India’s Rising Defence Innovation & Export Capability

For Prelims: **Operation Sindoor**, **BrahMos missiles**, **iDEX scheme**, **Defense Industrial Corridors**, **Defense Space Agency**, **Positive Indigenization Lists**, **INS Vikrant**, **Aatmanirbhar Bharat**, **Chief of Defence Staff**, **SCALP Cruise Missiles**, **HAMMER**

For Mains: Key Major Developments in India’s Defence Sector, Key Challenges Confronting India’s Defence Sector.

Source: BL

Why in News?

India’s **defence sector** is shifting from **import dependence to export competence**, driven by initiatives like **iDEX (Innovations for Defence Excellence)** and a **surge in domestic production and exports,** aligning with the goal of achieving **self-reliance in defence.**

What are the Key Developments in India’s Defence Sector?

- **Surge in Indigenous Defence Production:** India's **domestic defence production** rose from **30–35% in 2014–15 to 65% in 2024-25,** reaching an **all-time high of Rs 1.27 lakh crore in FY 2023–24**, with a **target of Rs 3 lakh crore by 2029**.
    - The private sector plays a crucial role, contributing 21% to total defence production, fostering innovation and efficiency. In FY 2024–25, over **92% of capital procurement contracts** were **awarded to domestic firms,** witnessing strong policy support through initiatives like **Make in India**.
- **Defence Exports Expansion:** India’s defence exports grew over 34 times between FY 2013–14 and FY 2024–25, reaching Rs 23,622 crore in 2024–25, with the private sector contributing nearly **twice** as much as the **Defence Public Sector Undertakings (DPSUs).**
    - India exports **Dornier Do-228 aircraft, Chetak helicopters, bulletproof jackets, lightweight torpedoes,** and **interceptor boats** to **over 100 countries,** including the **US, France, and Armenia.**
    - India aims for **Rs 50,000 crore in defence exports by 2029** to strengthen global influence.

Where do India's Defense Exports Go?

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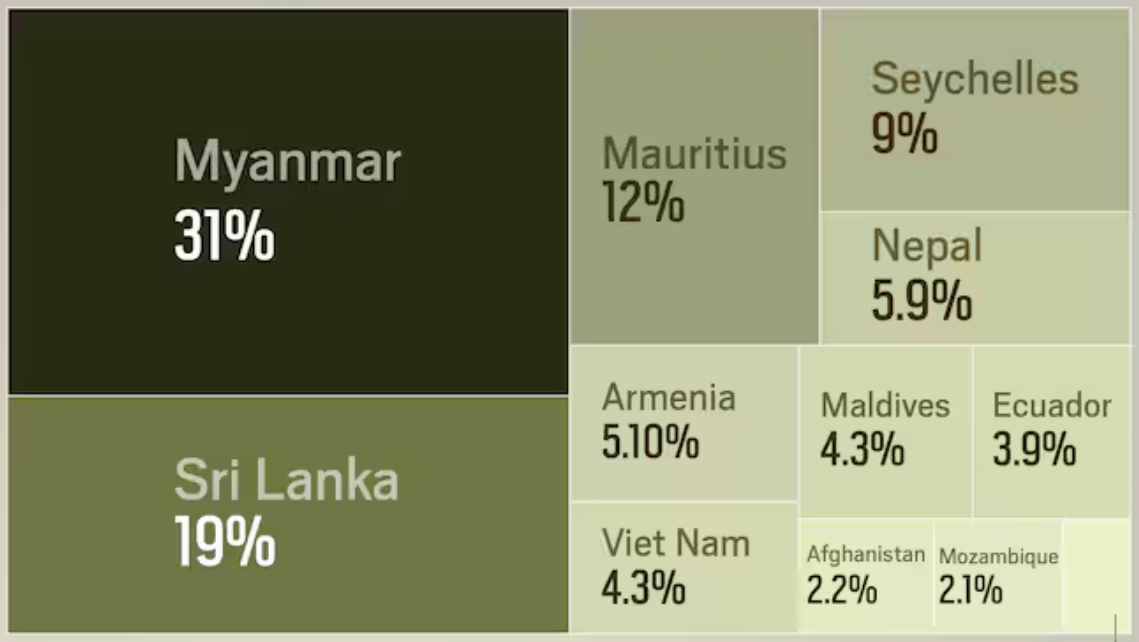
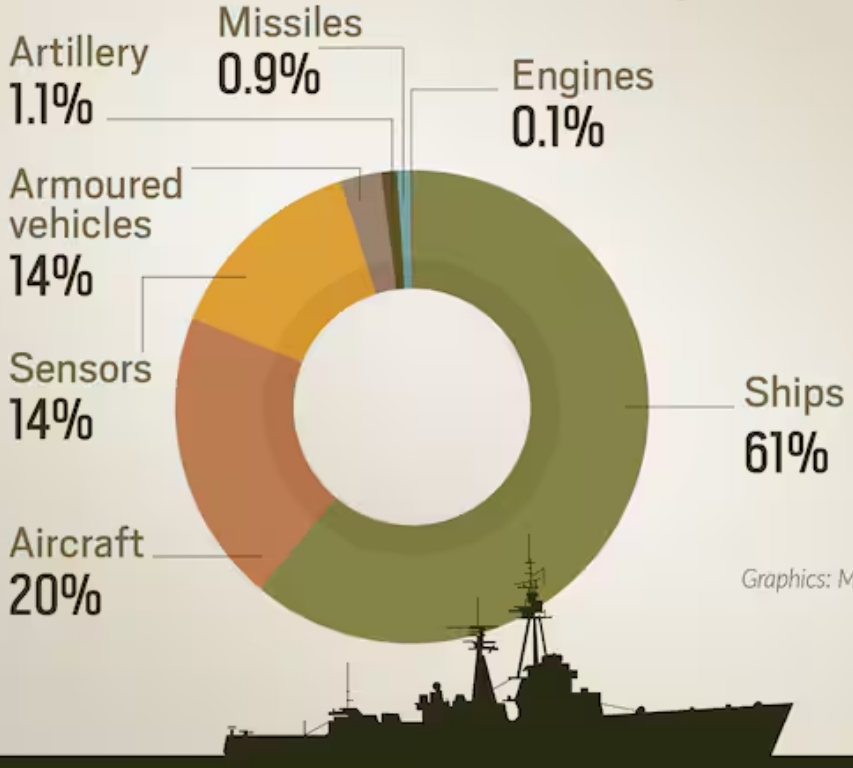
Key defense partners



Key defense exports



Source: SIPRI

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- **Technological Advancements in Defence R&D:** India's defence R&D has advanced through **iDEX** and **Technology Development Fund (TDF)**.
    - iDEX offers funding up to Rs 1.5 crore through **Support for Prototype and Research Kickstart (SPARK)**, up to Rs 10 crore through **iDEX Prime** and up to Rs 25 crore through **Acing Development of Innovative Technologies with iDEX (ADITI) (2024) scheme**
        - Key outcomes such as the **SkyStriker loitering munition and AI-powered surveillance robots**, deployed during **Operation Sindoor,** reflect its impact.
    - Recognised with the **Prime Minister's Award for Innovation in 2021,** iDEX has become central to India's push for defence self-reliance.
- **Defence Industrial Corridors (DICs) Development:** India has set up 2 **Defence Industrial Corridors** in **Uttar Pradesh** and **Tamil Nadu** to **boost indigenous defence production** and **attract investment**.
    - These corridors offer **infrastructure, incentives, and support for MSMEs**.
- **Modernisation of Armed Forces:** India is rapidly modernising its armed forces through a mix of indigenous and advanced imported systems.
    - In 2025, contracts were signed for **156 Light Combat Helicopters (LCH) Prachand,** boosting aerial capabilities.
    - Precision weapons like **SCALP missiles, HAMMER bombs, and loitering munitions** were effectively used in Operation Sindoor.
    - Modernisation also focuses on domestically developed platforms such as **Tejas Light Combat Aircraft, Arjun Mk-1A tanks, Astra air-to-air missiles**, and **Pinaka rocket systems**.
    - DRDO is advancing in hypersonic tech, **Unmanned Aerial Vehicles (UAVs), and anti-satellite weapons, while AI, robotics, and space-based Intelligence, Surveillance, and Reconnaissance (ISR) tools** are shaping India's preparedness for future warfare.
- **Policy Reforms: India allowed** up to **74% Foreign Direct Investment (FDI) via automatic route** (100% via government approval), attracting Rs 5,516 crore investment since 2000.
    - The **Defence Procurement Procedure (DPP) 2012,** reformed procurement process to promote industry participation and streamline processes.
    - **'Make' projects** and the **Defence Acquisition Procedure (DAP) 2020** focused on indigenisation and promoting **'Make in India' in defence manufacturing.**
    - Initiatives like **Self-Reliant Initiatives through Joint Action (SRIJAN)** linked the Armed Forces, DPSUs, private industry, to boost indigenous defence production, and accelerate the development of critical technologies.
    - **Positive Indigenisation Lists (PILs)** require defence items to be sourced domestically. The fifth PIL included 346 items for DPSUs, resulting in an import substitution value of Rs 1,048 crore and promoting the local industry.

What are the Key Challenges to India's Defence Sector?

- **Technological Gaps & Import Dependence:** India faces major gaps in **key defence technologies** like **fighter jet engines, Active Electronically Scanned Array (AESA) radars, semiconductors**, and **precision electronics**.
- **Slow & Complex Procurement Process: Bureaucratic delays** hinder defence acquisitions, impacting readiness.
    - For instance, the **Tejas program took almost 20 years from approval to prototype**, and deals like **Rafale fighters** and **Scorpene submarines faced long delays**.
    - Though new **Defence Acquisition Council** guidelines seek to speed up procurement, **effective implementation remains challenging.**
    - Despite plans for 6-8 new centres under **Defence Testing Infrastructure Scheme (DTIS)**, **delays slow validation and deployment** of indigenous projects.
- **Low R&D Budget:** In 2025-26, only **Rs 1.8 lakh crore of the Rs 6.81 lakh crore defence budget** is for **modernisation,** with **DRDO receiving just 3.94%.**
    - Overall **R&D spending in India is about 0.7% of GDP,** much below global peers such as **China (2.4%), the US (3.5%),** and **Israel (5.4%).**
- **Limited Private Sector Role:** Private firms contribute just **21% to defence**

production, hindered by **procurement risks, low R&D support**, and **weak collaboration with public units.**
    - Further, **uncertain global events** like **trade tensions** further **dampen investor confidence** and **hinder long-term private sector participation** in the defence ecosystem.
- **Testing and Certification Challenges:** India lacks sufficient facilities for testing advanced defence tech like UAVs, electronic warfare, and electro-optics.
- **Cybersecurity & Internal Security Challenges**: India's cybersecurity and electronic warfare capabilities **lag behind countries like China**, as seen in the **2020 Mumbai power grid cyberattack**.
    - Moreover, despite the creation of the **Chief of Defence Staff (CDS)**, **lack of integrated planning** and **delayed implementation** of **Integrated Theatre Commands** hamper **joint operational effectiveness.**
- **Outdated Equipment:** Legacy systems like **MiG-21s** still operate **without upgrades,** reflecting deeper procurement and planning flaws.

What Measures Should be Taken to Boost India's Defence Innovation & Export Capacity?

- **Enhance Defence R&D and Innovation:** Boost defence research investment by fostering collaboration between DRDO, private industry, startups, academia, and global tech firms.
    - Establish **Defence Innovation Zones** and **incubation hubs** focused on cutting-edge technologies like **quantum computing**, **hypersonics,** **autonomous systems,** and **cyber defence.**
        - Government-backed research must be scaled up through increased R&D grants and private-sector engagement.
    - For example, **Hindustan Aeronautics Limited (HAL)** use of **3D printing** in aerospace components has reduced costs and production times significantly.
- **Strengthen Private Sector & MSME Participation:** Reserve procurement quotas for indigenous companies, particularly in Tier-2 and Tier-3 cities, to decentralize manufacturing and expand the supply chain.
    - Support **start-ups with seed funding** and streamlined access to defence contracts to harness grassroots innovation.
- **Upgrade Testing & Cybersecurity Infrastructure:** Expand and **modernise testing and certification facilities** for UAVs, AI-driven platforms, electronic warfare, and communications through public-private partnerships.
    - Establish a **National Defence Cyber Command** to protect military networks, integrate AI-based defence strategies, and incorporate cyber warfare training.
- **Boost Strategic Global Partnerships & Defence Exports:** Pursue **joint development and technology transfer agreements** with foreign **Original Equipment Manufacturers** in aerospace, shipbuilding, and missile technology.
    - Collaborations with **France (Rafale offsets)** and **Russia (joint missile projects like BrahMos)** provide access to **cutting-edge tech and open export avenues**.
    - India can strengthen **defence diplomacy** and **expand markets** in Africa, Southeast Asia, and Latin America by leveraging forums like **Quad** and **I2U2,** supported by a **dedicated Defence Export Facilitation Cell** to manage o**ffsets and tech transfers.**
- **Institutionalise Monitoring & Export Promotion:** Implement a **real-time Defence Indigenisation Dashboard** and an **Indigenisation Performance Index** to track localisation targets and hold ministries accountable under the **Defence Production and Export Promotion Policy (DPEPP)**.
    - **Identify new export markets** and **simplify access to international defence tenders** to enhance India's position as a reliable global defence exporter.
- **Establish Regional Service & Maintenance Hubs:** Set up **regional hubs in strategic countries** (e.g., Vietnam, UAE) to provide **after-sales service, maintenance, and upgrades.** This builds customer trust, generates revenue, and strengthens long-term defence relationships.

Conclusion

India’s transformation into a **defence innovator and exporter** is steadily progressing. Initiatives such as **iDEX, increasing private sector involvement,** and **supportive policy reforms** have created the foundation for a **self-reliant** and globally competitive defence ecosystem. This evolution not only **strengthens national security** but also advances India’s vision of becoming a **Viksit Bharat by 2047,** with enhanced strategic autonomy and global influence in the defence sector.

Drishti Mains Question:

Discuss the transformation of India’s defence sector from import dependence to a global exporter. What are the key initiatives that have driven this change?

UPSC Civil Services Examination, Previous Years Questions (PYQs)

Prelims

Q. Operations undertaken by the Army towards upliftment of the local population in remote areas to include addressing of their basic needs is called: (2024)

(a) Operation Sankalp

(b) Operation Maitri

(c) Operation Sadbhavana

(d) Operation Madad

Ans: C

Mains

Q. “Increasing cross-border terrorist attacks in India and growing interference in the internal affairs of several member-states by Pakistan are not conducive for the future of SAARC (South Asian Association for Regional Cooperation).” Explain with suitable examples. (2016)

Q. The terms ‘Hot Pursuit’ and ‘Surgical Strikes’ are often used in connection with armed action against terrorist attacks. Discuss the strategic impact of such actions. (2016)