26, 2022, US researchers unveiled a pacemaker that dissolves in the human body after completing its job.
- The pacemaker is a near-perfect example of the ongoing fourth industrial revolution (4IR).
- Another example of is the reproductive ability of the first living robot, called xenobots.
- Xenobots, which are less than a millimetre long, were created in 2020 from the stem cells of the African clawed frog and can be programmed using artificial intelligence.
- Such inventions make the ongoing 4IR different from the earlier three industrial revolutions.

Fourth industrial revolution (4IR)

- Fourth industrial revolution (4IR) is the use of different technologies to blur the boundaries between the digital, physical and biological worlds.**
- 4IR is a collection of nine technologies: cloud computing, big data, augmented reality, system integration, autonomous robots, cybersecurity, simulation, additive manufacturing, and the internet of things (IoT).
- The 4IR, which is building on the third revolution, has data at its core.
- Countries are deliberately investing in 4IR technologies.

India's 4IR initiatives

- 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.

- Union Ministry of Heavy Industries launched the **Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) scheme**, which brings together manufacturers, vendors, and customers to make them aware of 4IR technologies.
- 4IR-driven projects, including **Drone Shakti**, to encourage start-ups that will facilitate the use of drone services.
- India even has a 4IR centre in Mumbai run by WEF, which is closely working with several state governments.
- The Centre has recently come up with the **Fourth Industrial Revolution for Sustainable Transformation (FIRST) Cancer Care** model in which 4IR technologies would be used to provide better healthcare for cancer patients.

Pushback for embracing 4IR technologies

- Like most other countries, India is also experiencing pushback for embracing 4IR technologies from the people.
- **The immediate fear is that of job loss, particularly in the informal sector.**
- There are also concerns that as India's progresses on the journey of 4IR will take over many white-collar jobs across sectors as well.
- According to an estimate, in the next three to five years, 20 per cent of legal work in India would be taken up by artificial intelligence software.
- In India, temporary and contractual jobs are already increasing at a higher rate than full-time jobs.
- So, the advent of 4IR technologies would disrupt the job market.
- The employees of the Indian Railways have protested against the introduction of vending machines for ticket dispensation at stations and the general automation of maintenance of train tracks.
- Experts warn that jobs such as artificial intelligence engineers, data scientists and robot maintenance workers, will also shrink.

Supporters of 4IR

- **The supporters of 4IR say job losses will be temporary as new opportunities that are currently unknown will emerge.**
- For example, the third industrial revolution, which triggered widespread job losses in manufacturing. Over time, the services sector evolved and created new job opportunities for many.
- 4IR supporters say that as people will have more time to indulge in leisure, the arts will take over from the sciences and other disciplines in providing humans with work.

Concerns / Challenges

- The adoption of 4IR technologies is going to be skewed as developing and least developed countries lack the data framework and infrastructure.
- There is a growing concern that the existing fallacies in humans might only get more accentuated after 4IR.
- There are several studies that show how facial recognition technologies have a higher chance of misidentifying African and Asian people compared to their Western counterparts.
- This is due to the biases in the data being used by these technologies.

Way Forward

- The future depends on whether we take into account all kinds of diversity — economic, geographical, gender and age.
- **Technologies need to be more inclusive and acceptable to all.**
- The current debate talks about individual problems that can arise out of the 4IR.
- What is needed is a paradigm shift where processes are developed to plug the overall challenges with 4IR.
- This is going to be critical as people are already predicting a fifth, sixth and even seventh industrial revolution in the days to come.