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Current affairs summary for prelims

04 November 2024

U.S., Japan, and South Korea Collaborate on Digital Infrastructure in India

Context: Recently, the United States, Japan, and South Korea announced a significant initiative aimed at enhancing digital infrastructure in India. This collaboration, known as the Digital Infrastructure Growth Initiative for India (DiGi Framework), seeks to streamline processes for strategic digital infrastructure projects, thus promoting economic growth and development in the region.

Key Partners of the framework:

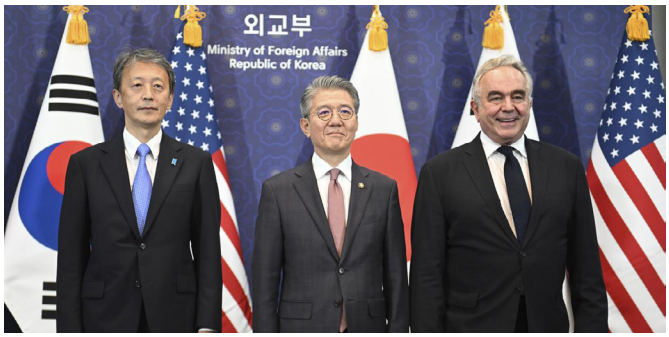
- The DiGi Framework is a collaborative effort involving three key organizations:
  - U.S. International Development Finance Corporation (DFC)
  - Japan Bank for International Cooperation (JBIC)
  - Export-Import Bank of Korea (Korea Eximbank)
- These institutions are committed to leveraging their resources and expertise to support the digital infrastructure needs of India.

Key Focus Areas of the framework:

- The framework outlines several critical focus areas for investment and development, including:
  - 5G Technology
  - Open RAN
  - Submarine Cables
  - Optical Fiber Networks
  - Telecom Towers
  - Data Centers
  - Smart Cities
  - E-commerce
  - Artificial Intelligence (AI)
  - Quantum Technology
- These sectors are crucial for advancing India's digital landscape and ensuring sustainable economic growth.

Core aspects:

- A core aspect of the DiGi Framework is its emphasis on collaboration with the Indian private sector. By working together, the framework aims to address the pressing infrastructure needs of India while promoting effective policy dialogues.
- This approach will encourage private funding for digital projects, making it easier for private sector stakeholders to engage in infrastructure development.



Strategic Objectives:

- The DiGi Framework aligns with the goals established during the U.S.-Japan-Republic of Korea trilateral summit. Its aim is to enhance cooperation and shared priorities among the three nations, ultimately benefiting India's digital landscape and economic growth.

Commitment to India:

- Through the DiGi Framework, DFC, JBIC, and Korea Eximbank demonstrate their dedication to partnering with India. By harnessing private sector resources, these organizations aim to promote high-quality investments in digital infrastructure, supporting India's development agenda.

About Digital infrastructure:

- Digital infrastructure refers to the digital technologies that provide the foundation for an organization's information technology and operations. India's digital infrastructure has made tremendous progress under the Digital India Programme.

Key initiatives:

- **Digital Identity:** Aadhaar, a 12-digit biometric and demographic-based identity, has enrolled over 135.5 crore residents, providing a unique, lifelong, online, and authenticable identity.
- **Digital Services:** Common Services Centres (CSCs) offer over 400 digital services in rural areas through Village Level Entrepreneurs (VLEs), with 5.21 lakh CSCs functional across the country .
- **Digital Locker:** DigiLocker has over 13.7 crore users, with more than 562 crore documents available from 2,311

issuer organizations .

- **Digital Signatures:** e-Sign facilitates instant signing of forms/documents online, with over 31.08 crore e-Sign issued by all agencies .
- **Digital Villages:** The Digital Village Pilot Project covers 700 Gram Panchayats/Villages, offering digital health, education, financial services, and skill development .
- **e-District Services:** The National Rollout of eDistrict MMP provides 4,671 e-services in 709 districts across India .(all data is updated till December , 2022)

India's Alarming Ranking in the Nature Conservation Index

Context: India's position in the inaugural Nature Conservation Index (NCI) has raised significant concerns about its environmental policies and conservation efforts. Ranking 176 out of 180 countries, with a score of just 45.5 out of 100, this report underscores the serious challenges India faces in protecting its natural resources.

Key Areas of Assessment:

The Nature Conservation Index evaluates countries based on four essential pillars:

- **Management of Protected Areas:** India's performance in safeguarding its national parks and wildlife sanctuaries has been deemed inadequate. While 7.5% of its terrestrial land is designated as protected, this is insufficient given the country's biodiversity.
- **Addressing Threats to Biodiversity:** The impact of human activities on ecosystems remains a significant challenge. India struggles to mitigate various threats, including habitat destruction and pollution, which adversely affect its rich biodiversity.
- **Nature and Conservation Governance:** The index highlights deficiencies in India's environmental laws and policies. The current governance framework does not adequately address the urgent need for conservation and sustainable management of natural resources.
- **Future Trends in Natural Resource Management:** India's approach to sustainable development is critically lacking, as indicated by its low score in this area. The need for innovative strategies and effective implementation is more pressing than ever.

Marine Conservation: A Major Weakness:

- One of the most alarming aspects of the NCI report is India's abysmal score of 0 out of 100 in managing marine protected areas and safeguarding marine species. Only 0.2% of India's national waters are under protection, and there is no coverage in the Exclusive Economic Zone (EEZ). This stark deficiency highlights the urgent need for comprehensive marine conservation strategies.

Comparative Performance:

- India's ranking is particularly makes small troubling when compared to its South Asian neighbors. Countries like Bangladesh, Pakistan, Myanmar, and China have all outperformed India in terms of conservation efforts. Bhutan stands out as a model of success in the region, ranking among the top 15 countries globally for its commitment to conservation.

About NCI:

- The NCI was developed by the Goldman Sonnenfeldt School of Sustainability and Climate Change in collaboration with BioDB.com. The initiative aims to create a straightforward, unbiased measurement tool to assess how well countries manage conservation challenges.

Parameters for Evaluation:

- The NCI assesses countries based on 25 specific parameters across the four evaluation pillars. While India has shown some strengths, particularly in ecological diversity, these have been overshadowed by significant weaknesses in marine ecosystem conservation and overall governance.

Objectives of the Nature Conservation Index:

- The NCI aims to provide a comprehensive annual assessment that can guide environmental research and

inform policymakers. It serves as a critical tool for raising awareness about conservation efforts globally and encourages nations to take decisive action in safeguarding their natural resources.

Semaglutide: A Dual Solution for Diabetes and Alzheimer's Risk

Context: A groundbreaking study published in Alzheimer's & Dementia (October 24, 2024) has unearthed significant evidence suggesting that semaglutide, a widely used medication for type 2 diabetes and weight management, possesses substantial potential in mitigating the risk of Alzheimer's disease.

About Alzheimer's disease:

- **Nature of the Disease:** Alzheimer's is characterized by a gradual decline in memory, thinking, behavior, and social skills, making it the most prevalent cause of dementia.
- **Impact on Patients:** As the disease progresses, individuals experience significant challenges in daily functioning and quality of life.

Key Findings from the Study

- **Reduced AD Risk:** Adults with type 2 diabetes who were prescribed semaglutide demonstrated a significantly lower risk of developing Alzheimer's compared to those taking other antidiabetic medications.
- **Comparative Effectiveness:** The risk reduction attributed to semaglutide ranged from 40% to 70%, outperforming other diabetes medications, including other GLP-1 receptor agonists.
- **Consistent Benefits:** The reduced risk of AD was consistent across various demographics, including age, gender, and obesity status.

Research Methodology:

- Conducted by researchers at Case Western Reserve School of Medicine, the study analyzed the electronic health records of nearly 1 million U.S. patients with type 2 diabetes.
- Patients were tracked for up to three years, allowing for a thorough comparison between semaglutide and seven other diabetes medications, including insulin and metformin.

Neuroprotective Effects

- **Mechanisms of Action:** Semaglutide's potential in lowering Alzheimer's risk is thought to stem from its neuroprotective effects, which include:
  - **Reduction of Beta-Amyloid Deposition:** This hallmark of Alzheimer's is associated with cognitive decline.
  - **Improved Glucose Metabolism:** Enhanced glucose utilization in the brain may support cognitive function.
  - **Lowering Neuro-Inflammation:** By mitigating inflammation linked to Alzheimer's, semaglutide may help preserve brain health.

Implications for Alzheimer's Treatment:

- Current FDA-approved treatments for Alzheimer's, such as Biogen's Leqembi, focus on targeting amyloid plaques but may have significant side effects.
- The findings suggest that GLP-1 receptor agonists like semaglutide could provide a dual benefit—effectively managing diabetes while potentially reducing the risk of dementia.

Significance for India:

- India faces one of the highest rates of type 2 diabetes globally, a condition that correlates with increased cognitive decline. The introduction of GLP-1 drugs as a preventive strategy against dementia could be particularly impactful for India's aging population, offering new hope in a landscape where few preventive measures currently exist.

Advancements in Atomic Clocks through Quantum Magnetometry

Context: Researchers at the Raman Research Institute (RRI) have successfully utilized the Doppler effect to enhance the response of atomic clocks and magnetometers to magnetic fields, achieving a tenfold increase in sensitivity.

- The findings of this study, published in the New Journal of Physics, highlight the potential to use quantum effects at room temperature, simplifying experimental setups.
- Recent developments in quantum magnetometry using cold Rydberg atoms have significantly improved the precision and reliability of atomic clocks. These advancements are crucial for applications in navigation, telecommunication, and aviation.

About Rydberg Atoms and Electromagnetically Induced Transparency (EIT):

- Rydberg atoms are highly excited atoms, characterized by one or more electrons in a state with a very high principal quantum number. This excitation can be measured using a technique called Electromagnetically Induced Transparency (EIT). EIT allows an opaque medium to become transparent under specific conditions, enabling unique control of light.
- In EIT, a three-level atomic system is involved, where two transitions are stimulated by a weak probe laser beam and a strong coupling laser beam. The principle of quantum interference plays a crucial role in this phenomenon.
- When atoms transition between quantized energy levels, their multiple pathways can either enhance or cancel each other. This interference can lead to a state where certain light frequencies are absorbed less, effectively making the medium transparent.

Innovations in Quantum Magnetometry:

- At RRI, researchers employed Rydberg EIT to measure how thermal rubidium atoms respond to magnetic fields at room temperature. Their innovative approach took advantage of the Doppler Effect, significantly enhancing the magnetic field response of Rydberg atoms.
- The team observed that analyzing Rydberg EIT in a unique configuration, without compensating for the Doppler shift, resulted in an improved response to the magnetic field.
- Typically, the Doppler Effect, caused by the motion of atoms, is viewed as a limitation in sensing; however, this research demonstrated its beneficial impact on the sensitivity of the Rydberg EIT signal.

Implications of the Research:

- Unlike traditional magnetometry, which often relies on cryogenically-cooled devices or ultra-high vacuum conditions, this room-temperature method is more accessible for various applications.
- Magnetic fields influence the energy levels of atoms. When exposed to these fields, the energy levels shift, resulting in multiple transmission peaks. The separation of these peaks can be utilized to measure magnetic fields accurately, enabling precise measurements without needing complex cooling technologies.

Practical Applications

- **Geophysics:** Identifying mineral deposits and understanding geological formations.
- **Medical Imaging:** Monitoring brain activity and supporting diagnostics.
- **Space Exploration:** Measuring magnetic fields in extraterrestrial settings.
- **Archaeology:** Assisting in locating buried structures and artifacts.

Conclusion

The integration of quantum magnetometry with Rydberg atoms represents a major advancement in atomic clocks and magnetometers. By leveraging the Doppler effect and enhancing sensitivity in a practical setup, this research contributes to improved precision in timekeeping and magnetic field measurements, essential for navigation, telecommunication, and aviation. Continued exploration of these quantum

Power Packed News

World Championship 2024

The 2024 World Wrestling Championships was held from 28 to 31 October 2024 in Tirana, Albania. Athletes who participated in the 2024 Paris Olympic Games was not allowed to compete. India has already made a strong showing in wrestling this year, with Chirag Chikkara winning gold in the men's 57 kg competition at the U23 World Wrestling Championships.

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- Indian Medallists in U23 World Championships 2024:
  - » Chirag Chikkara - Gold (Men's Freestyle 57 kg)
  - » Anjli - Silver (Women's Freestyle 59 kg)
  - » Shiksha - Bronze (Women's Freestyle 65 kg)
  - » Monika - Bronze (Women's Freestyle 68 kg)
  - » Neha Sharma - Bronze (Women's Freestyle 57 kg)
  - » Vishvajit More - Bronze (Men's Greco-Roman 55 kg)
  - » Vicky - Bronze (Men's Freestyle 97 kg)
  - » Sujeet Kalkal - Bronze (Men's Freestyle 70 kg)
  - » Abhishek Dhaka - Bronze (Men's Freestyle 61 kg)

TATA Aircraft Complex for C-295

Recently, Prime Minister Shri Narendra Modi and Spain's Prime Minister Pedro Sanchez have inaugurated the TATA Aircraft Complex for C-295 aircraft manufacturing in Vadodara, Gujarat. This facility marks a significant step in India's "Make in India, Make for the World" initiative, highlighting the nation's expanding role in global aerospace manufacturing.

Key Highlights of the Project:

- **Partnership:** Tata Advanced Systems Limited (TASL) is collaborating with Airbus for this 'Make in India' project.
- **Production:** The facility will manufacture 56 C-295 aircraft for the Indian Air Force, with 40 assembled locally and 16 delivered from Spain.
- **Indigenous Manufacturing:** The complex will support the production of 18,000 aircraft parts, providing significant opportunities for Micro, Small, and Medium Enterprises (MSMEs) across India.

Raigad Fort

- As part of the Rashtriya Ekta Divas celebrations, a replica of Raigad Fort was showcased, honoring Shivaji Maharaj's contributions to Indian history and military innovation.
- Raigad Fort served as the capital of the Maratha Empire under Chhatrapati Shivaji Maharaj. Renowned for its strategic significance and architectural brilliance, the fort is nominated for UNESCO World Heritage status as part of the "Maratha Military Landscapes of India."
- Captured in 1653 from the Mores, Raigad became the capital after Shivaji Maharaj's coronation in 1674.

Raigad fort features:

- **Rajsadar (Hall of Public Audience):** The site of Shivaji Maharaj's court, renowned for its acoustic design.
- **Royal Complex:** This includes the Ranivasa, Naqqarkhana, and elegant towers, symbolizing the grandeur of Maratha rule.
- **Temples:** The Jagadishwar Temple and the Samadhi of Shivaji Maharaj are significant pilgrimage sites.

17th Urban Mobility India (UMI) Conference & Exhibition 2024

- Bhubaneswar has been recognized as the "City with the Best Public Transport System" at the 17th Urban Mobility India (UMI) Conference & Exhibition 2024, while Srinagar took the award for City with the Best Non-Motorized Transport System. The 17th UMI Conference & Exhibition 2024 was organized by the Ministry of Housing and Urban Affairs

Other notable winners:

  - » City with the Most Sustainable Transport System: Kochi
  - » City with the Best Safety and Security System & Record: Gandhinagar
  - » City with the Best Intelligent Transport System (ITS): Surat
  - » Metro Rail with the Best Multimodal Integration: Bengaluru
  - » Metro Rail with the Best Passenger Services and Satisfaction: Mumbai

- Union Minister Shri Manohar Lal announced Gurugram, Haryana as the venue for the 18th Urban Mobility India (UMI) Conference & Exhibition 2025.