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***Daily News Feed***

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***21.07.2025***

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**City and the river:** The Arkavati entering Thippagondanahalli reservoir on the outskirts of Bengaluru. Once the primary source of drinking water for the city — from 1936 to 2000, according to the Bangalore Water Supply and Sewerage Board — the river is today a shadow of its former glorious self. **K. K. DEEPIKA**

# Bringing a 'ghost river' back to life

The Karnataka government has announced its ambitious plan to bring the Arkavati back to life, but people living close to the river have little hope, while experts point out to many challenges, writes **K.C. Deepika**

As the clouds play hide-and-seek and the sun beats down in mid-July, in what has been a dry southwest monsoon for Bengaluru thus far, waters of the Arkavati river, unsettlingly black, flows its course on the outskirts of the city.

Jayaram, 60, a resident of Jwalahalli, close to the Thippagondanahalli (T.G. Halli) reservoir, is walking around in the quiet village as devotional songs play out of a speaker from a nearby temple. Two class 5 students of a government school hang around him as he tells *The Hindu*. "Until a few years ago, we used to wash clothes in the river. They started letting polluted water in from everywhere. What flows now is acid water. We cannot even step into it. There is an odour and froth. Some are brave enough to use it for agriculture."

He recalled that, when he was around 30 years old, he would drink water from the river and wash clothes in it. "When it rains, we see some clean water briefly, and then the black water comes again. The water is of no use to anyone, not even to animals," he says.

Balbhanna, 60, at the nearby Varthur Sarasimbanayara, was watching over her grazing goats close to a pumping station. "I came here after getting married 40 years ago, and I remember we used to drink this water and cook with it. It has been at least 15 years since we stopped using it. It smells," she says, adding that they use borewell water for their daily needs.



The BWSSB is building a 20 MLD capacity sewage treatment plant and water treatment plant at the T.G. Halli reservoir. **K. KURUBU KUMAR**

Once the primary source of drinking water for Bengaluru — from 1936 to 2000, according to the Bangalore Water Supply and Sewerage Board (BWSSB) — the Arkavati is today what one research scholar called "a ghost river", a shadow of its former glorious self.

**Immense potential**  
Over two and a half decades later, in June 2025, the Karnataka government announced a high-level committee of experts to spearhead the rejuvenation of the Arkavati through a public-private partnership (PPP) model. The BWSSB, while announcing the plan, said, "Stretching 53 km from Nandi Hills to T.G. Halli, and covering a basin area of 1,400 sq km, the Arkavati holds immense potential to be reborn as a sustainable lifeline."

BWSSB Chairman Kam Prasanth Manohar, while announcing the plan, said water from the Vestimabole project (which envisages the diversion of west-flowing river water to meet the drinking water needs of seven parished districts in the south Karnataka region) was intended to mix with the Arkavati waters at T.G. Halli, but rapid industrial growth, wastewater discharge, and environmental degradation rendered the reservoir's water unfit for consumption. While admitting that only 15% of the Arkavati's river basin falls under the BWSSB's jurisdiction, he also said that several government agencies, NGOs, and civic bodies were coming together to shape a comprehensive action plan. The BWSSB also an-

nounced that Infrastructure Development Corporation (Karnataka) Ltd. has already begun an integrated study covering areas such as Hesaraghatta, Madanayakanahalli, and parts of the Bruhat Bengaluru Mahanagara Palike (BBMP), laying the groundwork for rejuvenation.

**Stakeholder meeting**  
According to a BWSSB document on the 'Rejuvenation of Arkavati River up to T.G. Halli', from the origin of the river at Nandi Hills, till Doddaballapur town, the stream is less polluted, barring drain water entry and dumping of solid waste.

"Municipal sewage from Doddaballapur town enters into the Nagara Kere (Lake) and polluted industrial wastewater enters from Bashtettyhalli Industrial Area at Veerapur into the river," says the document, adding that once the river crosses Doddaballapur town and enters Bengaluru Rural, the river is in "a highly stressed state due to pollution from rapid urbanisation and industrialisation".

The document also acknowledges that as the river traverses, it accumulates various pollutants, including untreated sewage and industrial waste, leading to poor water quality in T.G. Halli, and that the water is not useful for drinking or any other domestic purposes.

The BWSSB has planned to take up the rejuvenation of the Arkavati from Nandi hills to T.G. Halli (54 km) "to make the river pollution-free". The document lists views and recommendations from multiple stakeholders of the river, one of which is the Bangalore Development Authority (BDA), as the Dr. Shivanam Ganath Layout is in the Arkavati catchment area. "It is necessary to know the disposal scheme of the wastewater generated from the layouts developed by the BDA in the Bengaluru region," it says.

**Questionable policy decisions**  
But is it going to be possible? Experts who have conducted studies on the river say it is not going to be easy. Sharachandradeva Lele, Distinguished Fellow in Environmental Policy and Governance, Centre for Environment and Development, Ashoka Trust for Research in Ecology and the Environment, says "rejuvenation" is a tricky concept.

"If it means the natural flow should come back, that will require major changes in groundwater use in the upstream, which looks very difficult. If it means making the river flow 'anyhow', then the idea of putting Vestimabole water into T.G. Halli will make it look like the Arkavati has been 'rejuvenated' but will it really solve any problem? We must also ask, 'rejuvenation for whom?' Do we want the river to be a 'boating place' or a scenic riverside 'for urban folks, or a source of water and cultural value for agricultural households?" he asks.

In a study published in January 2013, titled "Water management in Arkavati basin: A situation analysis", of which Lele was one of the authors, it was stated that the decline of the Arkavati's flow into T.G. Halli reservoir was directly caused by the expansion of eucalyptus cultivation and increased groundwater pumping in the



**Revival bid:** In June 2025, the Karnataka government announced a high level committee of experts to spearhead the rejuvenation of the Arkavati through a public-private partnership model.



**Polluted:** According to a BWSSB document, once the river crosses Doddaballapur town, Arkavati is in a 'highly stressed state due to pollution from rapid urbanisation and industrialisation'.

T.G. Halli catchment area. "It has been aggravated by the construction of an excessive number of check dams and other structures on the various streams that feed the Arkavati, which resulted in further reductions in surface flows, but did not augment baseflows as the groundwater withdrawal remained unregulated," explains Lele. The changes in cropping, such as the growth of eucalyptus and shift to groundwater-irrigated horticulture and vegetable farming, are the result of government incentives, as well as market pressures (rising demand from Bengaluru, and also the result of changing labour availability as labour migrated to Bengaluru), he says.

**Arkavati river**

- Originates at Nandi Hills in Chikballapur district
- Joins the Cauvery at Sangama in Bengaluru South (formerly Ramanaagara) district
- Length of the river: 170 km
- It traverses through four districts
- Chikballapur, Bengaluru Rural, Bengaluru Urban, and Bengaluru South
- It has three tributaries
- Kurnool, Srirangapatna, Krishnabhadra

Source: BWSSB

"While many of the changes are expected in an area close to a city, lack of a governance mechanism around groundwater and, in fact, around integrated management of water resources as a whole is the key missing policy piece." The benefits of groundwater over-exploitation have gone disproportionately to the rich farmers, as poorer farmers could not afford to dig borewells, or abandoned them after they failed, as groundwater levels dropped," he says, adding that the State agency in charge of T.G. Halli reservoir (the BWSSB) lost interest in the inflow decline problem, because it shifted to the Cauvery as the only source that they think will serve all of Bengaluru's water needs.

**Results of pollution testing**  
A more recent report, "Uncovering the hidden pollution in the Arkavati - Emerging contaminants impacting Bengaluru & beyond," summarises the results of pollution testing along the river, conducted by Paani Earth, in collaboration with the International Centre for Clean Water, IIT Madras, in February and March 2024. Paani tested samples for 45 inorganic water and 20 unique sediment pollution parameters and compared the testing results to national and international standards and guidelines for freshwater and sediment pollution.

The report states that every single test site exhibited pollution values above national and international standards and guidelines. "Even remote areas with no visible pollution had high levels of persistent pollutants, highlighting the river's vulnerability to long-range contamination. Across test sites, Paani observed notable spikes in pollution levels, frequently downstream of industrial areas or other zones with known pollution discharges. Additionally, the results demonstrated that high levels of pollutants from Urban Bengaluru enter the Arkavati via the Krishnabhadra and degrade water quality. Many

of the river sites had high phosphorus levels, causing eutrophication," states the report.

"Currently, our rivers are graded A to E based on just a handful of parameters like pH, dissolved oxygen, coliform bacteria, and a few others to decide if the water is 'fit' for drinking, bathing, irrigation, or industrial use. But these grades don't take into account many persistent and harmful chemicals that remain in the water and soil. As a result, water can still be carrying dangerous contaminants like hexavalent chromium and yet be reported as 'safe for irrigation' just because it meets these limited criteria," says Madhuri Mandava, who, along with Kishnu K. Birawat, both from Paani, accompanied *The Hindu* on the site visit to the Arkavati.

She adds that the instruments used are not sensitive enough to pick up dangerous chemicals in lower concentrations, which means harmful contamination can go completely unnoticed and unreported, while the same water continues to irrigate the food we eat.

### First things first

Lele says it is unlikely that the river will ever flow again "as it did in the past", and that this "past flowing river" itself is a myth.

"We must remember that even 200 years ago, there were probably 400 irrigation tanks blocking streams in the T.G. Halli catchment and that water was used to cultivate sugarcane or paddy. It is best to aim for sustainable and equitable water use in the T.G. Halli catchment and avert water pollution in the reservoir, because the Kurnool dam is still contributing inflow. Bengalurians really do not stand to benefit from its rejuvenation, unless the idea is to T.G. Halli dam to start supplying water again, which seems very unlikely," he says.

Birawat is more optimistic. "The first step to healing our rivers is to see what is really hurting them and identify the sources. The Central Pollution Control Board's 2017 guidelines for water quality monitoring laid out a robust framework to help understand pollution sources, trends, and the effectiveness of control measures. But on the ground, implementation by the Karnataka State Pollution Control Board falls short of this intent. Monitoring has been reduced to a simplistic grading exercise, with little evidence of meaningful classification of stations or comprehensive testing. As a result, the programme fails to guide corrective action or improve water quality, and risks, leaving the most critical pollution sources unaddressed," she says.

She also says no matter how much we clean the Arkavati, it will not make a real difference if the Krishnabhadra keeps pouring pollution into it.

A river, she points out, is just not water; it is a living ecosystem. "A river is so much more than just a line of water between two banks. It reflects everything around it — the forests, the lakes, the built-up areas, the storm-water drains, the floodplains, the fields, the hills, and the aquifers underground. It does feel too little and too late, when you see the pathetic state of the river, but better late than never. If we truly wish to rejuvenate the Arkavati, we must also protect its catchment. It feels deeply counter-intuitive when, on one hand, committees are set up to revive the river, yet on the other, the government proposes to dilute its buffer zones and weaken the T.G. Halli preservation notification," she adds.

# Key trends likely to reshape global reinsurance sector in 2025

## OPINION

Ramaswamy Narayanan

Even as the reinsurance sector was reeling from the impact of the higher tariffs announced by the U.S. on imports from 57 countries in early April, the flare-up of the Israel-Iran conflict and the devastating Air India plane crash have put additional pressures on the global reinsurance business. While the world's leading economy has since paused 'reciprocal tariffs' and continues to engage in talks with trading partners, economists have been warning of rising recession risks which could derail global demand forecast amid rising costs.

On account of the

heightened geopolitical uncertainties, global businesses are already witnessing order cancellations, piling inventory and heightened credit default risks; especially affected are those that rely on imported goods originating from conflict-ridden regions. As a result, insurers could see higher claim costs lines, compelling reinsurers to recalibrate underwriting and pricing strategies. Key near term reinsurance trends:

### Higher coverage

While the U.S. asserts its tariffs are intended to strengthen its domestic economy, many industries, including insurance, are expected to face significant inflationary pressures. The 25% duty on imported au-



Code red: While the world's leading economy has since paused 'reciprocal tariffs,' economists are warning of rising recession risks.

tomobiles and auto parts will not only drive up the prices of new cars and replacement parts, but also negatively impact automobile insurance rates, as insurers factor in the associated cost escalations.

Similarly, the 25% tariff on steel and aluminium imports will lead to higher construction costs, and ultimately lead to larger insurance payouts across home and commercial segments. What's more, with repair

costs rising on inflated material cost, insurers will also have to raise the coverage limits on existing policies. Also, insurers have to account for the increasing complexities and regulatory risks in public sector projects, forcing them to adjust underwriting policies across most insurance segments.

### Pricing strategies

As the cost of capital goods and services spirals upwards due to the tariff war, global reinsurers will have to adjust premium pricing models for the auto, property and casualty reinsurance segments, among others. Additionally, the fatal Air India plane crash compelled reinsurers to re-evaluate risks associated with wide-body aircraft

models like the Boeing 787-8 Dreamliner; this would harden aviation reinsurance market leading to stricter terms.

From an operational perspective, tariffs on reinsurance-related services will increase the running costs for global reinsurers, especially for services and contracts involving cross-border deals. Consequently, reinsurers will have to model different loss scenarios, identify potential market dislocations, and revise their premium pricing models on priority.

Even in the unlikely event that the U.S. settles for a flat 10% tariff policy for all its trading partners, reinsurers will have work cut out in the near term, as they factor in the impact of the disruptions on the glo-

bal reinsurance market.

### Stagflation concerns

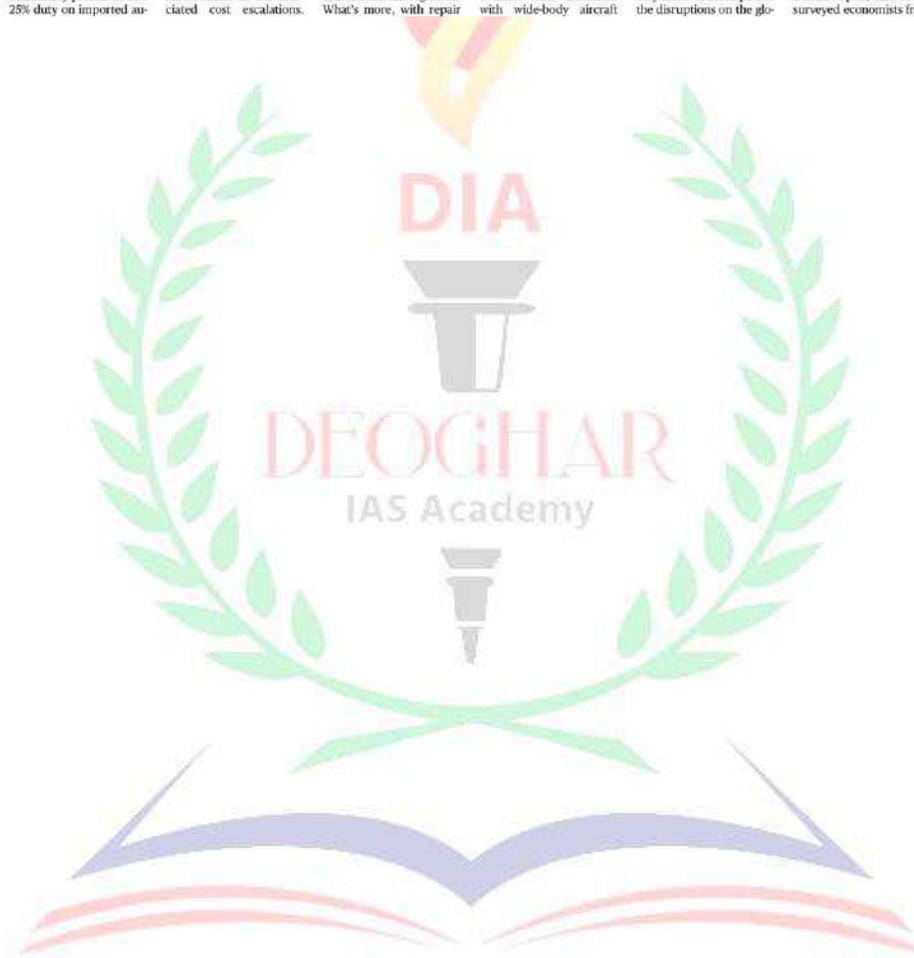
Within reinsurance, property reinsurance remains the largest and fastest growing segment, followed by casualty reinsurance covering liability insurance for individuals or corporations. In terms of regional market share, North America accounts for 34% of the global reinsurance business, while the Asia-Pacific region remains the fastest growing, with a 17% market share currently. While the global reinsurance market was poised to experience a compound annual growth rate of 8% between 2025 and 2032, the tariff war could derail some of this momentum. According to a Reuters poll, 92% of the surveyed economists from

50 different economies agree the tariffs will have a negative impact on business sentiment, with 75% alluding to a lower global growth forecast for 2025.

As a result, reinsurers may have to contend with shrinking economic activity in the most extreme scenario, thereby underscoring likelihood of reduced insurance demand and higher credit risks. This is especially true for price-sensitive reinsurance and markets like Latin America and the Asia-Pacific region.

Consequently, reinsurers will have to devise new cost-efficient solutions to tap the emerging markets and help them sustain the positive growth momentum from 2024.

(The writer is CMD, GIC Re)



# More volatility ahead, a mid-year prediction update

## OPINION

Shiv Shivakumar

I had predicted significant changes for the year ahead, in my January 25 opening note penned for *businessline's* Corporate File section. How did I do on my predictions?

\* I had said it would be an unpredictable year. The VIX index is at about 17-plus right now, signalling high volatility.

\* Trade wars via tariffs will replace physical wars. Tariffs are one of the most searched words this year. Tariffs are going up before going down, almost every country and every category is on the tariff list. If you are not on the list, you are irrelevant. Nothing is off the table. In the tariff wars,



**New world order:** In the tariff wars, a friend of an enemy is an enemy; rules and order have changed, convenience is in. REUTERS

a friend of an enemy is an enemy. Rules and order have changed, convenience is in.

\* Donald Trump, I said, would change things upside down, and he did. I predicted the U.S. GDP growth to be around 2%; now I think it will be closer to 1.4% – still significant,

adding \$420 billion on a \$30 trillion base. China will add about \$900 billion to its \$19 trillion GDP in 2025.

President Trump single-handedly changed the rules on everything, from meeting leaders live in the White House Oval Office, to calling out countries to fall in line. No other leader

in world history has wielded such power so swiftly. He has single-handedly made irrelevant institutions such as the WHO, WTO, and the UN.

Global competitiveness is now a combination of economic power, military strength, soft power, innovation strength, and digital readiness. Military spends, typically at \$3 trillion per annum, will grow by nearly 8% for the next few years. This will lead to a cut in welfare programmes and tax rise in many countries.

\* I predicted interest rates would go down; they have in the U.S., U.K., India and China.

\* I predicted the dollar will get stronger. I got this wrong. The dollar weakened by 11% against the six major currencies so far in 2025.

\* I predicted immigration to be a hot issue, and that's turning out to be so in the U.S., Bangladesh, India, and Europe. Immigration uncertainty will hit student enrollment at the top global universities.

\* Quick commerce was predicted to get stronger, and it has done. Expect Q-comm to get stronger in the second half.

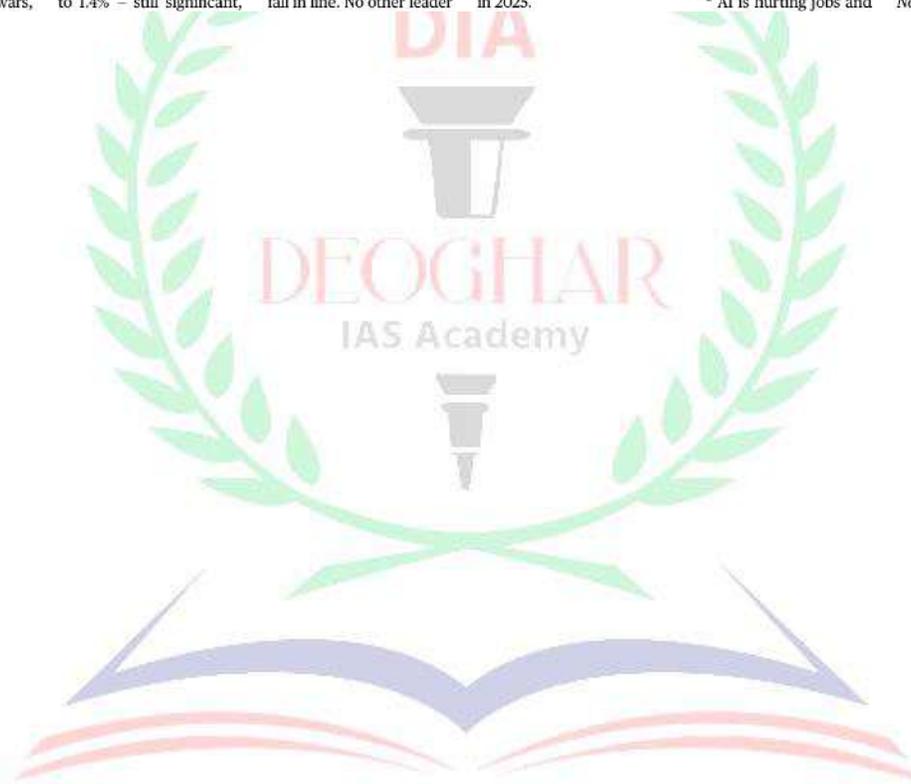
\* I predicted the Sensex to be at 85,000 by the year-end. It crossed 83,000 recently, before moving to 82,000-plus. If the U.S. trade deal happens and the EU issue over Russian oil purchase is resolved, then I still hold to 85,000. However, the one dampener here is job security. An unsure job environment will challenge people's participation in the stock market.

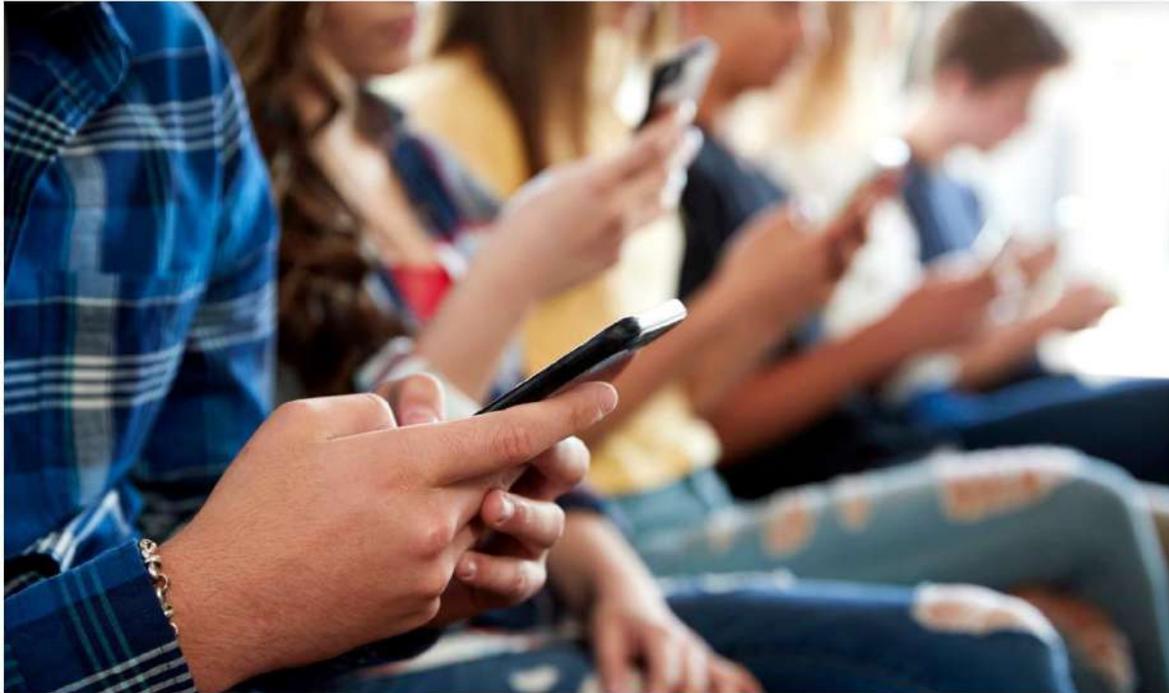
\* AI is hurting jobs and

will continue to do so. Going by the current trend, no one is too big or too senior to be untouched by the pink slip. A lot of technology companies and consultants are asking you to go up the value ladder at work. I don't understand this. Where will you go?

\* Job security will be at a premium, I predicted. Job losses in the tech industry alone are about one lakh so far, with more on the way. Individuals need to build their own skill base and not depend on companies to gift it to them. So, I got eight right on the list! Expect volatility in the next five months; fasten your seat belts.

(Shiv Shivakumar is operating partner, Advent International and former chief of Pepsico India and Nokia India)





Denmark, Greece, Spain, France, and Italy are some of the first countries that will work alongside the Commission with the aim of launching their own national age verification apps. GETTY IMAGES

## What is the European Commission's age check plan to keep children safe online?

European Commission is developing an age verification app under the Digital Services Act to prevent minors from accessing harmful online content while claiming to protect adult users' privacy; many critics argue that the move risks compromising privacy and fails to effectively safeguard children

[Sahana Venugopal](#)

### The story so far:

**T**he European Commission is working on an age verification app that is meant to stop children from accessing unsafe content online while protecting the privacy of adult internet users. Critics, however, claim this comes at the cost of user privacy.

### What is the European Commission age verification debate?

The European Union has, in the recent past, enacted multiple pieces of legislation to regulate the operations of large online platforms such as e-commerce giants, social media companies, and even pornography-hosting websites. In particular, the European Commission has highlighted some risks that children face when they are online, including platform designs that encourage digital addiction, cyberbullying, exposure to harmful content, and unwanted contact from strangers.

Digital advocates have previously recommended that the user interface of a large digital platform could be adjusted on the basis of the user's age, with children receiving private accounts and having their safety or well-being features turned on by default. When it comes to platforms such as porn sites, children ideally should not be able to access or even accidentally see explicit content. One way this could be done is through an app that verifies the user's age online, in

presented guidelines concerning the protection of minors on online platforms, along with a prototype of an age-verification app under the Digital Services Act (DSA). Development of the age verification blueprint began early this year and is built on the same technical specifications as the European Digital Identity Wallets (eID), which are slated to be rolled out before the end of 2026, according to the European Commission, with two services meant to be compatible.

Denmark, Greece, Spain, France, and Italy are some of the first countries that will work alongside the Commission with the aim of launching their own national age verification apps in the future, in their own languages.

"During the pilot phase, the age verification solution will be further enhanced with new features. Apart from eID, further updates will include additional options for users to prove they are over 18. The age verification will also be enhanced with the latest technical solutions (zero-knowledge proof) to ensure the highest level of privacy protection," said the European Commission in its post.

### How will age verification affect the privacy of adults?

While those in favour of creating a safer internet for children are in support of making age verification mandatory to access porn websites, critics of the move believe that it violates privacy rights and can put their security online at risk or make their browsing activities easier to

prototype app and said that it will enable age verification while preventing privacy violations. The regulator added that the technical specifications and the open-source age verification blueprint were freely available to view and use as well.

"It will, for example, allow users to easily prove they are over 18 when accessing restricted adult content online, while remaining in full control of any other personal information, such as a user's exact age or identity. No one would be able to track, see, or reconstruct what content individual users are consulting," stated the Commission.

Meanwhile, at the topmost levels of the French government, President Emmanuel Macron also supports age verification and even wants to ban social media for users who are under 15 years of age.

France is one of the countries that will first try out the age verification app prototype.

There are also ongoing discussions as to whether certain social media platforms that contain adult content, such as X, can be classified as porn platforms. This also has implications for the user experience of adult social media users across the European Union.

### Why are some porn companies against age verification?

While most companies agree that children using the internet should be protected from explicit content, cybersecurity threats, and social media addiction, they often disagree on the ideal way to go about this process.

level or not. In a company post on June 26, Aylo stressed the need for "device-based age verification." According to the company, age verification should have been carried out by Apple, Google, and/or Microsoft long before an underage user even arrives at an adult website such as Pornhub.

For close to two weeks in June, internet users in France who tried to access pornography platforms such as Pornhub, YouPorn, and RedTube encountered a largely black screen with a notice, or a historic painting with a call to action against the French government's move to implement mandatory age verification for adult platforms.

Aylo also warned that users unable to access Pornhub would go to smaller, less regulated sites potentially hosting illegal content. It unlocked its websites in late June after a Paris administrative tribunal's decision over the rule's unconfirmed compatibility with EU laws. But Aylo's next actions remain to be seen as the top administrative court affirmed this month that age verification was a must.

"Data breaches happen daily. Forcing you to enter sensitive personal information repeatedly creates an unacceptable security risk we refuse to impose on our users. We refuse to compromise your privacy with measures that, ironically, fail to effectively protect children," said Aylo in a statement on its website on July 15.

"To make the internet safer for everyone, every phone, tablet or computer should start as a kid-safe device. Only verified adults should be

# India can reframe the Artificial Intelligence debate

Less than three years ago, ChatGPT dragged artificial intelligence (AI) out of research laboratories and into living rooms, classrooms and parliaments. Leaders sensed the shock waves instantly. Despite an already crowded summit calendar, three global gatherings on AI followed in quick succession. When New Delhi hosts the AI Impact Summit in February 2026, it can do more than break attendance records. It can show that governments, not just corporations, can steer AI for the public good.

## India can bridge the divide

But the geopolitical climate is far from smooth. War continues in Ukraine. West Asia teeters between flareups. Trade walls are rising faster than regulators can respond. Even the Paris AI Summit (February 2025), meant to unify, ended in division. The United States and the United Kingdom rejected the final text. China welcomed it. The very forum meant to protect humanity's digital future faces the risk of splintering. India has the standing and the credibility to bridge these divides.

India's Ministry of Electronics and Information Technology began preparations in earnest. In June, it launched a nationwide consultation through the MyGov platform. Students, researchers, startups, and civil society groups submitted ideas.

The brief was simple: show how AI can advance inclusive growth, improve development, and protect the planet. These ideas will shape the agenda and the final declaration. This turned the consultation into capital and gave India a



**Syed Akbaruddin**

is a former Indian Permanent Representative to the United Nations and, currently, Dean, Kautilya School of Public Policy, Hyderabad

As the host of the AI Impact Summit next year, India can set the course — steering AI for the public good

democratic edge no previous host has enjoyed. Here are five suggestions rooted in India's digital experience. They are modest in cost but can be rich in credibility.

## Pledges and report cards

First, measure what matters. India's digital tools prove that technology can serve everyone. Aadhaar provides secure identity to more than a billion people. The Unified Payments Interface (UPI) moves money in seconds. The Summit in 2026 can borrow that spirit. Each delegation could announce one clear goal to achieve within 12 months. A company might cut its data centre electricity use. A university could offer a free AI course for rural girls. A government might translate essential health advice into local languages using AI. All pledges could be listed on a public website and tracked through a scoreboard a year later. Report cards are more interesting than press releases.

Second, bring the global South to the front row. Half of humanity was missing from the leaders' photo session at the first summit. That must not happen again. As a leader of the Global South, India must endeavour to have as wide a participation as possible.

India should also push for an AI for Billions Fund, seeded by development banks and Gulf investors, which could pay for cloud credits, fellowships and local language datasets. India could launch a multilingual model challenge for say 50 underserved languages and award prizes before the closing dinner. The message is simple: talent is everywhere, and not just in California or Beijing.

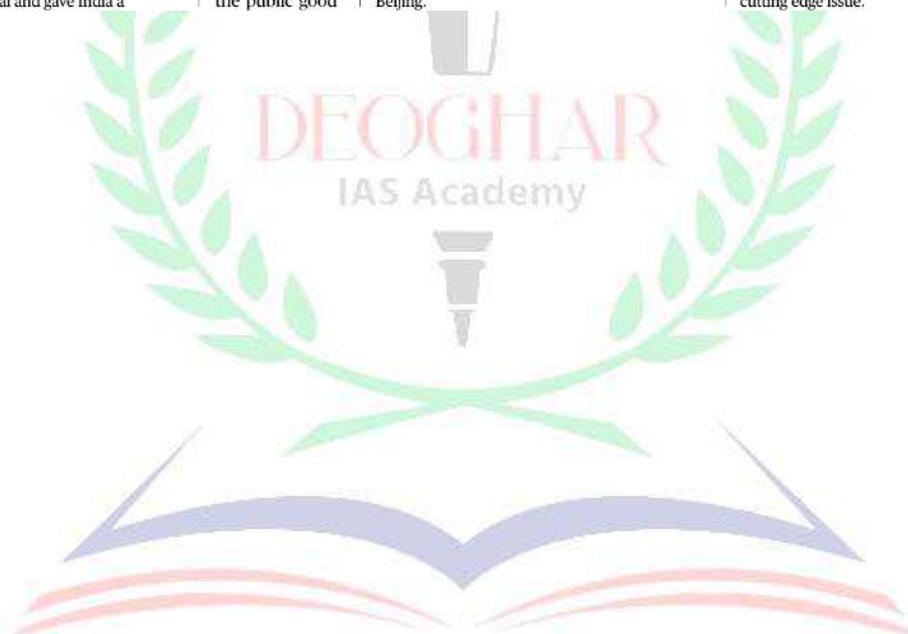
Third, create a common safety check. Since the Bletchley Summit in 2023 (or the AI Safety Summit 2023), experts have urged red teaming and stress tests. Many national AI safety institutes have sprung up. But no shared checklist exists. India could endeavour to broker them into a Global AI Safety Collaborative which can share red team scripts, incident logs and stress tests on any model above an agreed compute line. Our own institute can post an open evaluation kit with code and datasets for bias robustness.

Fourth, offer a usable middle road on rules. The United States fears heavy regulation. Europe rolls out its AI Act. China trusts state control. Most nations want something in between. India can voice that balance. It can draft a voluntary frontier AI code of conduct. Base it on the Seoul pledge but add teeth. Publish external red team results within 90 days. Disclose compute once it crosses a line. Provide an accident hotline. Voluntary yet specific.

Fifth, avoid fragmentation. Splintered summits serve no one. The U.S. and China eye each other across the frontier AI race. New Delhi cannot erase that tension but can blunt it. The summit agenda must be broad, inclusive, and focused on global good.

## The path for India

India cannot craft a global AI authority in one week and should not try. It can stitch together what exists and make a serious push to share AI capacity with the global majority. If India can turn participation into progress, it will not just be hosting a summit. It will reframe its identity on a cutting edge issue.



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## WHAT IS IT?

# Moon Day: remembering the leap

**The Hindu Bureau**



International Moon Day is celebrated every year on July 20 to commemorate humankind's first landing on the moon by the Apollo 11

mission in 1969. The UN General Assembly formally recognised this date in 2021, following a proposal recommended by the Committee on the Peaceful Uses of Outer Space (COPUOS). The commemoration also aims to highlight the collective progress of all nations in exploring the moon.

On the day, activities like public events, sky-gazing, educational outreach, and science competitions are organised worldwide to inspire curiosity and foster interest in space science, especially among the youth. According to the UN, International Moon Day also serves to promote sustainable practices in space, international cooperation, peaceful exploration, and the responsible use of lunar resources.

There have been minor criticisms related to the chosen date. Some commentators have noted that while the Apollo 11 lunar module landed on July 20, Armstrong's first step technically occurred at 2:56 UTC on July 21. This ambiguity has occasionally prompted debate over whether July 21 is more accurate to commemorate. There is also



An aircraft passes in front of the moon; the red glow is attributable to smoke particles from North American wildfires, a day ahead of the full supermoon on August 18, 2024. REUTERS

occasional commentary questioning whether the date, rooted in an American achievement, fully encompasses the international spirit intended by the UN, more so since other nations have contributed significantly to lunar exploration.

Despite these discussions, July 20 remains globally recognised for now as the date humankind first leapt beyond the earth.



**For feedback and suggestions**

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# Mental fatigue can trick the brain into taking the easy way out

Even sedentary work can feel exhausting when sustained for hours together. This exhaustion is called cognitive fatigue and builds up with continuous effort to maintain focus on daily tasks. While cognitive fatigue affects our performance and focus, a new study has found that it also influences decision-making by making one prefer easier tasks

Sheetal Potdar

**A**fter a long day at work, it's easier to flop on the couch than hit the gym. Scrolling over social media wins over reading a book. Our exhausted brains favour easier tasks, even if – according to a new study in the *Journal of Neuroscience* – those tasks offer fewer benefits.

Even sedentary work can feel exhausting when sustained for hours together. This exhaustion is called cognitive fatigue and builds up with continuous effort to maintain focus on daily tasks. While cognitive fatigue affects our performance and focus, the new study has found that it also influences decision-making by making one prefer easier tasks.

"Everybody has different capacities for work," Vikram Chib of the Johns Hopkins School of Medicine and the lead author of the study said. "We all have a subjective sense of effort – what you may find easy, I might find difficult." The study also provides a neurobiological model to explore how fatigue can influence everyday decisions.

## 'Really cool'

But first, how does sustained effort build up to cognitive fatigue, and how does it affect decisions about exerting further effort?

To answer these questions, researchers recruited healthy volunteers to repeatedly perform a working memory task. These individuals focused on a screen flashing different letters one by one. In the easy version of the task, they had to recall if the current letter matched the preceding one. As the task got harder, volunteers had to recall if the current letter matched with those displayed anywhere between two to six letters prior. After performing the harder tasks many times in a row, participants reported feeling fatigued.

Next, the participants were offered two choices: easy version of the task for less money or difficult version of the task for more money. Fatigued participants chose the easy option even if it meant earning less money, whereas they opted for harder tasks for more money when they were rested.

"It was really cool to see something we expected but was never quantified before, that fatigue actually influenced the participants' choices," Dr. Chib said.

While the participants made their choices, the researchers tracked their brain activity using functional magnetic resonance imaging (fMRI). This noninvasive technique allows scientists to pinpoint brain regions that are active during a task. As participants performed the working memory task and reported



Mental fatigue can directly change the value of some effort, making the task seem more demanding than if a person was rested. TONY TRAM/UISPLASH

feeling fatigued, fMRI revealed the dorsolateral prefrontal cortex (dlPFC), located just behind the forehead, was activated, in line with its understood role.

fMRI scans also revealed the right anterior insula was active when the participants made their choices. This region judges whether the effort required for a task is worth the reward. In previous studies from Dr. Chib's group, the insula had been found to estimate the effort of performing a physical task while physically fatigued.

## Pushing harder

In this study, the role of the insula was extended to evaluating cognitive effort. "This is our current working model of where effort is evaluated in the brain. The insula receives input of fatigue resulting from working memory tasks from the dlPFC and of fatigue resulting from physical tasks from the motor cortex, and it guides decisions about future effort based on the level of fatigue," Dr. Chib explained.

"A big strength of this study is that it finds connectivity linking exertion to choice," Antonius Wiehler, a researcher studying motivation and cognitive fatigue at the Paris Brain Institute, said. Indeed, Dr. Chib and his team found that signals from the dlPFC representing fatigue influenced the neural activity of the insula. This meant fatigue directly changed the value of effort, making the task seem more demanding than when a



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ANTONIUS WIEHLER  
Paris Brain Institute

person was rested.

The researchers also reported a peculiar observation: while participants reported feeling fatigued as they performed the hard tasks repeatedly, their performance didn't dip. The researchers interpreted this to mean that as people performed harder tasks, the fatigue made them pick easier tasks rather than compromise their performance.

Dr. Wiehler, who wasn't part of the study, agreed: "When the stakes are high and the benefits are clear, such as in this study, people can still use cognitive resources despite needing elevated effort. However, when benefits are uncertain or subjective, like in market decisions, the increased cost leads to behavioural changes."

We have all experienced this in our daily lives: when a deadline looms, we push ourselves harder to finish a task at hand despite needing more effort.

The study also opens new questions. Dr. Wiehler, who induces cognitive fatigue on much longer time scales (up to six hours) in his research, wondered, "How are short-term and long-term fatigue

effects related? How are cognitive capacities restored after a night of sleep?"

Can cognitive fatigue influence effort-based choices for any task? "We have a new study coming up where we report that cognitive fatigue, as induced here with the working memory tasks, makes participants choose even a physical task requiring less effort," Dr. Chib said. In other words, there may be a neurobiological reason to avoid the gym when one is mentally exhausted.

## Time for a break

Cognitive fatigue is a common symptom of many neurological and psychiatric conditions. Patients who have suffered stroke and those suffering from multiple sclerosis, chronic fatigue syndrome, depression, anxiety, and schizophrenia have reported mental fatigue. Yet the way fatigue manifests in these conditions is poorly defined. The new study is a step towards developing ways to manage fatigue by understanding how it affects effort and decision-making in the brain.

How can we avoid fatigue skewing our daily decisions? Dr. Chib advised being "mindful about taking breaks. While we haven't directly tested it, reframing tasks can also help." The next time you catch yourself making a poor but easy choice while mentally tired, you know it's time for a break.

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## THE GIST

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