

# **Technological Absorption in Defence Sector**

#### Why in news?

The Indian Army observing 2024 as the 'Year of Technology Absorption', this underscores the Army's steadfast focus on embracing technology to transform itself.

#### What is Disruptive Technology (DT)?

- **Disruptive technology** It is an innovation that significantly alters the way that consumers, industries, or businesses operate.
- **DT in Defence-** Disruptive technology in defense refers to innovations that significantly alter or replace existing technologies, processes, or capabilities within military operations.
- **Need-**These technologies can dramatically change the landscape of warfare by providing new methods and tools that offer substantial advantages over traditional systems.
- Artificial Intelligence- AI applications in defense range from autonomous weapon systems and drones to intelligence analysis, decision-making support, and predictive maintenance of equipment.
- Autonomous weapon system- It can operate independently or with minimal human intervention.
  - **Example-** Unmanned aerial vehicle (UAVs), ground robots and autonomous naval vessels.
- **Hypersonic weapons** They travel at speeds greater than Mach 5 (five times the speed of sound), making them extremely difficult to detect and intercept.
- **Cyber warfare capabilities** Advanced cyber tools and techniques such as hacking, cyber espionage etc., enable nations to conduct offensive and defensive operations in cyberspace.
- **Quantum technology** It can revolutionize encryption and decryption, significantly enhancing secure communications and complex problem-solving capabilities.
- **Directed energy weapons** These weapons use focused energy, such as lasers or microwaves, to disable or destroy targets. They offer precision targeting with minimal collateral damage and are effective against a wide range of threats, including drones and missiles.
- Advanced materials- Innovations in materials science, such as lightweight composites and nanomaterials, improve the durability, strength, and stealth capabilities of military platforms.
- **Biotechnology-** It includes advances in medical treatments, genetic engineering, and synthetic biology to enhance soldier performance, resilience, and recovery.
- **Internet of Military Things** It involves the integration of various devices, sensors, and systems in the battlefield, creating a networked environment that enhances situational awareness, decision-making, and operational efficiency.

India is the world's largest defence equipment importer and is expected to spend around USD 220 Billion in the coming decade to modernize its armed forces.

# What are the steps taken by India to promote technological absorption?

- **iDEX (innovation for Defence Excellence)** It aims at creation of an ecosystem to *foster innovation and technology* development in Defence and Aerospace by engaging Industries including MSMEs, start-ups, individual innovators, R&D institutes & academia.
- **DISC (Defence India Start-up Challenge)** It aimed at supporting Startups/MSMEs/Innovators to create prototypes and/or commercialize products/solutions in the area of National Defence and Security.
- **Defence Artificial Intelligence Council** It is led by <u>Ministry of Defence</u> to provide overall guidance and support for projects involving cutting-edge technologies.
- **Defence AI Project Agency** As per <u>Chandrasekaran committee</u> recommendation it was launched with an annual budget of 100 crores for AI programs to provide necessary guidance and structural support.
- **Project SAMBHAV** It is an indigenous, secure, end-to-end mobile ecosystem operates on <u>5G technology</u> developed by the Indian Army.
- Aero India 2023- It is held at Bengaluru which emphasized on two major shifts within the Indian Armed Forces.
  - $\circ\,$  The move towards 'Atmanirbharta' or self-reliance
  - Critical and Emerging Technologies (CET)

## Pillars of technology absorption identified by Indian Army

- Aligning and synergizing technology with existing systems for enhanced effectiveness.
- Mapping Futuristic Technologies to stay ahead in technological readiness.

• Strengthening the defense technology eco-system through collaboration with industry, academia, and government bodies.

- Modernizing acquisition and procurement processes for rapid technology integration.
- Training techno warriors and commanders to leverage new technologies efficiently.

# What are the challenges in adopting DT in defence?

- **Lethality issues** Incorporating new technologies into existing systems have made the modern battlefield more lethal.
- **Cybersecurity risks** Maintaining the integrity and security of data is riskier, particularly when using AI and autonomous systems.
- **Fund deficit** India has budgetary constraints that can limit the extent and pace of technology adoption.
- **Less industrial base** Limited industrial base for advanced technology manufacturing can hinder the production and integration of disruptive technologies.
- **Regulatory constraints** Lengthy and complex defense procurement procedures can slow down the acquisition and deployment of new technologies.
- Lack of R&D Indian Defence Industry with strong R&D base and Defence R&D establishments are needed for the critical technology into products and systems needed by defence.

- Low overall researcher density The researchers per million was negligible in India(156) compared to other countries such as Israel (8255), China (1133) Countries GDP contribution on R&D
- License issues It is found that the technology concerned is subject to approval of the foreign government and hence obtaining latest technology becomes difficult.
- Manpower shortage- There is a shortage of skilled professionals with expertise in advanced technologies such as AI, robotics, and cyber warfare.
- **Regional security dynamics** Navigating the complex security dynamics in the region, especially with neighbors like China and Pakistan.
- **Ethical issues-** The use of autonomous weapons raises ethical questions about accountability and decision-making in life-and-death situations.

## What lies ahead?

- As technology continues to grow by leaps and bounds there is an incessant need for adopting it to innovate and develop new systems with greater potential in the future.
- Technology absorption will also necessarily include several macro level aspects such as organisational restructuring, the management of human resources and cultivating specialists at execution levels.

## References

- 1. The Hindu | Marching ahead with technology absorption
- 2. <u>ET Government | Making the armed forces future ready</u>

