The Hindu Plus Summary : 01.01.2024

Mains Master

On the Moon, and exploring new frontiers

Context

The article highlights India's achievements in space exploration and scientific research in 2023, focusing on Chandrayaan-3's lunar landing, ISRO's ambitious future missions, establishment of the National Research Foundation, increased investments in research, and upcoming high-profile space launches in 2024. Despite challenges, India's scientific journey demonstrates great potential for future growth and global scientific contribution.

Space Exploration:

- **Chandrayaan-3 lunar landing:** Successful landing near the Moon's south pole, making India the fourth country to land on the Moon.
- **Shift towards planetary exploration:** ISRO unveiled ambitious plans for future missions, including Chandrayaan-4 (sample return), Gaganyaan (human spaceflight), Space Station Bhartiya Antariksh Station, and Moon landing by 2040.
- **Chandrayaan-3's "hop" experiment:** Demonstrated ISRO's capability to lift off from the Moon's surface, crucial for future missions.
- **International partnerships:** Joined Artemis Accords, agreed on joint mission to International Space Station with NASA, set up working group for commercial space collaboration with US.

Scientific Research:

- **National Research Foundation (NRF):** Established to fund, promote, and mentor research activities, with a focus on universities and colleges.
- **Increased investments in frontier research:** National Quantum Mission (Rs 6,000 crore), LIGO-India gravitational wave observatory, new research stations in Antarctica and Arctic.
- **New national awards for scientists:** Rashtriya Vigyan Puraskar, including awards for lifetime achievement, diverse researchers, and collaborative efforts.

Challenges and Opportunities:

- Low R&D spending (0.65% of GDP) and underrepresentation of women in research (18%) compared to global averages.
- NRF's effectiveness will be judged on its ability to improve these indicators and strengthen India's research landscape.
- India's growing scientific footprint in Antarctica and Arctic regions offers opportunities for research in diverse fields.

2024 and Beyond:

- High-profile launches: XPoSat astronomy mission, NASA-ISRO Satellite Aperture Radar (NISAR), and test flight of Gaganyaan spacecraft.
- NRF's impact on research progress in various fields.
- Continued focus on ambitious space exploration missions and international partnerships.

Overall:

- 2023 was a significant year for Indian science, marked by major achievements in space exploration, increased investments in research, and strategic initiatives like NRF.
- Despite challenges, India's scientific journey shows immense potential for future growth and contribution to global scientific progress.

Sweet spot : India's economy poised to do well in 2024

Context

The article discusses India's economic outlook for 2024, highlighting positive factors like a robust economy, investment attraction, infrastructure focus, and fiscal responsibility. It also addresses challenges such as global headwinds, skills deficit, and rural-urban disparities. Overall, it emphasizes the potential for a turning point in India's economy in 2024 if challenges are effectively addressed.

Positive Indicators:

- **Robust Economy:** India's economy is the fastest-growing in the world, recovering well from the pandemic. Fiscal and external accounts are in good shape, inflation is projected to decline, and the potential re-election of the Modi government promises increased investor confidence.
- **Attracting Investments:** India aims to become a "China plus one" supplier, with its large domestic market, skilled workforce, and economic management competence drawing more foreign direct investment. Easing global interest rates and performance-linked incentives further enhance this prospect.

- **Infrastructure Focus:** Increased government spending on infrastructure and industry, coupled with improved ease of doing business and emerging ecosystems like electronics and semiconductors, create a promising environment for job creation and economic growth.
- **Fiscal Responsibility:** The focus on capex-driven growth, supported by state-level investments, offers a more sustainable growth model with lower inflation risks. Direct benefit transfers can rationalize subsidies and maintain fiscal balance, even with potential election-year welfare schemes.

Challenges and Opportunities:

- **Global Headwinds:** Rising protectionism in a de-globalized world and the need for a comprehensive AI policy are external factors requiring attention.
- **Skills Deficit:** India needs to address the skill gap despite rising work participation rates to improve job quality and prevent social unrest like the Maratha agitation. Focus on education and vocational training is crucial.
- **Rural-Urban Divide:** The gap in rural and urban demand cannot be solely addressed through free food grains. Government initiatives like one-district-one-product and artisanal skills development need better implementation for a more inclusive and productive economy.

Overall Outlook:

India enters 2024 with a strong economic foundation, a focus on attracting investments, and a government prioritizing infrastructure development. However, addressing skill gaps, bridging the rural-urban divide, and adapting to a changing global environment are crucial for long-term, sustainable growth. The year 2024 has the potential to be a turning point for India's economy, shaping a more inclusive and productive future if these challenges are addressed effectively.

EU's AI Act and the Brussels effect

Context

The article provides insights into the EU's forthcoming AI Act, focusing on its key aspects and global implications, especially its extraterritorial reach affecting non-EU businesses. It emphasizes compliance requirements, challenges, and opportunities for companies operating within the EU, positioning the Act as a benchmark for global AI regulations.

The EU's landmark AI Act, nearing finalization, promises to be the world's first comprehensive law governing artificial intelligence. This article provides a detailed analysis of its key features and potential implications, particularly its extraterritorial scope and impact on non-EU businesses.

Key Features:

- **Risk-based Approach:** The Act classifies AI systems based on their harm potential: prohibited (e.g., manipulating behavior), high-risk (e.g., credit scoring), and limited-risk. Different obligations apply to each category.
- **High-Impact AI Models:** Recognizing the future risk of general-purpose AI, the Act addresses these systems with specific rules.
- **Global Reach:** Similar to the GDPR, the Act applies to non-EU entities whose AI systems operate or produce effects within the EU. This creates the "Brussels effect," where EU regulations influence global markets.

Implications for Non-EU Businesses:

- **Compliance Obligations:** Developers or users of "in-scope" AI systems targeting the EU market must comply with the Act, regardless of their location. This includes companies like Indian businesses offering AI-powered financial services in the EU.
- **Potential Challenges:** Non-EU entities may face compliance costs and adaptations to align their AI practices with the Act's requirements.
- **Leveraging Existing Compliance:** Companies with established GDPR compliance programs can utilize elements like data management processes and risk assessments to meet some AI Act requirements.
- **Data Governance:** The Act emphasizes responsible data use in AI development and deployment, necessitating strong data governance practices.
- **Intellectual Property and Personal Data:** Balancing intellectual property rights with responsible personal data utilization will be crucial under the Act.

You had your genome sequenced and found something – now what?

Context

The article details the advancements in personal genomics, highlighting its affordability, accessibility, and significant impact on healthcare. It covers the transformative potential of genetic analysis for disease prediction, treatment customization, and large-scale research initiatives, underscoring the importance of ethical considerations surrounding incidental findings. The focus is on how population-scale sequencing could revolutionize healthcare by providing tailored insights for proactive disease management and personalized medicine.

Advancements in Genomic Technology:

- **Democratization of Genomic Technology**: Next-generation sequencing advancements have reduced personal genome analysis costs, enhancing public accessibility.
- **Personal Genome Sequencing:** Analyzing individual genetic profiles aids in predicting disease susceptibility and tailoring treatments for better outcomes.

Large-scale Genomic Initiatives:

- **Population-wide Genome Sequencing Projects:** Aims to comprehend disease genetic foundations and develop personalized medicine strategies.
- **Iceland's Research Advancements:** Unique population and early investment in sequencing have offered insights into disease susceptibility and personalized medicine.

Genetic Testing and Findings:

- **Types of Genetic Testing:** Various tests cater to disease identification, pharmacogenomics, carrier screening, and ancestry mapping.
- **Incidental Findings and ACMG Recommendations:** Comprehensive tests may uncover unexpected genetic abnormalities, prompting debates on disclosure, aligned with ACMG recommendations for actionable conditions.

Prevalence and Impact of Findings:

- **Incidental Findings Prevalence:** Studies suggest 1-3% carry actionable incidental findings, including underdiagnosed diseases like cardiac channelopathies in the Indian population.
- **Lifespan Impact:** A recent Icelandic study suggests actionable variants could reduce lifespan by an average of 1 year, with mutations in cancer-related genes having greater effects.

Future Prospects:

- **Future Outlook:** Increasing affordability and accessibility will likely result in population-scale and newborn sequencing initiatives, offering actionable health insights for proactive disease prevention and personalized medicine.
- **Overall Potential:** Personal genomics' transformative potential in healthcare relies on understanding incidental findings, ethical disclosure, and utilizing widespread sequencing for personalized medicine and preventative measures.

Prelims Booster

Government appoints Arvind Panagariya as sixteenth Finance Commission chief

- 🏛️ Former Niti Aayog Vice Chairman Arvind Panagariya appointed as Chairman of the Sixteenth Finance Commission.
- 📜 Finance Ministry notified President Draupadi Murmu's order for Panagariya's appointment and Ritvik Ranjanam Pandey as the panel's secretary.
- 📅 Chairman and members to serve until the submission of the report or October 31, 2025, whichever is earlier.
- 🗓️ October 2025 set as the deadline for the Commission's recommendations to be included in the 2026-27 Budget exercise.
- 📊 The Sixteenth Finance Commission tasked with reviewing tax-sharing formulas and suggesting disaster management financing arrangements.
- 💰 Focus on enhancing State funds for Panchayats and Municipalities in supplementing available resources.

XPoSAT launch by ISRO

- 🚀 ISRO to commence 2024 with the XPoSAT (X-ray Polarimeter Satellite) launch on January 1, 2024, at 09:10 am from Sriharikota's first launch pad.
- 🛰️ PSLV-C58 Mission will inject XPoSAT into an eastward low inclination orbit before adjusting to a 350 km circular orbit for three-axis stabilized mode.
- 🛠️ XPoSAT is the first dedicated satellite from ISRO for space-based polarisation measurements of X-ray emissions, carrying two payloads - POLIX and XSPECT.
- 🌌 Aims to measure X-ray polarisation in the 8-30 keV energy band from cosmic sources and conduct long-term spectral and temporal studies in the 0.8 - 15 keV energy band.
- 🔬 Seeks to study magnetic field distribution, geometric anisotropies, and characteristics of cosmic X-ray sources.
- 🎉 Marks ISRO's 60th launch using the Polar Satellite Launch Vehicle (PSLV) and the fourth launch using the PSLV-DL variant, highlighting PSLV's reliability since its first successful launch in October 1994.

Exclusive Economic Zone

- 🌊 Defined by the 1982 United Nations Convention on the Law of the Sea (UNCLOS) as an area granting a sovereign state exclusive rights for marine resource exploration and use.
- 💼 Includes rights to exploit energy sources like water and wind; however, it doesn't denote ownership of maritime features within the zone.
- 🗺️ Extends from the outer limit of the territorial sea (12 nautical miles or 22.224 kilometers from the baseline) to 200 nautical miles (370.4 kilometers) from the coastal state.
- 🏞️ Often encompasses the maritime continental margin and may involve the continental shelf but excludes areas beyond the 200 nautical mile limit.
- 🌅 Contrasts with the territorial sea by conferring full sovereignty over waters to the state, whereas the EEZ offers a "sovereign right" to the coastal state.