

### PRIME MINISTER RESEARCH CHAIR SCHEME



- It is a **flagship national initiative** aims to **attract accomplished Indian origin researchers** and professionals from leading global institutions and industries with outstanding achievements in research, innovation, and technology.
- It seeks to **connect global Indian talent** with **premier government higher education** institutions, national laboratories and research centres across the country.
- **Features of Prime Minister Research Chair Scheme:**
  - It will focus on **13 priority sectors** namely:
    - Artificial intelligence, Quantum computing, Semiconductors, Energy and climate change, cybersecurity, Healthcare and medical technology, Biotechnology, Advanced materials, space and defence, Next-generation communications, Manufacturing, Agriculture and food technologies, Blue economy, and atomic energy.
  - It is anchored on **three core pillars: Lead Institutions, Host Institutions, and PMRC Fellows** to ensure research projects are aligned with national priorities and deliver measurable outcomes.
  - **Selection Process:** Fellows will be selected through a rigorous process overseen by an **Empowered Committee chaired by the Principal Scientific Advisor** to the Government of India.
  - It offers **three categories of engagement** namely **Young Research Fellows** for early career researchers, **Senior Research Fellows** for experienced researchers, and **Research Chairs** for globally accomplished research leaders.
  - **Eligible Fellows:** Eligible Fellows include accomplished **Indian origin researchers**, scientists, and professionals, including Indian Nationals working abroad, **OCI cardholders, and Persons of Indian Origin.**

○ **Host Institutions:**

- Government Higher Educational Institutions ranked among the **Top 100 in NIRF Overall or Engineering categories**, or **Top 50 in the NIRF Research category**,
- National laboratories and research institutions under agencies such as Department of Science and Technology (DST), Department of Biotechnology (DBT), Indian Council of Medical Research (ICMR), and Council of Scientific and Industrial Research (CSIR), among others.

### MISSION SENEHJORI



• It is a **comprehensive cluster-based initiative** aimed at **transforming Assam's unique Muga silk sector** into a globally competitive, high-value luxury textile ecosystem.

- **Objective:** It seeks to **strengthen the entire Muga silk value chain** from host-plant cultivation and silkworm seed production to reeling, weaving, branding, export promotion, digital traceability and tourism.
- It is **anchored by the MDoNER** in convergence with the Government of Assam, Central Silk Board, Ministry of Textiles and other Central Ministries/ organizations.
- **Key Features of Mission Senehjori:**
  - **Cluster Based Approach:** It adopts a **cluster-based approach** covering major Muga silk producing districts of Assam.
  - **Infrastructure & Institutional Support:** It envisages strengthening **host plant ecology**, establishing **modern reeling infrastructure**, promoting Farmer Producer Organisations (FPOs), creating **Common Facility Centres (CFCs)**.
  - **Branding:** It enforces GI authentication and building global market access under the unified brand identity "Senehjori".

**Convergence Model:** It has been conceptualised on the **principle of "whole-of-government" approach**, with convergence across Central Ministries, Govt. of Assam and private partners.



### RUDRAM-II MISSILE

- It is an indigenously-developed **solid-propelled air-launched missile system**.
- It is meant for **Air-to-Surface role** to neutralise many types of enemy assets.
- It has been indigenously developed by **Research Centre Imarat, Hyderabad** as the nodal DRDO laboratory in collaboration with other sister labs
- **Key Features of RudraM-II Missile:**
  - **Speed:** It can reach a peak **speed of Mach 5.5**.
  - **Range:** It is capable of striking targets at a distance of **approximately 300 km**.
  - **Payload:** It can carry a warhead **weighing up to 200 kg**.
  - It can be **deployed from aircraft like Sukhois** flying at altitudes ranging from 3 to 15 km.
  - It acts **as a key force multiplier** and intends to eventually replace the older Russian-origin Kh-31 **anti-radiation missiles**.
- It uses a **hybrid navigation system** combining an **inertial navigation system, GPS** and a **sophisticated passive homing head** that detects radio frequency emissions across a wide frequency band.

### What is an Anti-radiation Missile?

- These are designed to detect, track and neutralise the adversary's radar, communication assets and other radio frequency sources, which are generally part of their air defence systems.
- **Such a missile's navigation mechanism comprises**
  - **Inertial navigation system:** A computerised mechanism that uses changes in the object's own position — coupled with GPS, which is satellite-based.
  - **Passive homing head:** A system that can detect, classify and engage targets (radio frequency sources in this case) over a wide band of frequencies as programmed.

### STRENGTHENING INDIA'S EV SUPPLY CHAINS: THE NEXT BIG CHALLENGE

India's EV sector is growing fast — around 2.5 million vehicles were sold in FY26, up significantly from FY25. Government policies like purchase subsidies, road tax exemptions, and registration waivers have successfully created market demand.

#### **The Core Problem: Trading One Dependency for Another**

- For years, India's energy security concern was about oil imports. EVs were seen as a way out. But the shift to EVs has not eliminated import dependence — it has merely changed its form.
- The heart of the problem is the lithium-ion battery. It is the most critical and expensive component of any EV and India does not make enough of them domestically.
- **How Deep Is the Dependence?**
  - India has awarded 40 GWh of battery manufacturing capacity under the ACC (Advanced Chemistry Cell) Production Linked Incentive scheme — but only about 1 GWh has actually been installed so far.
  - In 2025, passenger EVs in India sourced batteries from 14 global manufacturers, importing 7,987 MWh worth of cells.
  - A significant share of these imports came from Chinese manufacturers.
  - This means: more EVs sold in India = more batteries imported from China. The two are tightly linked right now.

#### **Why China Dependence Is a Strategic Risk?**

- China is not just a supplier — it is a competitor with its own industrial and geopolitical priorities.
- Several developments in China are already affecting India's battery supply:
  - Tighter technology export restrictions
  - Prioritisation of domestic Chinese demand over exports
  - Withdrawal of VAT exemptions on battery exports
  - Rising manufacturing and transport costs

### What Needs to Be Done?

- **Short Term: Diversify Suppliers ("China + 1")**
  - Many EV manufacturers already talk about a "China + 1" strategy — sourcing from at least one non-Chinese supplier.
  - But in practice, this is uneven. Premium EVs are increasingly using non-Chinese NMC (Nickel Manganese Cobalt) batteries, while affordable mass-market models still rely on cheaper Chinese LFP (Lithium Iron Phosphate) cells.
  - True diversification means spreading across suppliers, battery chemistries, and geographies.
  - Yes, it may raise costs initially — but it significantly reduces the risk of a single disruption stalling the entire sector.
- **Medium Term: Smarter Product Design**
  - Rising battery costs should push Indian manufacturers to design more efficient vehicles — lighter architectures, smarter drivetrains, better software, and batteries sized for actual Indian usage rather than oversized imported designs.
  - India's market may ultimately reward lean, purpose-built EVs over vehicles designed around expensive imported battery economics.
- **Emerging Technology: Sodium-Ion Batteries**
  - Indian manufacturers should start testing vehicles with sodium-ion batteries.
  - Sodium is abundantly available and not dependent on lithium supply chains.
  - Sodium-ion is not yet a full replacement for lithium-ion, but it can serve as a meaningful hedge — especially as domestic production scales up.
  - It broadens India's technology base and reduces dependence on any single chemistry.
- **Long Term: A Global EV Supply Chain Alliance**
  - India needs to build a structured alliance with trusted partner countries — covering minerals, manufacturing, technology, and standards.

### DNA TEST IN PATERNITY CASES

The Supreme Court recently dismissed a challenge against orders directing a man (referred to as CP) to undergo a DNA test. The case was filed by a person claiming to be CP's biological son, who sought both a declaration of paternity and a share in CP's property.

CP had been denying the claim since 1999 — over two decades. The Court upheld the DNA test order, balancing CP's right to privacy against the alleged son's right to establish his identity and inheritance.

#### Background: The Legal Framework

- **Section 116 of the Bharatiya Sakshya Adhiniyam 2023 (Earlier it was Section 112 of the Indian Evidence Act)**
  - When a child is born during a valid marriage — or within 280 days of its dissolution — the law presumes that child to be the legitimate child of the husband.
  - This presumption can only be overturned by proving that the husband and wife had no access to each other at the time of conception.
  - Mere suspicion or assertion is not enough. The intent is clear: protect the child's legitimacy and dignity.
- **The Problem: No Law Explicitly Allows DNA Testing**
  - There is no statute in India that expressly authorises courts to order DNA tests.
  - The entire framework has evolved through judge-made law — that is, through Supreme Court judgments over the years.

#### Evolution Through Case Law

Case	Year	Key Principle
<i>Gauram Kundu v. State of West Bengal</i>	1993	DNA test cannot be ordered routinely; no one can be compelled to give blood samples; must consider stigma to child and mother
<i>Dipansita Roy v. Ramdeboto Roy</i>	2014	Test permitted when necessary, but should be avoided if possible to protect child's legitimacy
<i>Aparna Ajinkya Firodia v. Ajinkya Arun Firodia</i>	2023	Parties must lead evidence first; DNA test only if court cannot draw inference otherwise; children have a right to privacy and must not be treated as objects
<i>Ivan Rathnam v. Milan Joseph</i>	2025	Introduced "balance of interests" — weigh stigma and harm against child's right to know biological father
<i>Nikhil Parveen v. Rafigae</i>	April 2026	Reiterated that courts have consistently shown a "well-placed hesitation" to order DNA tests

- The Supreme Court's position on DNA testing in paternity disputes has developed gradually, with each case adding a new layer of nuance.

- The common thread across all these judgments: courts are reluctant to order DNA tests and will do so only as a last resort.

### The Three-Part Test: When Can a Court Order a DNA Test

- The Supreme Court laid down three conditions that must be satisfied:
  - **Paternity must be directly in issue** — it must be the central question in the case, not a peripheral one.
  - **No other evidence should be available** — if paternity can be established through other means, a DNA test should not be ordered.
  - **It must be in the best interest of the parties or justice** — the court must weigh the harm of ordering the test against the harm of not ordering it.

### The Present Case: How the Court Decided?

- In this case, all three conditions were met. CP had denied paternity for over 20 years.
- There was no other evidence on record. The alleged son had no other way to establish his identity or claim his inheritance.
- The Court framed the issue honestly: CP's right to privacy was real, but so was the alleged son's right to closure on a question that had defined his entire life.
- Denying the test would mean denying him rights he might legitimately be entitled to — forever.
- The Court therefore upheld the DNA test order.

### Ethical Dimensions Touched by This Judgement

- **Right to Privacy (Article 21)** — The Puttaswamy judgment (2017) recognised privacy as a fundamental right. This case shows that even **fundamental rights are not absolute** — they must be balanced against competing rights and interests.
- **Judicial Activism vs. Judicial Restraint** — Courts have built an entire framework on DNA testing without any legislative backing. This raises questions about the role of the judiciary in filling legislative gaps.
- **Rights of the Child** — The tension between a child's right to legitimacy and a child's right to know their biological identity is a recurring theme in family law.

### FUTURE OF INDIA'S CHIP INDUSTRY

- Semiconductors, commonly known as chips, are materials that conduct electricity better than insulators but not as well as conductors.
- They form the foundation of modern electronics and are found in virtually every electronic device, including:
  - Consumer electronics: Smartphones, laptops, televisions, and home appliances.
  - Automobiles: Modern cars contain hundreds of chips for engine control, infotainment, and safety systems.
  - Defence equipment: Missiles, radars, satellites, and communication systems.
  - Industrial machinery: Robots, automation systems, and IoT devices.
  - Healthcare devices: Medical imaging, diagnostic equipment, and wearables.

### **Stages of Semiconductor Manufacturing**

- The semiconductor value chain comprises several stages:
  - **Design:** Creating chip architecture and circuits.
  - **Fabrication (Fabs):** Manufacturing the actual chip on silicon wafers in highly specialised facilities.
  - **Assembly, Testing, Marking, and Packaging (ATMP):** Final stages where chips are packaged and tested before shipment.
- Fabrication is the most capital-intensive and technologically complex stage, requiring ultra-clean environments and specialised equipment costing billions of dollars.

### **India's Semiconductor Push**

- The Union government launched the **India Semiconductor Mission (ISM)** with a corpus of **76,000 crore** to develop a robust semiconductor ecosystem. The mission supports:
  - Semiconductor fabrication units with capital subsidies of over 50%.
  - Display fabs for manufacturing display panels.
  - Compound semiconductors and packaging facilities.
  - Design-linked incentives for chip design startups.

- **Current Status**

- India does not yet have a single operational fabrication unit.
- The first fabrication unit is expected to begin operations in **Dholera, Gujarat** by 2028.
- A total of ten semiconductor projects are in various stages of development.
- Multiple semiconductor packaging and testing facilities have been approved with significant subsidies.

### Challenges Facing India's Semiconductor Industry

- **Capital Intensity**

- Setting up a single fab requires billions of dollars in investment.
- High operational costs and long payback periods deter private investment.
- Need for sustained government support over decades.

- **Technology Gap**

- India lags significantly behind established semiconductor manufacturers like Taiwan (TSMC), South Korea (Samsung), and the US.
- Lack of indigenous process technology and IP.
- Heavy reliance on foreign equipment and expertise.

- **Talent Shortage**

- Shortage of specialised engineers with semiconductor manufacturing experience.
- Need for comprehensive training programmes and educational reforms.
- Competition for talent with established global semiconductor hubs.

- **Supply Chain Dependencies**

- Dependence on imported raw materials, chemicals, and gases.
- Need to develop a domestic ecosystem of suppliers.
- Vulnerability to geopolitical disruptions.

- **Infrastructure Requirements**

- Need for reliable power supply, ultra-pure water, and specialised gases.
- Requirement for clean room facilities with stringent environmental controls.