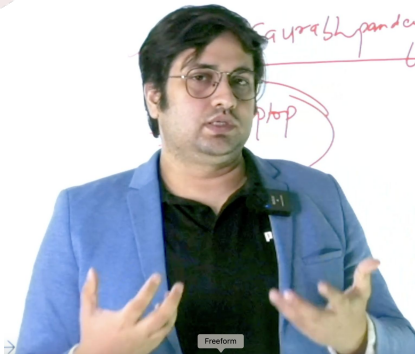
Topics - MINDS MAPS included (Daily current affairs)-- 9TH October 2024

- PSLV C-37 Mission
- Nobel Prize in Physics 2024: Hopfield & Hinton
- India Eliminates Trachoma as a Public Health Problem
- 70th National Film Awards Overview
- Transcription Factors
- Discovery of Carbon Dioxide on Pluto's Moon Charon
- Energy Transition: Lessons from the UK's Coal Phase-Out



By saurabh Pandey

THE HINDU

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- Indian Textile and Apparel Sector: A Vision for 2030
- Global Digital Compact (GDC) Overview
- El Alfalfal Zone
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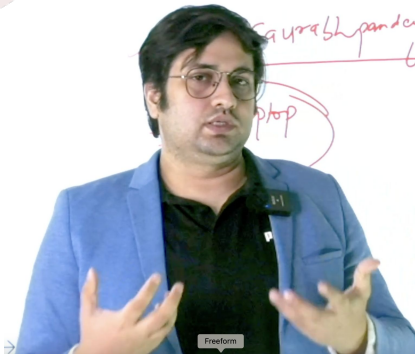

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Target Mains -2025/26 -

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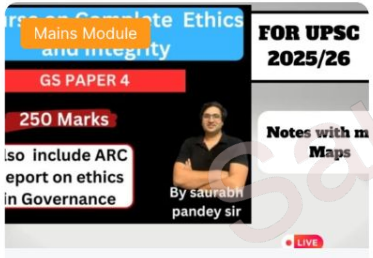

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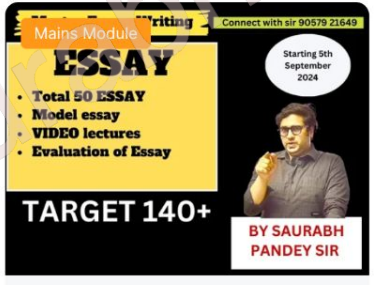

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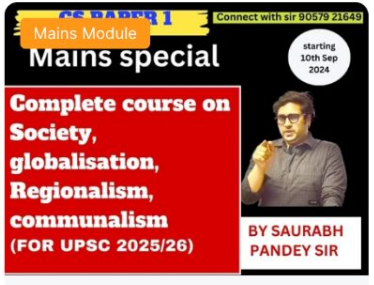

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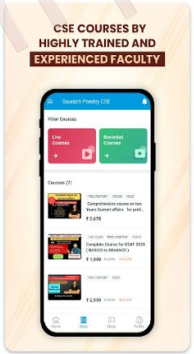


App support

The ISRO launched the PSLV-C37 rocket, carrying a record 104 satellites, from Sriharikota in February 2017. PTI

PSLV C-37 rocket body re-enters the earth's atmosphere: ISRO

The Hindu Bureau
BENGALURU

The Indian Space Research Organisation (ISRO) said that the upper stage of the Polar Satellite Launch Vehicle C-37 (PSLV C-37 mission) re-entered the earth's atmosphere on Sunday.

The PSLV-C37 mission was launched on February 15, 2017, with Cartosat-2D as the main payload along with another 103 satellites as co-passengers, namely INS-1A, INS- 1B, Al-Farabi 1, BGUSAT, DIDO-2, Nayif 1, PEASS, 88 Flock-3p satellites, and 8 Lemur-2 satellites. The space agency created history as it was the first mission to launch 104 satellites with a single vehicle. After injecting the satellites and passivation, the upper stage (PS4) was left at an orbit of approximately 470x494 km.

"It was regularly tracked by U.S. Space Command (USSPACECOM) as an object with NORAD id 42052. Its orbital altitude slowly decayed, primarily due to atmospheric drag effects," ISRO said on Tuesday.

Since September, ISRO System for Safe and Sustainable Space Operations Management (IS4OM) regularly monitored the orbital decay as part of its regular activities and predicted re-entry into the atmosphere in the first week of October. "The orbit had decayed to a size of 134x148 km, as of October 6, 2024. As per USSPACECOM prediction, the re-entry took place on Sunday at 15:49 UTC while IS4OM prediction showed that re-entry would occur on Sunday at 15:48:25 UTC. The impact point is in the North Atlantic Ocean," ISRO said.

Debris mitigation

The atmospheric re-entry of the rocket body is fully compliant with the international debris mitigation guidelines, in particular, the guideline of Inter-Agency Space Debris Coordination Committee that recommends limiting the post-mission orbital life of a defunct object in Low-Earth orbit to 25 years.

Topic→PSLV C-37 Mission

Key Highlights

Launch Date: February 15, 2017
Main Payload: Cartosat-2D
Total Satellites: 104 (including 103 co-passengers)
Re-entry Date: October 6, 2024

The PSLV-C37 mission set a record by launching 104 satellites in a single mission, showcasing ISRO's capabilities in space technology and satellite deployment.

Mission Details

Re-entry Location: North Atlantic Ocean 🌊
Tracking Agency: U.S. Space Command (USSPACECOM)
NORAD ID: 42052

Orbit Characteristics:

Initial Orbit: 470x494 km
Decayed Orbit: 134x148 km

Monitoring Agency: ISRO System for Safe and Sustainable Space Operations Management (IS4OM)

WHAT IS NORAD ID ??

- The **Satellite Catalog Number** (**SATCAT**), also known as **NORAD Catalog Number**, **NORAD ID**, **USSPACECOM object number**, is a sequential nine-digit number assigned by the United States Space Command (USSPACECOM), and previously the North American Aerospace Defense Command (NORAD), in the order of launch or discovery to all artificial objects in the orbits of Earth and those that left Earth's orbit.
- For example, catalog number 1 is the Sputnik 1 launch vehicle, with the Sputnik 1 satellite having been assigned catalog number 2

Machine learning pioneers win Physics Nobel

Vasudevan Mukunth
CHENNAI

The 2024 Nobel Prize in Physics has been awarded to John Hopfield and Geoffrey Hinton "for foundational discoveries and inventions that enable machine learning with artificial neural networks", the Royal Swedish Academy of Sciences announced on Tuesday.

While many areas of research have used machine learning (ML) models and artificial neural networks (ANNs) to process data, these terms have entered the household, thanks to the explosion of chat AI apps, including ChatGPT.

The work of this year's laureates concerns the theoretical foundations of machines that can learn without humans teaching them and can use their knowledge to answer questions. ANNs are collections of neurons, or more broadly nodes capable of processing data, connected in specific ways. In a recurrent neural network, information can flow both ways.

Professor John Hopfield, left, and Professor Geoffrey Hinton. AP

Recurrent networks

Professor Hopfield, of Princeton University in the U.S., is credited with developing the Hopfield network, a type of recurrent neural network. Its neurons learn and process information based on Hebbian learning – an idea in neuropsychology that if one neuron repeatedly triggers a second, the connection between the two becomes stronger.

The rules of a Hopfield network are based on the physics of a group of atoms, each producing its own small magnetic field. The processes the network performs to complete an incomplete pattern or to denoise an image are the same ones that, by analogy, would reduce the total energy of the magnetic atoms. "In his 1982 paper, Hopfield asked a basic question about the ability of a large collection of simple neurons to form computational tasks as a spontaneous collective or emergent phenomenon," Spenta Wadia, founding director of the International Centre for Theoretical Sciences, Bengaluru, said.

"He analysed this in a model system which included biological ingredients. The paper laid the foundation of the use of statistical physics methods and ideas in neural circuit modelling."

Professor Hinton, of the University of Toronto, and his peers adapted another network called the Boltzmann machine to perform cognitive tasks, building on the principles of the Hopfield network, among others.

He made a breakthrough in the 2000s by developing a learning algorithm for a modified ANN called a restricted Boltzmann machine (RBM). A layer of neurons could be trained as an RBM and multiple layers could be stacked, creating the first ANNs capable of deep learning.

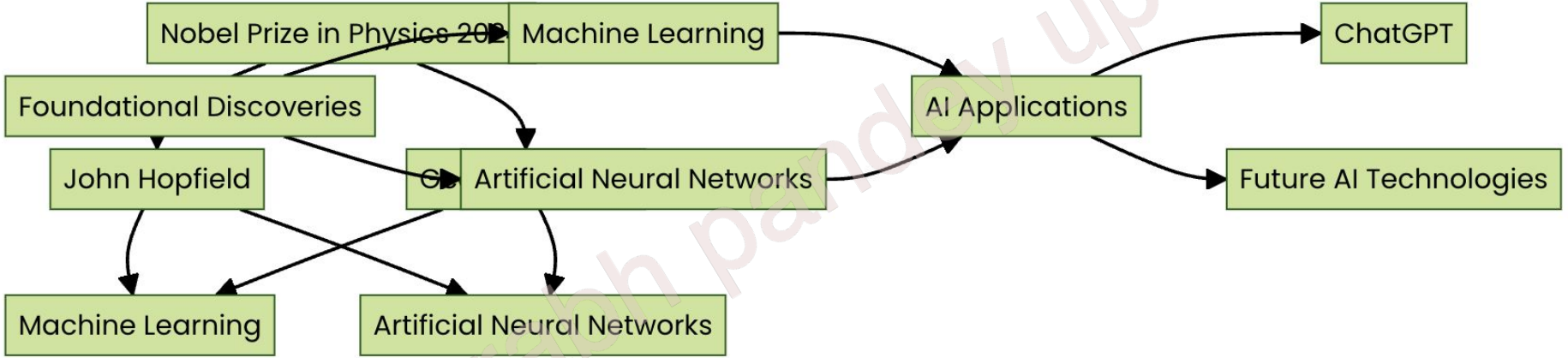
Topic→Nobel Prize in Physics 2024: Hopfield & Hinton

Overview

Awarded: John Hopfield & Geoffrey Hinton
Contribution: Foundational discoveries in Machine Learning and Artificial Neural Networks (ANNs)
Significance: Impact on everyday AI applications like ChatGPT

Contributions and Impact

💡 **Contribution:** They made foundational discoveries in Machine Learning and Artificial Neural Networks (ANNs).
🌍 **Significance:** Their work has significantly impacted everyday AI applications, including ChatGPT.
🤖 **Field:** Their contributions are pivotal in the field of artificial intelligence.
📚 **Legacy:** Their discoveries continue to influence modern AI research and development.
📈 **Future:** Their research paves the way for advancements in AI technologies.



Artificial neural networks (ANNs) and machine learning.

🧠 ANNs Functionality: These networks are designed to emulate the functioning of animal brains, with interconnected neurons processing information akin to biological systems.
🔬 Interdisciplinary Roots: The evolution of ANNs is influenced by fields such as statistical physics, neurobiology, cognitive psychology, and artificial intelligence.

📉 Hopfield Network: Introduced in 1982, it can denoise images by minimizing the system's magnetic energy upon activation.

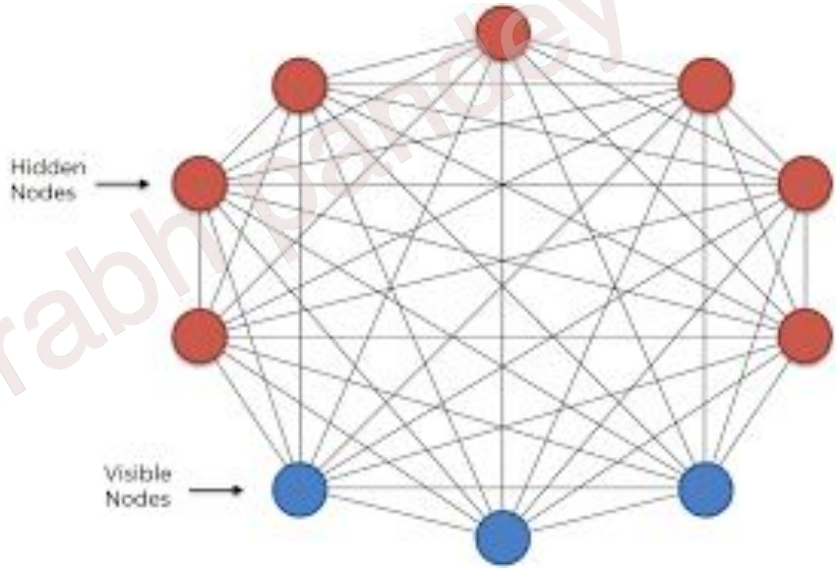
⚛️ **Boltzmann Machine:** Popularized by Hinton and Sejnowski, it is utilized for cognitive tasks and data classification by minimizing energy functions.

🌍 **AI Advancements:** The theoretical groundwork laid by the laureates and other researchers has significantly propelled advancements in AI.

🇮🇳 **Challenges in India:** The country faces hurdles in scientific research due to low funding and bureaucratic inefficiencies, risking missed technological opportunities.

What is BOLTZMANN MACHINE ??

A Boltzmann machine is a type of neural network that consists of interconnected neurons capable of making stochastic decisions. It was invented by Geoffrey Hinton and is used to learn internal representations of input.



India has eliminated trachoma, says WHO

Bindu Shajan Perappadan
NEW DELHI

The World Health Organization (WHO) has now recognised that India has successfully eliminated trachoma, a bacterial infection that affects the eyes, as a public health problem.

In a citation shared by Saima Wazed, Regional Director, WHO South-East Asia, on Tuesday, the UN health body announced that India is the third country in the Southeast Asia Region to reach this public health milestone. "With great pleasure, I congratulate the Government of India on achieving the elimination of trachoma as a public health problem. India's success is due to the strong leadership of its Government and the commitment of ophthalmologists and other cadres of healthcare workers. They worked together with partners to ensure effective surveillance, diagnosis and management of active tracho-

Topic→ India Eliminates Trachoma as a Public Health Problem

Recognition by WHO

🌍 The World Health Organization (WHO) has acknowledged India's success in eliminating trachoma as a public health issue.
👁️ Trachoma is a bacterial infection that primarily affects the eyes.

India's Achievement

🇮🇳 India is the third country in the Southeast Asia Region to reach this significant milestone.
🎉 The announcement was made by Saima Wazed, WHO Regional Director for South-East Asia, on Tuesday.

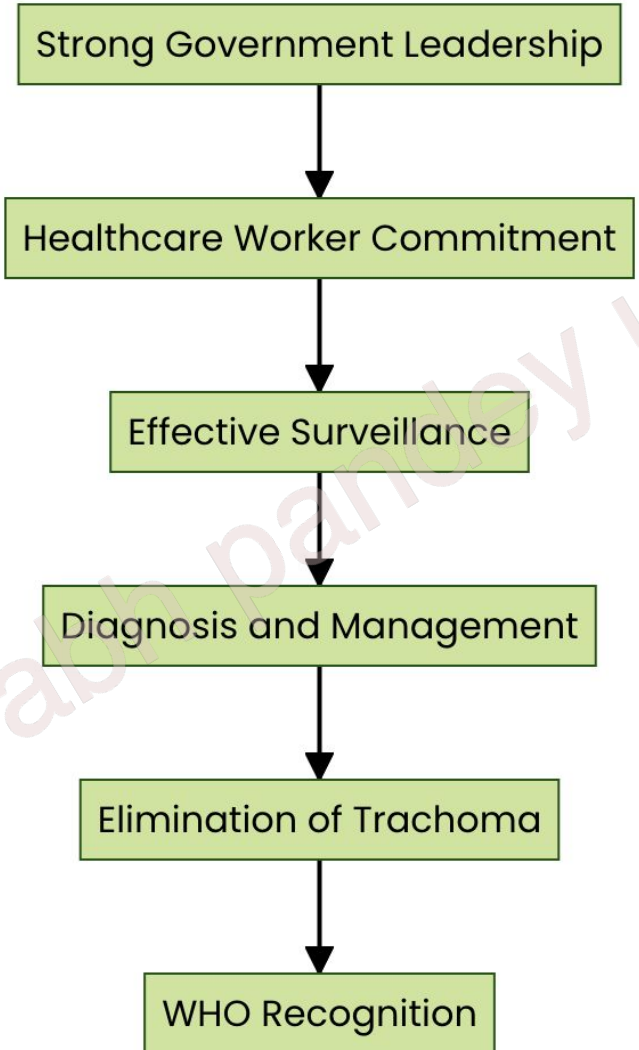
Factors Contributing to Success

👩‍⚕️ The achievement is credited to strong government leadership and the dedication of healthcare workers, including ophthalmologists.

🤝 Collaboration with partners was crucial for effective surveillance, diagnosis, and management of trachoma.

Public Health Progress

📈 This accomplishment underscores India's advancement in public health initiatives.



Trachoma

Definition: Trachoma is a bacterial eye infection that can lead to blindness.

Causes: Caused by *Chlamydia trachomatis*.

Symptoms: Eye irritation, discharge, and visual impairment.

At film awards, Murmu calls for women-led development

The Hindu Bureau
NEW DELHI

President Droupadi Murmu on Tuesday gave away the 70th National Film Awards to the winners in various categories. Veteran actor Mithun Chakraborty was honoured with the Dadasaheb Phalke Lifetime Achievement Award for 2022.

Speaking on the occasion, Ms. Murmu said only 15 of the 85 awardees were women. She called for more efforts to ensure women-led development in the film industry. "I believe that films and social media are a great tool to bring about a change in society," she said.

Information & Broadcasting Minister Ashwini Vaishnaw, and Union Minister of State L. Murugan were present.

The best feature film award went to *Aattam* (The Play), a Malayalam film directed by Anand Ekarshi and Best Non-Feature Film to *Ayena* (Mirror), directed by Siddhant Sarin. Rishab Shetty got the award for the best male actor in a leading role for his performance in *Kantara* (Kannada). The award for the best female actor in a leading role went to Nithya Menen for her portrayal in *Thiruchitrambalam* (Tamil) and Manasi Parekh for *Kutch Express* (Gujarati). The best director award went to Sooraj R. Barjatya for the Hindi film *Uunchai*.

The President presents the award for the best female actor in a lead role to Nithya Menen in New Delhi on Tuesday. SUSHIL KUMAR VERMA

Some of the other award winners included *Brahmastra - Part 1: Shiva* in the Best Film in Animation, Visual Effects, Gaming & Comic category; *Kantara* for Best Popular Film Providing Wholesome Entertainment; and *Kishore Kumar: The Ultimate Biography* for Best Book on Cinema.

Aattam was also awarded for being the best in Editing (Mahesh Bhuvanend) category and for Screenplay (Anand Ekarshi) jointly with Hindi film *Gulmohar* (Arpita Mukherjee and Rahul V. Chittella); and the Best Choreography award went to Sathish Krishnan for his work in *Thiruchitrambalam*. *Gulmohar* got the Best Hindi Film award as well, while Niki Joshi won the Best Costume Designer award for *Kutch Express*.

A. R. Rahman got the Best Music Director (background music) award for Mani Ratnam's *Ponniyin Selvan-Part 1* (Tamil).

Topic→70th National Film Awards Overview

Highlights of the Awards

🎬 President Droupadi Murmu presented the awards to the winners.
🏆 Mithun Chakraborty was honored with the Dadasaheb Phalke Lifetime Achievement Award for 2022.
👩‍🎤 Gender Representation: Only 15 out of 85 awardees were women, emphasizing the need for more women-led initiatives in the film industry.
🎥 Best Feature Film: "Aattam" (The Play)
🎥 Best Non-Feature Film: "Ayena" (Mirror)

🌟 **Best Actor Awards:**

Male: Rishab Shetty for "Kantara"

Female: Nithya Menen for "Thiruchitrambalam"

🎶 **Best Music Director:** A. R. Rahman for background music in "Ponnyin Selvan-Part 1"

📚 **Best Book on Cinema:** "Kishore Kumar: The Ultimate Biography"

Summary: The 70th National Film Awards celebrated significant achievements in Indian cinema, with a focus on gender representation and notable winners across various categories.

Study uncovers surprising new ‘spatial grammar’ of gene expression

The findings can ‘help filter and refine genomic tools and algorithms that predict gene expression,’ which can inform new diagnostic and therapeutic strategies for diseases like cancers caused by mutations in regulatory elements, says Meenakshi Ghosh, a structural biologist turned clinical scientist

Sneha Khedkar

In his quest to understand how each cell of an organism interprets the same genome in a different way, researcher Sascha Duttke wondered whether there might be any undiscovered rules of biology.

The human genome contains information about our development, functioning, growth, and reproduction, and all of it takes up only about 2 MB of space.

“That led us to wonder: maybe some of the magic is in the CD player, too?” Duttke, an assistant professor at the College of Veterinary Medicine, Washington State University, wrote in an email. “In this analogy, the CD is our genome and the CD player is the regulatory machinery,” and the transcription factors are important components in the player.

Transcription factors are proteins that bind to specific portions of the DNA and control the rate at which the cell transcribes genetic information from DNA to RNA. Representative illustration. GETTY IMAGES

Inspired by a toddler

Transcription factors are proteins that bind to specific portions of the DNA and control the rate at which the cell transcribes genetic information from DNA to RNA. The cell then makes proteins by “reading” the RNA.

Groundbreaking new work by Duttke and his colleagues has shown that the fate of a gene being transcribed depends on the location of the transcription factor binding site relative to the location where transcription begins.

The results, published in the journal *Nature*, provide insights into how different spatial arrangements of the same transcription factors can have different effects.

The findings can “help filter and refine genomic tools and algorithms that predict gene expression,” which can inform new diagnostic and therapeutic strategies for diseases like cancers caused by mutations in regulatory elements, Meenakshi Ghosh, a structural biologist turned clinical scientist, said.

“Watching my toddler destroy a puzzle by forcing in the right colour but the wrong shaped piece made me think: maybe we’ve been focusing too much on transcription factor binding sites and protein interactions, and not enough on how everything fits together spatially and in an even bigger picture,” Duttke said.

Before or after?

The team investigated whether the arrangement of transcription factors relative to the transcription start site could influence gene expression.

When presented with the DNA, the activator transcription factor binds to it at specific points, the binding sites. These points are different from the transcription start site.

Team members developed tools to help them analyse patterns in the building blocks of the DNA that are typically found at the start sites. They subjected cells specially cultured in the lab to a form of RNA sequencing that could detect these sites in RNA. Then they identified the preferred locations at which transcription factors bound relative to an active start site.

The researchers found the binding sites for activator transcription factor NRF1 were located before the start sites and for factor YY1 it was located after the start site. Curiously, NRF1 is an activator whereas YY1 is both an activator and a repressor, a factor that stops transcription.

Next they checked how the relative position of the start site affected how the transcription factor behaved.

When they knocked down the gene that cells used to make NRF1, the cells transcribed less DNA only when NRF1’s binding site was located before the transcription start site. If its binding site was located after, the absence of NRF1 increased the transcription rate.

Natural genetic variations

These results were “surprising,” Duttke said. “If you look in textbooks or even Wikipedia, transcription factors are usually grouped into either activators or repressors. The fact that some factors can do both was considered unusual.”

Organisms often carry natural genetic variations at the binding sites. The researchers assessed how these variations influenced the start of transcription. They analysed more than 4 million variations and 80,000 start sites in mice cells and found opposing transcription outcomes depending on whether the variations affected the factors before or after the start site. For instance, only mutations affecting NRF1 binding before the start site reduced the transcription rate.

> If you look in textbooks or even Wikipedia, transcription factors are usually grouped into either activators or repressors. The fact that some factors can do both was considered unusual

The researchers also synthetically inserted binding sites for six factors at different distances from the start sites in some DNA sequences. They observed similar position-dependent outcomes. For example, adding an NRF1 binding site ahead of the start increased transcription, consistent with its activator function. Inserting it after the start site reduced transcription.

‘Spatial grammar’

Last, the researchers studied the relevance of these effects in human diseases.

They identified start sites from genomic sequences from 67 people and combined this information with databases that describe disease risk linked to specific genetic variants. Consistent with previous results, they observed position-dependent effects of disease-associated variants based on the location of the start sites and the binding sites.

“Uncovering this spatial ‘grammar’ was a true eureka moment for many scientists like us who are working to understand how DNA encodes the instructions for turning genes on and off,” Duttke said, adding it would be “exciting” to explore how interactions between different factors affect this spatial grammar.

These results have “vast potential applications,” including helping researchers identify and predict disease-associated mutations, called polymorphisms, that occur outside genes and provide a basis for therapeutic interventions.

“How many of those polymorphisms contribute to disease is currently largely unknown,” he said. “The discovery of the spatial grammar may help to change that.”

The light of evolution

“This study is pretty cool,” Ghosh said. “It adds crucial new insights about how positioning and spacing relative to [start sites] can impact the ability of [factors] to either activate or repress gene expression.”

She added that the results can also improve our understanding of evolution and how organisms regulate gene expression to adapt to environmental changes.

Duttke said he would like to understand more about how this grammar evolved and how it helped create complex organisms like humans. He quoted the title of geneticist Theodosius Dobzhansky’s famous 1973 essay to make his point: “Nothing in biology makes sense except in the light of evolution.”

(Sneha Khedkar is a biologist turned freelance science journalist. snehakhedkar30@gmail.com)

THE GIST

Transcription factors are proteins that bind to DNA and control the rate at which the cell transcribes genetic information from DNA to RNA. The cell then makes proteins by reading the RNA

The fate of a gene depends on the location of the transcription factor binding site relative to where it begins. Cells transcribed less DNA only when NRF1’s binding site was before the transcription start site. If it was located after, absence of NRF1 increased transcription

This spatial grammar was a defining moment for scientists working to understand how DNA encodes instructions for turning genes on and off. The results have vast potential, including helping researchers identify and predict disease-associated mutations

Topic→ Transcription Factors

Definition: Proteins that bind to DNA and regulate transcription from DNA to RNA 🧬

Function: Control the rate of transcription and influence gene expression

Importance: Key for understanding genetic instructions and cellular functions

BIG SHOT

This NASA image released in 2015 shows Pluto's moon Charon just before the New Horizons spacecraft made its closest approach in July that year. Scientists using the James Webb Space Telescope have detected carbon dioxide on the frozen surface of Pluto's biggest moon, Charon, for the first time, research revealed on October 1 this year. The discovery, along with hydrogen peroxide, is hoped to shed light on how icy worlds formed and evolved. NASA/AFP

Topic→>Discovery of Carbon Dioxide on Pluto's Moon Charon

Overview of the Discovery

Date of Discovery: October 2023
Location: Pluto’s largest moon, Charon
Instruments Used: James Webb Space Telescope (JWST)
Key Findings:
- Detection of carbon dioxide (CO_2)
- Presence of hydrogen peroxide (H_2O_2)
- Insights into the formation and evolution of icy worlds

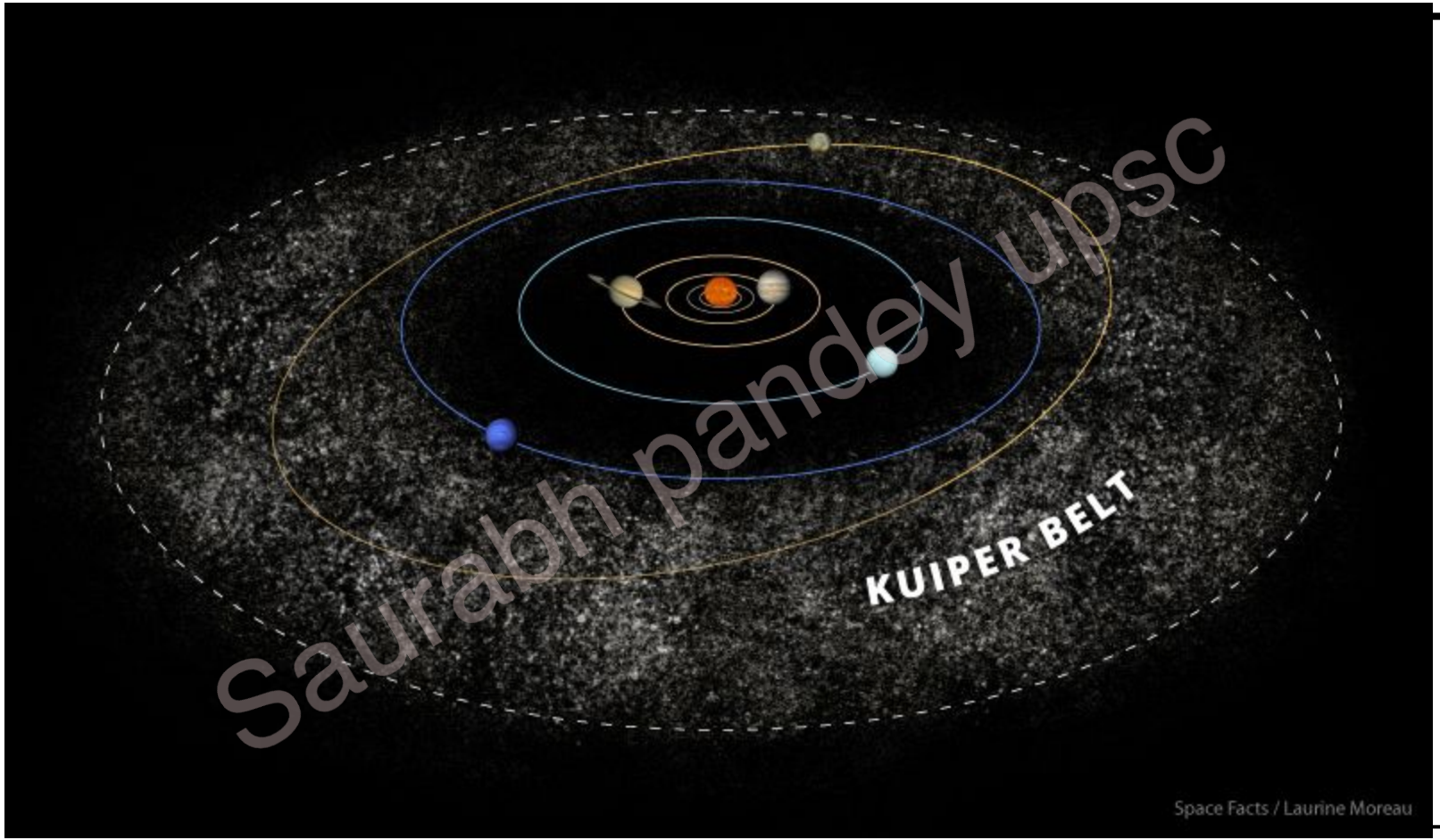
Significance:

Helps understand the chemical composition and geological processes of Charon.
Provides clues about the solar system's origins and the Kuiper Belt.

What is Kuiper Belt??

The Kuiper Belt is a doughnut-shaped region of icy bodies extending far beyond the orbit of Neptune.

It is home to Pluto and Arrokoth. Both worlds were visited by NASA's New Horizons spacecraft.



Sunset for the U.K.'s coal-fired power, lessons for India

Kunal Shankar

The shuttering of Britain's last coal-fired power plant, in Nottinghamshire, is a milestone and indicates the hastening of an ongoing paradigm shift in energy production globally. But this has by no means been a frictionless transition, as it has been portrayed in much of the press. There have also been calls to replicate the United Kingdom's coal phase-out globally. While Britain's experiment could hold good for a few developed economies, a far more tailor-made approach would be required for developing and least-developed nations.

Britain's coal phaseout must also not be viewed as beginning with its 2015 Paris pledge to bring down unabated coal-fired power to zero by 2025. It must largely begin with the disastrous Great Smog of London of 1952, leading to the enactment of environmental legislation such as the 1956 Clean Air Act and other protracted processes over a 70-year period, which included geo-political, environmental, economic and social pressures. The discovery of natural gas in the North Sea in 1965 and the desire to move away from coal imports from the Soviet Union at the height of the Cold War, as depleting domestic reserves made mining uneconomical, thereby jacking up costs of coal-fired energy production, collectively hastened the transition away from coal, which began almost 60 years ago. The subsequent forced closures of about 20 mines in the mid-1980s by the Margaret Thatcher government, despite a year-long miners' protest, led to blight and inter-generational poverty that some parts of the erstwhile coal-reliant regions of the U.K. continue to face. This is not to undermine the urgency with which nations must work toward drastically reducing their carbon emissions over the next two decades, but to appreciate and emphasise the vastly different trajectories and plans required to reach this goal.

Let us consider comparing India with the U.K.'s trajectory to achieving net zero emissions. At the 2021 Glasgow COP, India and China stood out seeking an amendment to the final declaration and having the phrase 'phasing down' and not 'phasing out' of coal introduced. India pledged to achieve net zero emissions by 2070 and meet half its energy needs from renewables by 2050.

Cumulative emissions

India is the third largest carbon emitter, behind the United States and China, emitting about 2.9 gigatons in 2023, far ahead of the U.K.'s 384 million metric tonnes in the same year. But India's population is over 20 times that of the U.K. Moreover, India's per capita emissions were at 2 tonnes in 2023, less than half the global average of 4.6 tonnes and almost a third of the U.K.'s 5.5 tonnes in the same year.

An analysis by Carbon Brief that considered historical emissions of nations between 1850 and 2024 (till the closure of the Nottinghamshire plant), took into account their carbon footprint as colonial powers. This put the U.K. at fourth place, with emissions touching 10.4 billion tonnes, which Carbon Brief said was 'more than most countries ever produced from all sources'.

Britain built the earliest known public coal-fired power plant in 1882 in the heart of London near Fleet Street. Coal became the mainstay in Britain, powering homes, industries and businesses for well over half a century until the mid 1960s. Coal employment peaked in 1920, employing 1.2 million miners at about 3,000 mines nationwide. About a 100 small coal-fired power plants dotted the landscape at this time, supplying power to nearby towns and industrial areas. And, Britain dominated coal exports in the early 20th century accounting for 30% of global exports in 1913. The U.K.'s peak thermal power consumption was in the 1950s and 1960s, when 90% of energy was generated by coal, before steadily shifting to natural gas, nuclear and, more recently, wind and solar.

India's coal story

India's first coal mine, the Raniganj coalfield, straddles present-day West Bengal and Jharkhand. While it was established as early as in 1774 by the British East India Company (and this is why historical CO_2 emissions matter), this led to large-scale coal extraction from much of India's eastern and central States of Jharkhand, West Bengal, Odisha, Chhattisgarh and Madhya Pradesh. India's first coal-fired power plant was the Hussain Sagar Thermal Power Station, established in 1920 in Hyderabad, during the Nizam's rule. It powered the twin cities of Hyderabad and Secunderabad well into the early 1980s. But it was not until 1956, when the Trombay power station near Mumbai was commissioned, that thermal power was truly heralded as India's mainstay. Moreover, the average age of India's coal-fired power plants is about 12 years, meaning they have a few decades before they could be decommissioned. While India has exported coal to neighbouring Myanmar and Sri Lanka, it has largely used its reserves for domestic power production. Of late, it has even been importing coal as power demand has been steadily rising.

India is yet to reach its peak coal production and consumption, which is expected between the years 2030-35, about 80 years since Britain reached this spot. About 70% of its energy output is currently from coal, accounting for 218 GW of installed capacity. It has more than 350 operational mines and about 120 new ones have been planned. A study by Global Energy Monitor estimates that these mines provide direct employment to almost 3,40,000 miners. This is likely an under-estimation as many from the agriculture sector are seasonal workers at mines. A Council on Energy, Environment and Water (CEEW) study estimates that India's thermal power plants employ about 4,00,000, people, again a likely under-estimation as informal employment at thermal power plants is high. This means that at its peak, about 10 years from now, the coal sector is likely to provide employment to well over a million people, which is about how many miners alone worked in Britain more than a century ago.

Moreover, Britain's per capita energy consumption was almost three times India's in 2022, and this is despite the Russia-Ukraine war-induced energy austerity, and even as the world was at the tail end of the COVID-19 pandemic.

Having made the case that a direct comparison on coal phase-out between the two countries cannot be made, there are lessons that India could learn from the U.K.'s transition particularly in the past decade, and also ensure it does not make the mistakes Britain made in the 1980s and 1990s.

India could learn from the U.K.'s transition, ensuring that it does not make the mistakes Britain made

Britain's transition

After committing to phasing out coal by 2025, when Britain had already reduced its use to a fifth of its energy needs, it pursued a holistic transition of not just the workforce of the sector but also the regions and communities that depended on it. Retraining programmes focused on sectors that required skills similar to those in coal mining and power generation such as engineering, heavy machinery operation and maintenance. This was mixed with early retirement and redundancy payments; new education and apprenticeship programmes, and community and regional redevelopment of historically coal-dependent regions, or impetus to set up new industries in their place. The sighting of renewable energy projects, particularly offshore wind farms close to major coal producing regions such as the North Sea off Yorkshire, and repurposing the existing grid infrastructure to transmit wind energy along with remodelling old coal-fired power plants for other forms of energy generation such as biomass in Drax, have helped alleviate some of the fears of job loss and economic slowdown. This is not to say concerns do not remain, but the gradual decline in coal, with growing awareness about climate change, and transparent, fixed timelines to transition, enabled Britain's coal phase-out. Outliers remain, like the protests at the now shuttered Talbot steel plant as the Tata-owned facility attempts to shift from coking coal to electric furnaces, but this might likely be a temporary closure.

While India has set itself a sufficient timeline of 45 more years to attain net zero emissions, there has already been a steady and impressive growth in renewables capacity. But coal-fired energy use also has risen, and the country must begin working on fixing timelines on plant decommissioning, regional redevelopment programmes, and retraining of miners and power plant workforces, bearing in mind that India's historically coal-dependent regions are some of the poorest in the country, and have workers who have largely transitioned from agriculture to mining. Only a holistic, transparent, and early forward planning approach, would hasten a transition that is inclusive and just.

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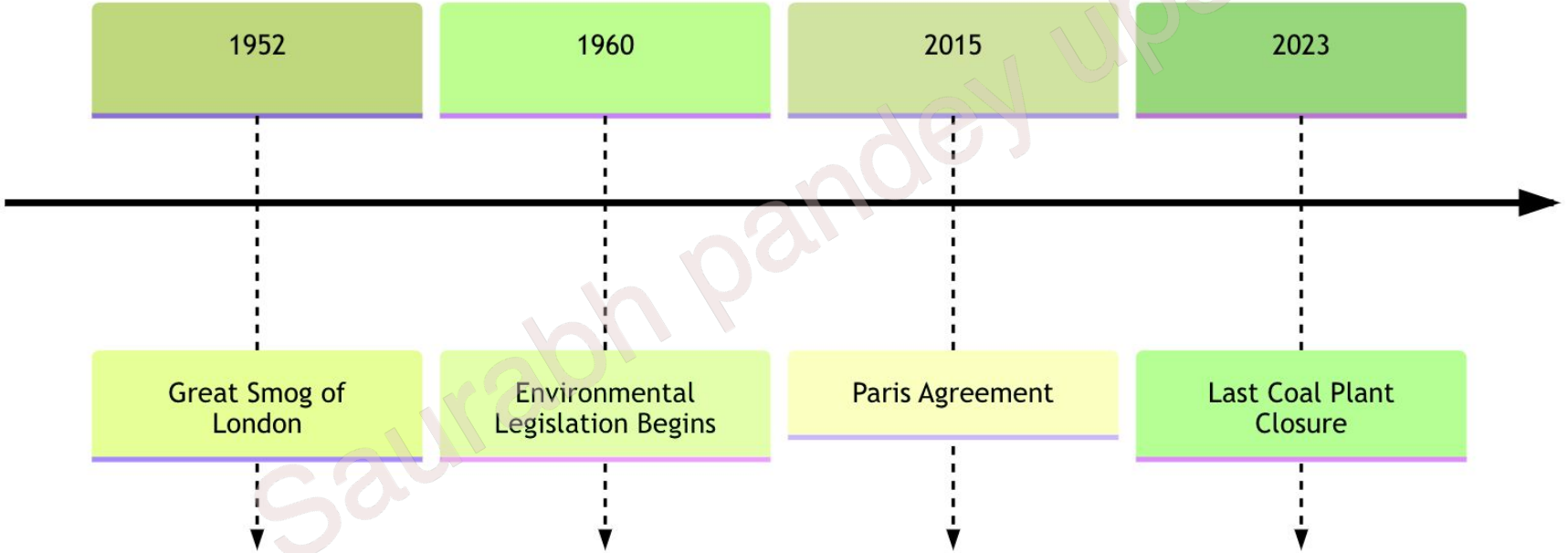
Topic->> Energy Transition: Lessons from the UK's Coal Phase-Out

Britain's Shift from Coal 🏭

The closure of the last coal-fired power plant in Britain marks a significant shift in global energy production.
This transition highlights the complexities of moving away from coal.

Britain's Coal Phase-Out



Global Implications 🌍

Calls for a global replication of the UK's coal phase-out must consider the unique needs of developing nations.
Tailored approaches are necessary for these countries.

Historical Context 📜

The UK's journey began before the 2015 Paris Agreement, rooted in events like the Great Smog of London in 1952.
Subsequent environmental legislation played a crucial role.

India's Path to Net Zero 🇮🇳

India, the third-largest carbon emitter, aims for net zero emissions by 2070.
The country's reliance on coal contrasts with the UK's historical trajectory.——

Comparison Chart:

Country	Net Zero Target	Coal Dependency
UK	Achieved	Low
India	2070	High

Historical Emissions Analysis 🔍

The UK has a substantial carbon footprint due to its colonial past. Emissions total 10.4 billion tonnes since 1850.

Transition Strategies 👷

The UK's transition involved retraining programs and community redevelopment.

These are lessons India could adopt for a just transition in coal-dependent regions.

Future of India's Coal Sector ⚡

- India's coal sector is expected to peak in production and consumption between 2030-35.
- A significant workforce remains reliant on coal mining and power generation.
- Historical data on UK's emissions
- India's energy policies and targets
- Global energy transition reports

Summary: The closure of Britain's last coal-fired power plant signifies a complex transition in energy production, offering valuable lessons for India as it navigates its own coal reliance and aims for net zero emissions by 2070.

Why is the textile industry struggling to perform better?

What caused the slump in the Indian textile sector in the last two financial years?

M. Soundariya Preetha

The story so far:

Union Minister for Textiles Giriraj Singh recently said that the Indian textile and apparel sector is aiming for a total business of $350 billion annually by 2030, which is to generate 3.5 crore jobs. However, the industry went through a tumultuous phase during the last two financial years, casting a shadow on the possibility for 10% CAGR.

What is the status now?

The size of the Indian textile and apparel industry was estimated to be $153 billion in 2021, with almost $110 billion contributed by domestic business. In FY22, India was the third largest textile exporter globally, enjoying a 5.4% share. India is also said to have the second largest manufacturing capacity, with a robust capability across the value chain. The sector's contribution to GDP is close to 2.3% (FY21) and 10.6% of total manufacturing Gross Value Added (GVA) in FY23. About 105 million people are employed by the textile and garment units, directly and indirectly. For an industry that has 80% of its capacity spread across MSMEs and is sensitive to international developments as it is strongly linked to global markets, FY2021-2022 saw tremendous growth with $43.4 billion exports.

However, slowdown in demand that started in 2022-2023 only worsened in FY24 with a slump in exports and domestic demand. This impacted manufacturing clusters severely. For instance, Tamil Nadu, which has the largest spinning capacity in the country, saw the closure of nearly 500 textile mills in the last two years. In Tiruppur, which is a knitwear production destination, many units saw a 40% drop in business in FY23.

Why did exports slump?

Geopolitical developments and a slump in demand in buying countries hit the exporting units. This was exacerbated by high raw material prices of both, cotton and Man Made Fibres (MMF), and the growing import of fabrics and garments.

The imposition of a 10% import duty on cotton has made Indian cotton more expensive compared to international prices. In the case of MMF, introduction of quality control orders has disturbed raw material availability and price stability. The industry is repeatedly demanding removal of the import duty on cotton at least during the off-season months of April to October. "This is an industry in which the stakeholders compete in the international market with countries that heavily support their domestic production capabilities. So, India needs schemes that run for at least five years and boost investments. Raw material should be available for the domestic industry at internationally competitive prices," says a spokesperson of a leading industry association.

What are the other challenges?

Apart from policy issues, the industry is also staring at disruptions in its traditional business systems. Direct retailing to customers through e-commerce is a trend that is catching on among garment and home textile manufacturers, with more startups entering this space. A report by Wazir Advisors notes that "(Foreign) brands are fast-tracking the adoption of ESG sustainability across the supply chain." They are defining their sustainability targets and want to source from vendors who will meet these targets. Further, there is a rise in comfort wear, loungewear, and athleisure as the emphasis on comfortable clothing has increased among consumers. "Even in the domestic market, much has changed in the way business is done. Customers in rural and semi-urban areas prefer to shop in multi-brand outlets or hyper markets. They do not want to step into outlets of less known brands," said Palanisamy, a basic garment producer in Tiruppur.

What next?

The industry is looking at a $100 billion investment across various segments of the value chain by 2030 to augment production capacities and meet the $350 billion target. Labour constitutes roughly 10% of the production cost in the textile sector. The average daily wage of a trained textile worker is reported to be ₹550 a day. Unskilled workers earn about ₹450 a day. The industry has no option but to look at technology and skilling of its workforce to improve productivity and reduce wastages, say industry sources.

THE GIST

- The size of the Indian textile and apparel industry was estimated to be $153 billion in 2021, with almost $110 billion contributed by domestic business.
- However, slowdown in demand that started in 2022-2023 only worsened in FY24 with a slump in exports and domestic demand.
- Apart from policy issues, the industry is also staring at disruptions in its traditional business systems. Direct retailing to customers through e-commerce is a trend that is catching on among garment and home textile manufacturers, with more startups entering this space.

Topic→>Indian Textile and Apparel Sector: A Vision for 2030

📈 Growth Target

Objective: Achieve a total business of $350 billion annually by 2030.
Job Creation: Generate 3.5 crore jobs in the sector.

🌍 Current Market Size

Valuation: Industry valued at $153 billion in 2021.
Domestic Business: Contributed $110 billion.
Global Share: Holds a 5.4% share in global textile exports.

👥 Employment Impact

Workforce: Employs approximately 105 million people, both directly and indirectly.

📉 Export Challenges

Issues: Geopolitical tensions, high raw material prices, and a 10% import duty on cotton.
Competitiveness: These factors have led to a decline in export competitiveness.

🏭 Manufacturing Decline

Tamil Nadu: Closure of nearly 500 textile mills.
Tiruppur: Experienced a 40% drop in business in FY23.

💻 E-commerce Shift

Adaptation: Industry is moving towards direct retailing through e-commerce.
Focus: Increasing emphasis on sustainability and comfort wear.

💰 Investment Needs

Requirement: A $100 billion investment needed by 2030.
Purpose: Enhance production capacities and meet growth targets.

Summary

The Indian textile industry is targeting substantial growth by 2030, aiming to overcome challenges such as export declines, high raw material costs, and a shift towards e-commerce and sustainability.

Growth and Challenges Overview:

GETTY IMAGES

Global Digital Compact: advancing digital innovation in a sustainable fashion

The GDC is a diplomatic instrument which focuses on the potential of digital technologies, with the specific intention to harness and regulate them for the common good. The GDC rests on the idea that digital technologies are dramatically changing our world

Neethu Rajam
Krishna Ravi Srinivas

In the recently concluded 'Summit of the Future' organised by the United Nations, member countries adopted the 'Global Digital Compact' (GDC). This ambitious instrument is perhaps the first of its kind in the international arena focusing on the potential of digital technologies, with the specific intention to harness and regulate them for the common good.

What is the GDC?

The GDC is not a binding law but a diplomatic instrument with a set of shared goals for governments, institutions, firms, and other stakeholders to bear in mind. Once there is greater adherence, the terms of the compact may become soft laws in each country.

Earlier, the UN helped pilot and legitimise two other compacts: the 'Global Compact' ("a voluntary initiative based on CEO commitments to implement universal sustainability principles and to take steps to support UN goals") and the 'Global Compact for Safe, Orderly, and Regular Migration' (covering all dimensions of international migration in a holistic and comprehensive manner).

The GDC rests on the idea that digital technologies are dramatically changing our world. While they offer potential benefits for societies and for our planet – by enabling Sustainable Development Goals (SDGs) – they also pose serious challenges and concerns.

Realising the GDC

The GDC is a collaborative project with the objective of ensuring human oversight of technologies in ways that advance sustainable development. Building on the norms of international law, the Universal Declaration of Human rights, and the UN 2030 Agenda, among others, the GDC proposes global cooperation in the governance of data and digital technologies

To meet the Compact's goals, UN member countries have committed to establish two panels – an 'Independent International Scientific Panel on AI [Artificial Intelligence]' and a panel for 'Global Dialogue on AI Governance'.

These goals include closing the digital divide, including everyone in the digital economy, improving access to data, and advancing responsible and equable data governance. In the same vein, the Compact's principles are based on inclusive participation, access to data and digital technologies, sustainability, and trustworthy technologies that function within a free and competitive market.

Digital goods and services

To address the digital divide, the GDC proposes "digital public goods" that will include open-source software, open data, and open AI models, plus adherence to privacy and best practices.

This is an acknowledgment of digital public goods' ability to drive social change as elements of a "digital public infrastructure" that delivers services. Such infrastructure involves the development and use of shared digital systems according to specific priorities and needs of stakeholders. To this end, the GDC envisions partnerships, including with private entities.

What are the GDC's lacunae?

First, the extensive European experience with public-private partnerships vis-à-vis digital projects suggests openness within such partnerships is restricted between 'as open as is required' and 'as closed as is essential'. In other words, openness in the context of the digital public infrastructure may be limited by contractual requirements such as non-disclosure, confidentiality, and protection of intellectual property.

Second, the GDC adds little to existing frameworks of internet governance but importantly it calls for digital technology companies to self-regulate to keep their users safe and their users' trust. This is not an optimum solution because self-regulation has already proved to be ineffective in practice.

Third, the GDC recognises interoperable data governance as essential to foster innovation and promote economic growth. But experts have noted that the increasing collection, sharing, and processing of data – particularly for AI – may amplify risks in the absence of effective personal data protection and privacy laws.

Fourth, the Compact stresses on achieving SDGs within a paradigm where governments and private entities track, collect, and analyse data to measure progress, while underscoring the importance of governing data in the public interest. For this the Compact proposes to give corporate entities more power in data and internet governance. However, it fails to emphasise the countervailing measures required to stave off monopolistic control.

The GDC and the UN

In many sections the GDC makes wishful statements that bypass the complexity of underlying issues, assuming the comity of nations will be enough to achieve its objectives. But this stance may also reflect the UN's wish to remain a major player in governing technologies, including AI.

For example, in the 21st century data is oil: it is as valuable even as its use is embedded in extractive industries with polluting effects. Consider the ongoing explosive growth of generative AI models and the spheres, volumes, and varieties of data collected to train them. The GDC acknowledges issues in AI governance but has little to offer in terms of concrete solutions or even strategies.

Similarly, the GDC does bat for "data flow with trust" but many countries have refused to accept this idea because it goes against the spirit of digital sovereignty. Some even have specific laws that require data about their citizens to remain within their borders.

Finally, the GDC links various objectives and proposed actions with the relevant SDGs. This is a welcome move because it reflects the view that digitisation should play a prominent role in realising the SDGs. At the same time, when the SDGs were adopted in 2015, the current AI revolution hadn't started. Given the unimpressive record of nations in realising the SDGs, it is doubtful whether an add-on Compact like the GDC could make a difference.

The UN's member states are striving to find ways to work with and regulate Big Tech while also asserting their digital sovereignty. The global governance of digital technologies thus is too complex to be captured or 'fixed' by a singular entity like the GDC. We need multilateral as well as regional negotiations to go with it to address jurisdictional, regional, and/or local needs. By appealing to existing modes of digital governance as well as by combining SDGs with digitalisation, the GDC is positioning itself as an instrument of brainstorming rather than as a provider of roadmaps. Still, the GDC can help with capacity building and with South-South and North-South collaborations in the development of digital public goods.

In sum, the GDC may not result in a paradigm shift in the world's governance of digital technologies but it can facilitate significant and tangible outcomes if member states take it seriously.

Neethu Rajam is Associate professor of intellectual property and technology law, National Law University Delhi. Krishna Ravi Srinivas is Adjunct professor of law, NALSAR University of Law Hyderabad.

Topic→ Global Digital Compact (GDC) Overview

Definition: Non-binding diplomatic instrument for digital technology governance.
Goal: Harness and regulate digital technologies for the common good.
Background: Builds on previous UN compacts focusing on sustainability and migration.

Key Components

Collaborative Project: Emphasizes human oversight and global cooperation.
Panels Established:

Independent International Scientific Panel on AI.
Global Dialogue on AI Governance.

Goals of the GDC

Close Digital Divide: Inclusive participation in the digital economy.
Access to Data: Improve data accessibility and governance.
Digital Public Goods: Promote open-source software, open data, and AI models.

Challenges and Concerns

Openness in Partnerships: Limited by contractual obligations.
Self-Regulation of Tech Companies: Ineffectiveness of self-regulation.
Data Governance Risks: Potential for abuse without strong privacy laws.
Corporate Power: Increased influence of corporations over governance.

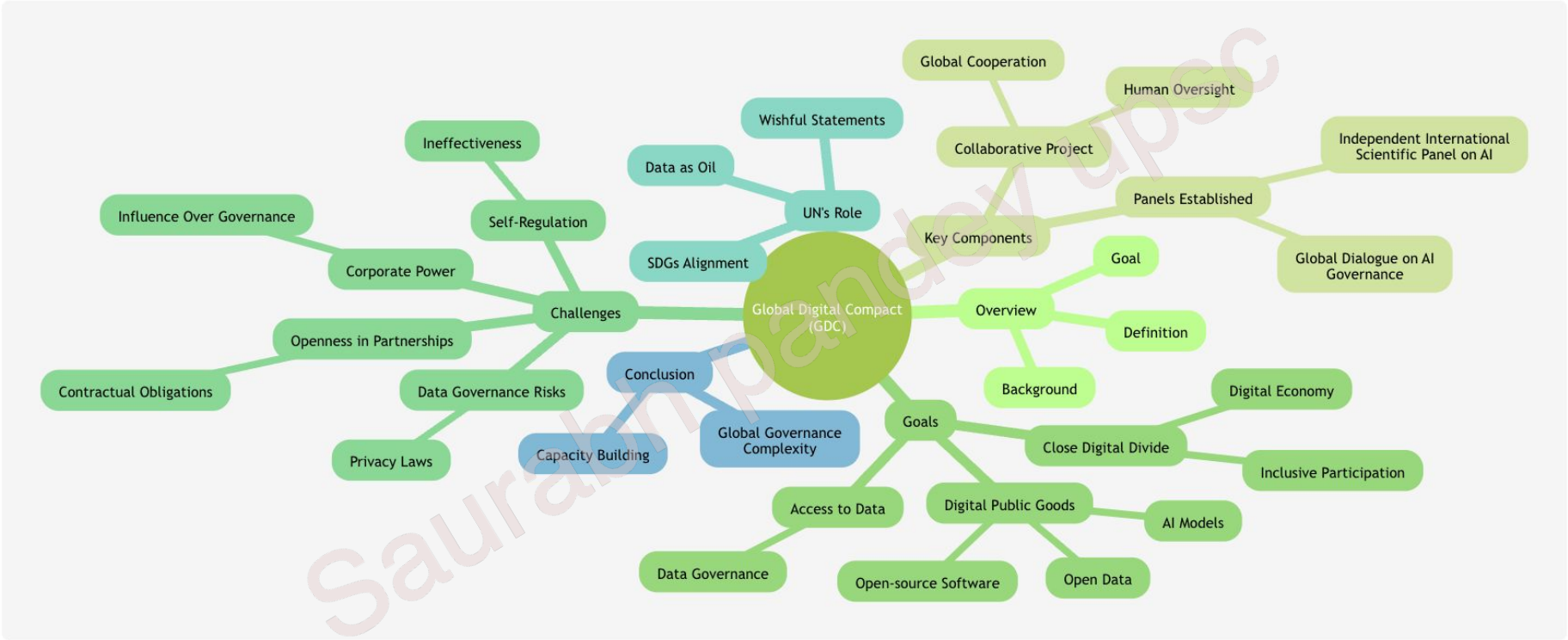
UN's Role and Challenges

Wishful Statements: Simplistic views on complex issues.
Data as Oil: Acknowledgment of data's value and implications for governance.
SDGs Alignment: Linking digital goals with Sustainable Development Goals.

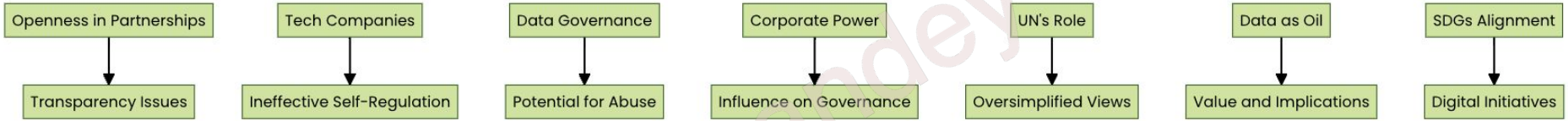
Conclusion

Complex Global Governance: Requires collaboration beyond singular entities.

Capacity Building: Potential for significant outcomes with serious commitment from member states.



Conceptual Overview:



One-liner Summary

The text explores the challenges of governance in the digital era, focusing on corporate influence, data governance, and the necessity for international collaboration.

Surviving scarcity

A drone view shows goats eating from a pile of discarded vegetables delivered by an NGO in Chile to farm animals in water-scarce areas, at 'El Alfalfal' zone, on the outskirts of Santiago. REUTERS

Mapping →El Alfalfal Zone

Overview

El Alfalfal: A prominent agricultural area focused on alfalfa farming.
Climate Impact: Hotter weather and drought conditions affecting irrigation and crop yield.
Water Usage: Significant water consumption for alfalfa production, raising sustainability concerns.

Key Themes

Farming Techniques: Innovations in irrigation and crop management.
Economic Factors: The impact of water scarcity on local economies.
Environmental Concerns: Sustainability of alfalfa farming amid climate change.

Alfalfa (Medicago sativa), also called lucerne, is a perennial flowering plant in the legume family Fabaceae. It is cultivated as an important forage crop in many countries around the world

The United States and Argentina are the world's largest alfalfa-producing countries, but significant land area is devoted to alfalfa in Australia, South and North Africa, Southern Europe, Chile, Mexico, Canada, China, and the Middle East.

Russia, China conduct joint naval patrol in the Pacific

Agence France-Presse
MOSCOW

Russian and Chinese navy ships have carried out a joint patrol in the north-east of the Pacific Ocean, the Russian military said on Tuesday.

The vessels "proceeded with manoeuvres" to practice anti-submarine tactics, it said.

The patrol came after the two countries held joint military drills, as the allies deepen ties that have seen NATO dub Beijing an "enabler" of Moscow's war in Ukraine. In early September, China said that the two sides would participate in a joint maritime patrol and that China would also participate in Russia's "Ocean-2024" strategic

Topic-- > Ocean24 Strategic Exercise

Overview

Definition: A joint military exercise involving naval and air forces from Russia and China.

Purpose: To enhance military cooperation and challenge US influence in the Pacific region.

Key Components

Participants:

Russia

China

Types of Exercises:

Naval Drills: In the Sea of Japan and other strategic locations.

Air Exercises: Joint operations involving air forces.

Objectives

Military Readiness: Improve coordination and readiness of forces.
Strategic Positioning: Strengthen presence in the Pacific to counterbalance US-led coalitions.
Political Messaging: Showcase strength and unity between Russia and China.

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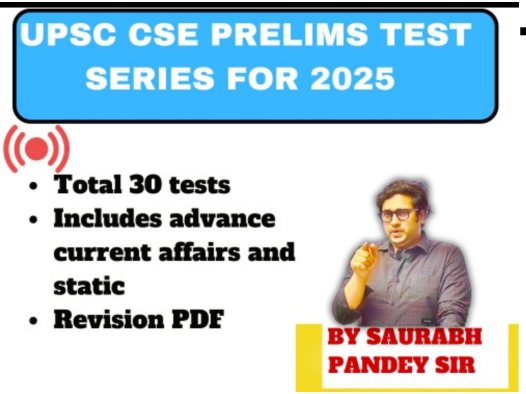

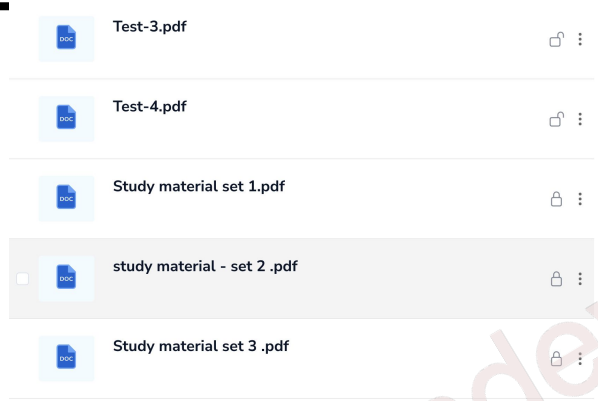

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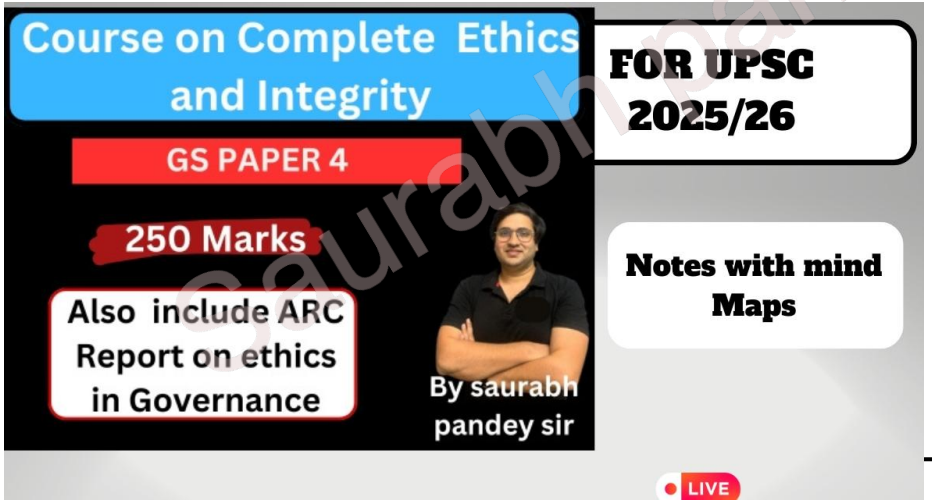

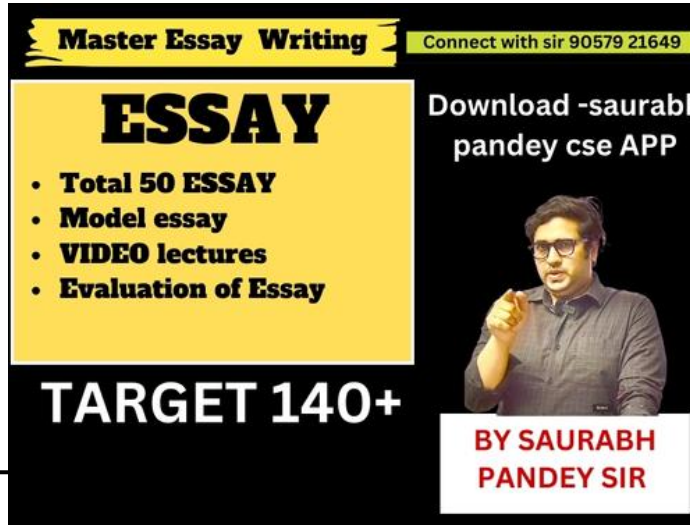

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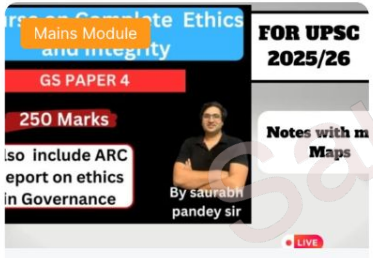

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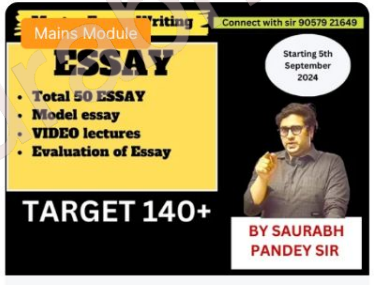

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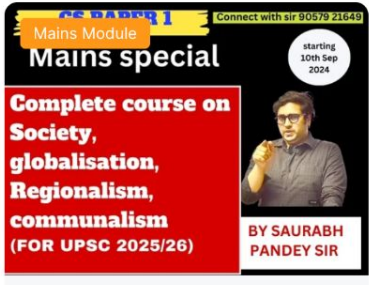

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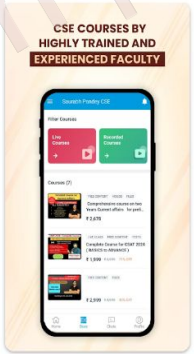

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Q Indian foreign policy is about balancing of “bilateral and multilateral” interest . Examine

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