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Gukesh-Ding match-up is more of a psychological duel

Gukesh and Ding. FIDE

The World championship in Singapore has suddenly taken on the flavour of a psychological duel instead of a purely chess match. In the last few games, we have started to see a very clear trend where Gukesh is trying to provoke his opponent into a battle, is ready to decline draws and take risks. Ding, on the other hand, seems to be pessimistic about his position and often goes for the safest line on the first opportunity, in the hope that Gukesh might overreach.

In Game 6, Ding Liren chose the London System which he had used to great effect in the last World title match against Ian Nepomniachtchi. Gukesh's preparation was excellent until move 16. On the next move, he had a couple of easy ways to make a draw, but chose a slightly inaccurate one that allowed Ding to get the unbalanced position he was presumably seeking.

On the 23rd move, Ding thought for a while, then gave up on his winning attempts, and essentially offered a draw by repetition. Even more surprisingly, given that the position slightly favoured Ding, Gukesh turned down the draw and kept playing. He defended accurately, but seemed to be taking extra risks. They agreed to a draw a few moves later.

In Game 5, Gukesh surprised Ding in the opening, by playing a peaceful variation. This year, the line has been somewhat popular though as people have discovered that it contained some venom. Ding was excellently prepared and equalised very easily.

On the 23rd move, Gukesh made a serious mistake, by not exchanging rooks. Ding went for perhaps the smallest of the three advantages. He could have put the knight on 'a4' or activated his rook first, which would have led to a significant advantage.

He made Gukesh's moves easier to find and then shockingly, took his bishop to the wrong square, captured a pawn and then returned it. The audience was astonished by this. In a game where Gukesh would have had to defend precisely for a long time, he managed to draw within a few moves thanks to Ding's inaccuracy.

Game 4 was a fairly uneventful draw. Ding's opening preparation was not lacking in venom, but he did not follow up with the effort required for the precise play. So with a few natural moves, Gukesh solved all his problems.

It is nice to have the rest day at this point because both sides will need to rework their strategies given that neither seems to be getting his desired positions.

Gukesh still hasn't found any chinks in Ding's armour, while the defending champion hasn't been able to take the chances that have come his way in the last few games.

Global push for cooperation as space traffic crowds Earth orbit

More than 14,000 satellites including some 3,500 inactive surround the globe in low Earth orbit alongside 120 million pieces of debris from launches; yet there is no centralised system that all space-faring nations can leverage and even persuading them to use such a system has many obstacles

NEWS ANALYSIS

Reuters
BENGALURU

The rapid increase in satellites and space junk will make low Earth orbit unusable unless companies and countries cooperate and share the data needed to manage that most accessible region of space, experts and industry insiders said.

A United Nations panel on space traffic coordination in late October determined that urgent action was necessary and called for a comprehensive shared database of orbital objects as well as an international framework to track and manage them.

More than 14,000 satellites including some 3,500 inactive surround the globe in low Earth orbit, showed data from U.S.-based Slingshot Aerospace. Alongside those are about 120 million pieces of debris from launches, collisions and wear-and-tear of which only a few thousand are large enough to track.

"There's no time to lose on space traffic coordination. With so many objects being launched into space, we have to do everything we can to ensure space safety, and that means facilitating the sharing of information between operators, be they public or private, in order to avoid collisions," said panel co-chair Aarti Holla-Maini, director of the United Nations Office for Outer Space Affairs.

Setting rules: A global effort is essential to develop enforceable rules akin to air traffic rules. REUTERS

Low Earth orbit must remain safe to prevent costly disruption to the technology behind global communication, navigation and scientific exploration, she further said.

Yet there is no centralised system that all space-faring nations can leverage and even persuading them to use such a system has many obstacles. Whereas some countries are willing to share data, others fear compromising security, particularly as satellites are often dual-use and include defence purposes. Moreover, enterprises are keen to guard commercial secrets.

> With so many objects being launched into space, we have to do everything we can to ensure space safety
>
> **AARTI HOLLA-MAINI**
> Director, United Nations Office for Outer Space Affairs

In the meantime, the mess multiplies. A Chinese rocket stage exploded in August, adding thousands of fragments of debris to low Earth orbit. In June, a defunct Russian satellite exploded, scattering thousands of shards which forced astronauts on the International Space Station to take shelter for an hour.

Low Earth orbit is the region most congested with human-made objects as it offers a balance between cost and proximity, making it a prime target for the rapidly growing commercial space sector. It has also seen a 17% rise in close approaches per satellite over the past year, Slingshot data showed.

Risky business

Projections point to tens of thousands more satellites entering orbit in the coming years. The potential financial risk of collisions is likely to be $556 million over five years, based on a modelled scenario with a 3.13% annual collision probability and $111 million in yearly damages, said Montreal-based NorthStar Earth & Space.

Low Earth orbit is densely packed, with bands such as the one for satellite internet service Starlink from commercial space company SpaceX–at an altitude of 540-570 km (336-354 miles). As of Nov. 27, Starlink had 6,764 satellites in orbit, Jonathan's Space Report showed.

SpaceX data showed Starlink satellites performed nearly 50,000 collision-avoidance manoeuvres in the first half of 2024, about double the previous six months.

The European Space Agency, which has fewer spacecraft than SpaceX, said in 2021 its manoeuvres have increased to three or four times per craft versus a historical average of one.

Expired satellites add to the clutter as they stay in orbit until they fall into–and burn up in–Earth's atmosphere years later or are flown to a "graveyard orbit" some 36,000 kilometres away.

Russia drew global criticism in November 2021 when it test fired a missile at a defunct satellite in orbit, creating thousands of fragments of debris. Russia invaded Ukraine three months after the test.

"The potential for conflicts between states has been on a steep rise in the recent past. If these extend to space it could complicate the outer space environment. We urgently need common global rules for coordination," said Anirudh Sharma, CEO of Bengaluru-based Digantara, which specialises in space situational awareness.

Global cooperation is essential to developing enforceable rules akin to those used by the International Civil Aviation Organization for air traffic, industry experts told Reuters.

Such effort would involve the use of existing tools, such as databases, telescopes, radars and other sensors to track objects while improving coverage, early detection and data precision.

Yet geopolitical tension and reluctance to share data with nations deemed unfriendly as well as commercial concerns over protecting proprietary information and competitive advantages remain significant barriers.

That leaves operators of orbital equipment relying on informal or semi-formal methods of avoiding collisions, such as drawing on data from the U.S. Space Force or groups like the Space Data Association. However, this can involve issues such as accountability and inconsistent data standards.

"The top challenges are speed–as consensus-building takes time–and trust," Ms. Holla-Maini said. "Some countries simply can't communicate with others, but the U.N. can facilitate this process."

Panel preparing new base year for national accounts: Minister

Press Trust of India
NEW DELHI

A panel comprising representatives of the Reserve Bank, Centre and State governments as well as academia has been set up to revise the base year of national accounts or GDP from 2011-12 to 2022-23, Parliament was informed.

The government has decided to update the base year for compilation of Gross Domestic Product (GDP) from 2011-12 to 2022-23, said the Minister of State for Statistics & Programme Implementation Rao Indjerjit Singh in a reply to Rajya Sabha.

He informed the House that the Advisory Committee on National Accounts Statistics (ACNAS) has been constituted for identification of new data sources and to advise on the methodology for compilation of National Accounts Statistics in the revised series.

He said steps such as the constitution of ACNAS and standardisation of data structure to boost harmonised quality reporting across the National Statistical System are meant to improve statistical system.

ISTOCKPHOTO

Proudhon's theory of mutualism: a critique of capitalism and authoritarianism

Mutualism is seen as a form of libertarian socialism, balancing individual freedom with collective well-being. It offers a radical alternative to both capitalism and state socialism, promoting voluntary cooperation and mutual respect

Rebecca Rose Varghese

Mutualism is an economic and social theory that emphasises voluntary cooperation, reciprocity, and the fair exchange of goods and services. It advocates for a society where individuals and communities engage in cooperative ownership, decentralising and collectively managing productive resources like land or tools for the benefit of all. Such systems would be free from central authority and capitalist exploitation.

While property itself is not inherently exploitative in this theory, ownership of tools or land is acceptable, provided it does not lead to exploitation of others.

Unlike capitalism, which profits from labour exploitation, mutualism envisions a system where individuals and communities own resources for personal and collective benefit. It also promotes the idea of workers controlling the means of production through cooperatives or other voluntary associations, ensuring that production is driven by need, not profit. This model seeks to eliminate hierarchical power structures and promote equality and fairness in economic relations.

Origins of the theory

The term "mutualism" was coined by French philosopher Pierre-Joseph Proudhon in the mid-19th century as part of his broader critique of capitalism and authoritarianism. While Proudhon is often remembered for his declaration, "Property is theft!" in his seminal work *What is Property?* (1840), his philosophy was more complex. Mutualism was not a call for the outright abolition of property but for its reimagining into a system that serves collective well-being and fairness.

Proudhon was influenced by a secret society of weavers, known as the 'Mutualists', who he encountered during his time in Lyon in 1843. These workers advocated for worker-led cooperative production, envisioning a society where factories and resources could be run by associations of workers. They believed in transforming society through peaceful economic action rather than violent revolution, challenging the centralised political traditions of Jacobinism. Deeply inspired by their ideas, Proudhon adopted the term "mutualism" as a tribute to these working-class visionaries. His adaptation of their ideals sought to build a decentralised society where cooperation and reciprocity replaced exploitation and domination.

Mutualism and property

Proudhon's approach to property is central to mutualist philosophy. While he condemned capitalist property for enabling exploitation and monopolisation, he did not call for the complete elimination of ownership. Instead, he distinguished between "property," which allowed control over others, and "possession," where individuals could use resources for personal benefit without infringing on others' freedoms. This distinction is crucial to understanding mutualism, as it emphasises a form of ownership based on usage rather than accumulation and profit.

Mutualism rejected property rights imposed by the state that perpetuated inequality and exploitation. It advocated for a decentralised system of voluntary and equitable exchanges rooted in reciprocity. Mechanisms like worker cooperatives and shared resources were central to aligning ownership with fairness and collective well-being. By balancing individual freedom with collective solidarity, Proudhon's theory sought to challenge the entrenched hierarchies of both capitalism and the state.

Mutualism and anarchism

Rejecting state-enforced property rights, mutualism also connects closely with anarchism, particularly in the debate between individualist and social anarchism. Individual anarchists emphasise personal autonomy and freedom, focusing on the liberation of the individual from state control, while social anarchists advocate for the collective management of resources and the organisation of society to promote equality and fairness. Proudhon's work occupies a unique space between these two schools of thought.

While some early anarchists saw mutualism as a form of individualist anarchism, emphasising personal freedom and the right to possess one's tools and land, others interpreted it as a more socialist form of anarchism, in which mutual cooperation and the collective management of resources were key. The tension between these interpretations arose from Proudhon's view that the state, by its very nature, was coercive and counterproductive to the freedom of the individual. However, Proudhon was not opposed to all forms of collective organisation. He argued that a mutualist society could be organised without a state, based on cooperative principles where people freely enter into contracts and mutual exchanges, thus blending both individual freedom and collective responsibility.

The collective and the individual

The emphasis on cooperative associations, mutual credit systems, and workers' control over production demonstrates the connection between mutualism and the collective. These ideas aim to foster economic and social environments based on mutual aid and cooperation, rather than competition and exploitation. Mutualism is also inherently tied to the human need for cooperation. By organising society and the economy on the basis of shared interests and reciprocity, mutualism seeks to build a society where individuals are free to pursue their own interests while maintaining a sense of community and mutual respect.

In *General Labour History of Africa: Workers, Employers and Governments, 20th-21st Centuries*, Stefano Bellucci and Andreas Eckert discuss how traditional African societies embodied mutualistic principles. In these communities, communal land ownership and collective labour were the norms, with resources shared and production aimed at the collective good. This reflects mutualism's focus on reciprocity and equitable distribution. The chapter on African mutualism contrasts it with neoliberalism, noting that mutualism promotes shared ownership, fair compensation, and cooperation, while neoliberalism fosters inequality. It also explores the role of governments in either supporting or hindering mutualistic practices across the continent.

Mutualism was also seen as a form of libertarian socialism, balancing individual freedom with collective well-being. It offered a radical alternative to both capitalism and state socialism, promoting voluntary cooperation and mutual respect without centralised power or hierarchy.

Critiques of the theory

While mutualism holds significant revolutionary potential, it has faced critiques on several fronts. One major critique is that its reliance on small-scale property ownership may not sufficiently challenge the capitalist system's broader structural inequalities. Critics argue that mutualism fails to address the concentration of wealth and power that is intrinsic to modern capitalist economies. Furthermore, some question the feasibility of creating an egalitarian society based on voluntary cooperation, suggesting that it may be too idealistic or difficult to implement on a large scale.

Marxist critics contend that mutualism does not sufficiently address the core issues of capitalism, such as exploitation and inequality, and fails to dismantle capitalist relations of production. They argue that Proudhon's defence of small property owners and opposition to collectivism overlooks the realities of class struggle, where small producers are squeezed out by larger corporations.

Despite these criticisms, mutualism remains a radical theory that offers an alternative to both capitalist exploitation and authoritarianism. While it may not have fully resolved the challenges of inequality and exploitation, it continues to be a significant concept in the history of anarchist and socialist thought.

The writer is a freelance journalist.

India's 'One Nation, One Subscription' plan

Is the global research ecosystem increasingly embracing open access publishing away from subscription-based models? What is an article processing charge? Do researchers own the copyrights of their work after it has been published in a journal? What are open access repositories?

EXPLAINER

Moumita Koley

The story so far:

The Union Cabinet approved the Indian government's 'One Nation, One Subscription' (ONOS) scheme on November 25. The ONOS promises to provide equitable access to scholarly journals in all public institutions.

What does the ONOS entail?

First mooted around 2018-2019, the scheme's ambitious rollout comes with a substantial financial outlay of ₹6,000 crore over three years (2025-2027), to be paid to 30 major international journal publishers. For perspective, the Indian public and its academic institutions collectively spend around ₹1,500 crore every year on journal subscriptions. This is a rough estimate and probably includes the cost of subscription to databases as well; if so, the current total public expense to access journals will be well lower than ₹2,000 crore per year.

At the outset, ONOS's promise to offer equitable access to research articles, irrespective of an institution's prestige or financial capacity, which seems like a step towards democratising knowledge. But a closer examination reveals complexities that call for deeper analysis.

Is ONOS swimming against the tide?

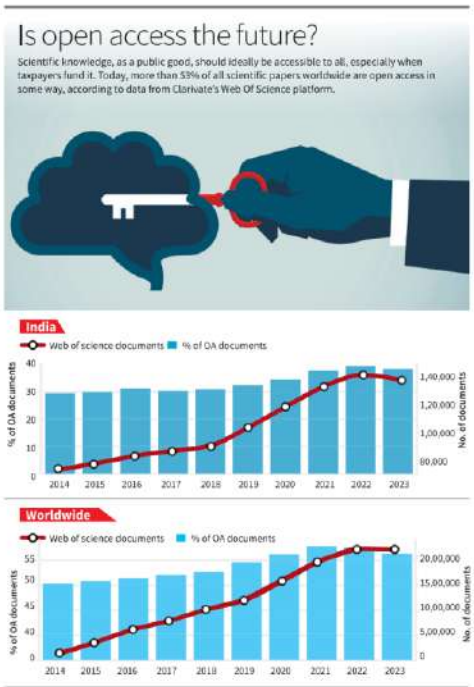
The central question is: why is India investing heavily in a subscription-based model at a time when the global research ecosystem is increasingly embracing Open-Access (OA) publishing?

In the subscription model, a journal receives manuscripts from scientists (about their studies, etc.), evaluates them through peer review, and accepts (or rejects) them. Once a paper is accepted, the journal publishes it and makes money by charging people and institutions to access it. OA refers to papers that are published to be freely accessible. There are different kinds of OA. A common type is called gold OA, where the journal makes money by charging authors an article processing charge (APC) to publish papers in the journal. The APC for a single paper has been known to be thousands of dollars. For example, *Nature Communications* charges $6,790 per paper. Scientific knowledge, as a public good, should ideally be accessible to all, especially when taxpayers fund it. The COVID-19 pandemic showed why it is important to have immediate and unrestricted access to research, not just for scientists but also for the people at large: to combat misinformation and drive informed decision-making.

Today, more than 53% of all scientific papers worldwide are open access in some way, according to data from Clarivate's Web Of Science platform. This is a significant increase since 2018-2019, when ONOS was first conceptualised, and raises questions about ONOS's financial prudence. If more than half of the research articles are freely accessible, should India not be paying significantly less for subscriptions than before? ONOS risks draining taxpayer money to achieve an obsolete good.

Some international developments further complicate the picture. The U.S. Office of Science and Technology Policy has mandated that from 2026, all publicly funded research articles must be freely accessible without any delay. Similarly, Horizon Europe, the European Union's flagship funding program, requires peer-reviewed publications resulting from its funding be made freely available online. Considering these moves, in another year a significant fraction of research produced worldwide is likely to be freely accessible to everyone.

This timeline raises questions about ONOS's relevance beyond 2025.



Source: Web of Science* The data only covers science, technology, engineering, and mathematics papers.

What are the challenges of commercial publishing?

The global scholarly publishing system is dominated by a handful of commercial publishers based in Western countries, and they have long been criticised for excessive subscription fees, inefficiencies resulting in delays in publishing articles, and resistance to innovation.

The scholarly publishing industry is built on publicly funded research. Researchers generate new knowledge, write their findings, and perform peer reviews – all without direct compensation from publishers. In the subscription model, these publishers charge exorbitant fees for access, creating a situation where public institutions must pay to access work they have already supported. Publisher profit margins often exceed 30%, revealing the exploitation implicit to scholarly publishing systems.

Even the shift towards OA has been dominated by gold OA and its high APCs. Many prominent journals in a few disciplines, such as biological science, have transitioned to become fully OA. Indian researchers wishing to publish in these journals will have to pay APCs since the allocation for ONOS doesn't provide for this fee. Moreover, most subscription journals are now hybrid, so researchers – especially from the U.S. and the EU – are paying APCs to publish their articles to be OA in these journals.

India, with its immense pool of talent and resources, has the potential to reimagine this publishing ecosystem, fostering innovation in the workflow. Especially when most of the backend work in the publishing industry is outsourced to India, the infrastructure and knowhow definitely exist in the national ecosystem. But ONOS risks entrenching the status quo by reinforcing reliance on Western publishers.

What about copyright transfers?

Another significant issue with the subscription model is the need for researchers to surrender their copyrights to publishers. This allows publishers to use their work without considering the authors' rights or consent. A recent controversy involving *Taylor & Francis* (T&F) and Microsoft exemplifies the extent of this problem. In early 2024, *T&F* had signed a deal allowing Microsoft to use its journal content to train artificial intelligence (AI) models. Since authors don't hold the copyright of their work, there is no need for permission from authors – yet they objected because the use of their work to train AI models was going unpaid. There is an urgent need for policies that protect researchers' intellectual property.

There are ways to address copyright violation concerns. Harvard University pioneered a policy in 2008 that granted the university a non-exclusive, irrevocable right to disseminate the work of university researchers. Researchers retained the right to self-archive their work in OA repositories. Many institutes like the Massachusetts Institute of Technology and the University of Oxford followed suit. ONOS has the opportunity to emulate these models by incorporating a nationwide 'rights retention' policy, enabling Indian researchers to deposit their work in institutional repositories immediately after publication – a practice known as green open access.

India's own 2014 Open Access Policy requires researchers funded by the Departments of Biotechnology and of Science & Technology to make their work openly accessible – but its implementation has been lacklustre. The ONOS could have been the ideal platform to enforce this mandate, ensuring Indian research becomes globally accessible through open repositories immediately after publication.

Is digital content preserved?

Another issue is the long-term preservation of research articles, now that almost all major journals are published online. A recent study in the *Journal of Librarianship and Scholarly Communication* reported that 28% of articles with Data Object Identifiers (DOIs) – unique IDs to identify published papers – aren't preserved, exposing gaps in current practices. The discontinuation of *Heterocycles*, a journal published by the Japan Institute of Heterocyclic Chemistry, in 2023 left around 17,000 articles inaccessible, highlighting the risks of relying solely on publishers to preserve scientific knowledge. In this case access was eventually restored, but the delay illustrates the need for solutions like self-archiving through green OA.

Is self-reliance possible in publishing?

In an era where self-reliance is a national priority, it has been overlooked in scholarly publishing. While Indian researchers may continue publishing in journals like *Nature*, *Science*, *Cell*, etc., significant potential exists to elevate Indian journals to world-class standards.

India has the resources and expertise to build a robust indigenous publishing ecosystem. Preprinting and data sharing should also be considered as an integral part of the publishing workflow (preprinting refers to a paper being published online before it has been peer-reviewed). By investing in infrastructure, editorial processes, and global visibility for Indian journals, the country can reduce its dependence on Western publishers and attract high-quality submissions from across the world. This is not just about the money being drained from our ecosystem: it's also about establishing India as a leader in science and innovation.

What could ONOS have done?

ONOS can be lauded for its ambition to democratise research access, but it should have addressed deeper structural issues plaguing scholarly publishing. There should have been parallel efforts to allow authors to retain copyright, implement OA through institutional repositories, and, importantly, improve self-reliance in scholarly publishing.

Given the allocation ONOS has received from the Indian government, it certainly had the potential to set a precedent for equitable and innovative publishing by addressing all the issues in parallel – yet it chose to overlook them. Without addressing these challenges, ONOS risks becoming a costly short-term fix. It is time to re-evaluate whether this initiative is a step forward or an expensive detour.

Moumita Koley is a senior research analyst at Indian Institute of Science, Bengaluru.

THE GIST

- In the subscription model, a journal receives manuscripts from scientists (about their studies, etc.), evaluates them through peer review, and accepts (or rejects) them. Once a paper is accepted, the journal publishes it and makes money by charging people and institutions to access it.
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- ONOS can be lauded for its ambition to democratise research access, but it should have addressed deeper structural issues plaguing scholarly publishing. There should have been parallel efforts to allow authors to retain copyright, implemented OA through institutional repositories, and, most importantly, improved self-reliance in scholarly publishing.

Breaking barriers with the help of tech

ICMR has been unlocking opportunities through assistive technology innovations

Rajiv Bahl

On this International Day of Persons with Disabilities, we celebrate the strength, determination, and boundless potential of individuals who constantly push the boundaries of what is possible. It is a moment to reflect on our collective responsibility to build a world where everyone can thrive, regardless of their ability.

This year, India's Paralympians made history at the 2024 Summer Paralympic Games by bringing home 29 medals. Sheetal Devi with her impeccable precision in archery, Sumit Antil with his extraordinary javelin throws, Sharad Kumar with his triumphs in high jump, and many others exemplified excellence and resilience.

While the medals are a result of their determination and talent, we must also acknowledge the role that assistive technology (AT) plays in enabling such success. From advanced prosthetics to precision tools, AT provides the support that athletes need to push past boundaries. The journeys of these sportspersons symbolise the powerful synergy between human resilience and technological advancement.

AT is not just a game-changer in sports, it also empowers individuals to shine in education, employment, and other walks of life. However, the World Health Organization reports that globally, 90% of persons with disabilities lack access to AT. While India has done tremendous work to close the gap, there is an increasing need for such technology given the rising incidence of non-communicable diseases and injuries. Universal access to such technology must become a cornerstone of

healthcare systems if we want true inclusivity.

The Indian Council of Medical Research (ICMR) has been unlocking new opportunities for millions through AT innovations. Recently recognised by the United Nations for its pioneering work, the ICMR has developed life-changing devices such as SmartCane, a mobility aid for the visually impaired, and TacRead, an affordable digital text reader. Created in collaboration with IIT Delhi, these empower individuals to live with greater independence and dignity.

For an inclusive future

To bridge the gap between innovation and accessibility, ICMR has launched the National List of Essential Assistive Products, standardising and improving access to AT across India. Complemented by awareness efforts such as the public launch of assistive devices at IIT Delhi's National Centre for Assistive Health Technologies, these initiatives foster empowerment and dignity for persons with disabilities.

The journey from idea to implementation is often challenging, with many promising innovations struggling to secure funding. I once met a dedicated group of educators who had developed an interactive learning app for students with learning disabilities. Despite their passion and vision, they faced significant challenges in securing the funding to bring their idea to life. Fortunately, programmes such as the BIRAC-Social Alpha Quest for Assistive Technologies and the Attvaran India accelerator play a vital role by supporting startups focused on AT solutions. These initiatives not only provide funding but also offer mentorship to help refine and bring innovative ideas to the market. They ensure that financial constraints do not stand in the way of progress.

The possibilities for AT are immense. New frontiers such as Artificial Intelligence and other emerging technologies offer opportunities to create smarter, more adaptive solutions that cater to diverse needs. Moving beyond a one-size-fits-all approach, India is investing in customised, user-centric designs that empower individuals and communities alike. As we stride towards our vision of Viksit Bharat 2047, inclusivity and empowerment must guide our development agenda. Integrating rehabilitation into our health systems will not only enhance support for individuals with disabilities but also transform how they are perceived and valued.

The medals won by India's Paralympians show how athletic excellence can be assisted by the transformative power of science. The remind us of the science behind the medals and of the possibilities it offers. They inspire us to build a future where every person has the tools to achieve their dreams.

Rajiv Bahl is Secretary, Department of Health Research, Government of India, and Director General, Indian Council of Medical Research

Enabling a level playing field

Sanskriti Bhatia

Former Consultant at Young Leaders for Active Citizenship, an Indian Sign Language Interpreter, and an MPP candidate at the University of Cambridge

Shivangi Tyagi

Officer, Programs and Policy Communications at Young Leaders for Active Citizenship

As Harmanpreet Kaur went out to bat during the 2024 ICC Women's T20 World Cup at Sharjah, millions were glued to their screens, including Sanskriti's 86-year-old grandfather, a former player who once captained India's deaf cricket team. While he always marvels at the action on the field, something else caught his attention this time: a sign language interpreter at the corner of the screen, translating every nuance of the game. For the first time, he could follow the commentary and post-match speeches without relying on us. Earlier this year, on Global Accessibility Awareness Day, Star Sports and Disney+Hotstar incorporated features that made live cricket accessible to India's 63 million hearing impaired and five million visually impaired citizens. Finally, the sport Sanskriti's grandfather loved was truly within reach.

As we approach the 20th anniversary of the United Nations Convention on the Rights of Persons with Disabilities in 2026, we must strive for better implementation of the Convention at the national level, particularly through the recognition of the linguistic human rights of hearing impaired people. This is crucial because, for most Indians, cricket is more than just a sport; it cultivates a sense of national belonging. Yet, this camaraderie unintentionally leaves many behind, especially the 90 million persons with disabilities.

A sense of isolation

Despite progressive endeavours, such as the Accessible India Campaign and the Rights of Persons with Disabilities Act, 2016, glaring gaps remain in the lived experiences of people with disabilities. They feel isolated not because of their condition, but because of social barriers. The world is unfortunately designed for able-bodied people and the exclusion of persons with disabilities persists in the way buildings, sidewalks, stadiums, movie theatres, seating areas, and even washrooms are built. Legal mandates such as ramps and tactile paving are either absent or are merely tokenistic gestures.

While ongoing state efforts towards inclusivity in the education and health sectors are relevant, the private entertainment sector also requires attention

The same inaccessibility can be seen in cricketing infrastructure too, whether in stadiums or on live broadcasts. While ongoing state efforts towards inclusivity in the education and health sectors are relevant, the private entertainment sector also requires attention. Persons with disabilities are not just citizens with capacity-building requirements; they are also individuals with the need to explore recreational avenues. That this has not been recognised by entertainment providers begs the question of whether our collective idea of leisure is inherently ableist. In theatres, where cricket matches are increasingly being screened, we rarely pause to wonder about access for wheelchair users or assistive devices for visually impaired people. This highlights the need to integrate accessibility into popular culture so that every person can reclaim their right to leisure.

However, enabling people to exercise their right to leisure does not end with making infrastructure accessible; it also demands showcasing inclusive stories in popular entertainment. Films such as *Margarita with a Straw* (2014) and *Srikanth* (2024) lent great depth and sensitivity to the representation of disability in cinema. Such films challenge the public's unidimensional perspective on disability, while also making persons with disabilities feel seen and heard. They help shed light on the state of accessibility, prompting slow but steady public shifts towards making future entertainment infrastructure more inclusive.

Steps in the right direction

The government is also increasingly aware of the intersection between entertainment and inclusivity. A recent ruling by a Supreme Court bench, headed by former Chief Justice of India D.Y. Chandrachud, stated that stereotyping differently abled persons in visual media and films perpetuates discrimination. The Court said that creators ought to provide an accurate representation of disabilities rather than mocking them. This is a step in the right direction.

Private players are also widening the scope for accessibility in subtle ways. We now have subtitles and audio descriptions on OTT platforms. These measures are convenient for everyone, including able-bodied persons, the elderly, and persons with disabilities. As technology continues to permeate our society, especially with the rise of Artificial Intelligence, we may soon see many more such measures.

Building disability friendly ecosystems is no longer about philanthropic leanings. Globally, the total spending power of 1 billion persons with disabilities, including their family and friends who are likely to make accessibility-based choices, is estimated at $13 trillion, an untapped opportunity. Investing in one's business to serve potential consumers and to build million-dollar revenues in the process is a strategic decision. These endeavours signal the recognition of individuals with disabilities as valued consumers and as crucial contributors to our economy.

Accessibility initiatives undertaken by different platforms in recent times offer a glimpse of what the future can be – a world where persons with disabilities are active participants in the entertainment industry. These efforts redefine the identities of persons with disabilities and give them both respect and a sense of belonging. This shift reminds us that a true community leaves no one behind.

New crimes, old tools

Fraudsters thrive when they do not fear prosecution; they must be put on notice

At the Conference of Director Generals of Police last weekend, Prime Minister Narendra Modi addressed the growing menace of cybercrime in India, particularly digital frauds and non-consensual intimate deepfakes. Unlike traditional crimes like petty theft, organised digital frauds are not merely the work of financially desperate individuals; they represent a new class of criminals equipped with a variety of tools. Vulnerable telecom infrastructure – ill-prepared for the overwhelming volume of calls and messages from malicious fraudsters – creates fertile ground for cybercrime. These criminals also employ ingenious techniques that constantly stay a step ahead of underprepared law enforcement and security systems. More troubling is the strong network of relationships these fraudsters cultivate with local police in key hotspots, which enables them to carry out their activities with a sense of impunity. The consequences of this rampant cybercrime are grave. Thousands of ordinary citizens face the constant threat of losing their life savings after a single ill-advised phone call or message. It is therefore encouraging that the highest levels of government are addressing this critical issue and pushing for action from those most equipped to combat it.

But talk alone will not solve the problem. It is crucial to pursue aggressive prosecutions with integrity, transparency, and wide publicity. The growing number of these criminals is both a threat and an opportunity: while their continued operations reflect poorly on the law enforcement and public safety apparatus, it also provides a window for significant breakthroughs in investigations and successful convictions. Holding these fraudsters accountable sends an important message – this is not a simple "call centre job" with questionable ethics, but a serious crime that is not worth the risk. Public awareness is another powerful tool in combating cybercrime. Cyber fraudsters constantly evolve their methods and adopt new personas to deceive unsuspecting victims. Alerting the public –repeatedly, creatively, and patiently – that they are at risk of losing money to fraudsters is an essential policy intervention. A little healthy scepticism could prevent many people from falling prey to scams. As the government pushes for universal banking and greater access to digital services, it is critical that these advances do not become vulnerabilities for ordinary people. The issue of non-consensual intimate imagery is also pressing. With advances in artificial intelligence, criminals can now use deepfake technology to place ordinary individuals' faces into pornographic content, causing great harm. But it is a matter of some comfort that though these crimes are new, the tools to combat them remain familiar: a mix of awareness and preventive measures.

A photo taken on July 5 by the New Zealand Department of Conservation shows rangers beside what appears to be the carcass of a rare spade-toothed whale after it was discovered washed ashore on a beach near Taieri Mouth, New Zealand. AFP

Scientists in NZ gather to decode puzzle of rarest whale

Associated Press

It is the world's rarest whale, with only seven of its kind ever spotted. Almost nothing is known about the enigmatic species. But on Monday a small group of scientists and cultural experts in New Zealand clustered around a near-perfectly preserved spade-toothed whale hoping to decode decades of mystery.

"I can't tell you how extraordinary it is," said Anton van Helden, senior marine science adviser for New Zealand's conservation agency, who gave the spade-toothed whale its name to distinguish it from other beaked species.

Van Helden has studied beaked whales for 35 years, but Monday was the first time he has participated in a dissection of the spade-toothed variety. In fact, the careful study of the creature, which washed up dead on a New Zealand beach in July, is the first ever to take place.

None has ever been seen alive at sea.

The list of what scientists don't know about spade-toothed whales is longer than what they do know. They don't know where in the ocean the whales live, why they've never been spotted in the wild, or what their brains look like. All beaked whales have different stomach systems, and researchers don't know how the spade-toothed kind processes its food.

Over the next week, researchers studying the 5-metre male at a research centre near Dunedin hope to find out.

"There may be parasites completely new to science that just live in this whale," said van Helden, who thrilled at the chance of learning how the species produces sound and what it eats. "Who knows what we'll discover?" Only six other spade-toothed whales have ever been found, but all those discovered intact were buried before DNA testing could verify their identification.

The dissection will be slower than usual, because it is being undertaken in partnership with the Maori, for whom whales are a precious treasure, and the creature will be treated with the reverence afforded to an ancestor

New Zealand is a whale-stranding hotspot, with more than 5,000 episodes recorded since 1840, according to the Department of Conservation. The first spade-toothed whale bones were found in 1872 on New Zealand's Pitt Island. Another discovery was made at an offshore island in the 1950s, and the bones of a third were found on Chile's Robinson Crusoe Island in 1986.

DNA sequencing in 2002 proved that all three specimens were of the same species and that it was distinct from other beaked whales. But researchers studying the mammal couldn't confirm whether the species was extinct until 2010, when two whole spade-toothed whales, both dead, washed up on a New Zealand beach.

On Monday, the seventh of its kind, surrounded by white-aproned scientists who were measuring and photographing, appeared relatively unblemished, giving no clue about its death. Researchers pointed out marks from cookiecutter sharks – normal, they said, and not the cause.

The dissection will be quiet, methodical, and slower than usual, because it is being undertaken in partnership with Maori, New Zealand's Indigenous people. To Maori, whales are a precious treasure, and the creature will

When a DNA analysis reveals a closely guarded family secret...

DNA analysis can create a 'narrow biologised notion of inheritance', to use the words of Projit Mukharji, for no reason other than that the molecule can reveal more than what we wish to tell. If this isn't a problem enough, consider what it means for laws we have, or don't, to protect our privacy

D.P. Kasbekar

The Centre for DNA Fingerprinting and Diagnostics (CDFD) is a government laboratory in Hyderabad. It provides DNA-based investigative services to the police, the judiciary, and to hospitals that offer organ transplant procedures. Recently, the CDFD handled the case of a family in which the father offered to donate an organ to his ailing son. CDFD technicians generated DNA profiles of the donor, the patient, and also the patient's mother.

While the DNA profiles of the mother and the son were consistent with their claimed mother-son relationship, those of the father and his son were not. The DNA showed that the woman's husband was not the actual father of the patient but a close paternal relative, possibly a brother of the actual father. These findings didn't preclude the organ transplant procedure but by revealing the practice of levirate they created a potentially awkward situation for the family.

Levirate is the custom in some families in which a woman who is widowed or one whose husband is mentally or physically incapacitated has children fathered by her husband's brother. Understandably, the family would prefer to keep such knowledge private. The report from the CDFD was meant to tell doctors they could proceed with the transplant operation because the donor and the recipient belonged to the same family. But by explicitly revealing the woman's husband was not her son's father, it created the risk of an unwanted breach of the family's privacy.

What are DNA profiles?

Every cell in our body has a nucleus that contains two copies of each of the 23 chromosomes, numbered 1 to 23. This 1-23 lump is our genome. One chromosome of each pair is inherited via the mother's egg and the other via the father's sperm.

When we make our own reproductive cells – eggs or sperm – each egg or sperm receives only one chromosome from a pair, i.e., one genome set. When a sperm cell and an egg fuse, they create a cell with two genome sets. This cell, called the zygote, divides to produce all the other cells of the baby.

Every chromosome contains a single DNA molecule that runs from end to end. A DNA molecule has two strands. Each strand is a long, linear sequence of four chemicals: adenine (A), cytosine (C), guanine (G), and thymidine (T). The As on one strand form bonds with the Ts on the other, while Gs bond with the Cs. The As, Cs, Gs, and Ts on one strand are called the DNA's bases and the A-T and G-C combinations are the DNA's base-pairs.

The largest chromosome in humans, chromosome 1, has more than 240 million base-pairs; the shortest, chromosome 21, has more than 40 million. The 23 chromosomes together have 3.2 billion base-pairs.

At several locations, or loci, on each of the 23 chromosomes, some short DNA sequences are repeated multiple times. These loci are called simple tandem repeats (STRs). For example, one strand of an STR locus might have multiple repeats of GGCCA (GGCCAGGCCAGGCCA...). These are paired with complementary CCGGT repeats on the other strand (CCGGTCCGGTCCGGT...). The repeat number of STR loci can differ in the two chromosomes of a pair. For example, a particular chromosome derived from the father might have 30 repeats while the same one from the mother may have 35.

The DNA profile of a person is simply the number of times the simple sequences are repeated in the STR loci. This number can be found by first creating lots of copies of DNA from a sample (using the polymerase chain reaction, PCR), then segregating the DNA fragments by size using a technique called capillary gel electrophoresis. It is sensitive enough to both accurately and precisely establish the number of repeats in an STR.

For example, the table below shows the number of repeats of the father, the mother, and the son in the case illustrated above – i.e. their DNA profiles.

According to the table, the mother's versions of locus D18S51 had 14 and 15 repeats, while the son's versions had 15 and 17 repeats. But the father's versions of D18S51 had 14 and 14. The son received his 15-repeat version from his mother and the 17-repeat version from his father. But the woman's husband didn't have a 17-repeat variant, so this man couldn't be the actual father. Likewise, for three other STR loci, the son received paternal variants that were absent from the donor.

The son and the man still had identical Y-chromosome profiles, plus identical variants in 19 of the 23 non-Y STR loci. This indicated that the woman's husband is closely related to the biological father – possibly a brother. Thus the marriage is levirate.

When DNA creates a privacy issue

DNA has unwittingly opened a Pandora's box where the family skeletons could tumble out of the closet. You offer your DNA to further something that needs to be done and open a gaping wound

DNA analysis has the potential to cause very unpleasant situations. Illustrative image.

AUTOSOMAL STR DNA PROFILES OF THE INDIVIDUALS

Locus	Link Person	Patient	Donor
D3S1358	16,16	16,16	15,18
vWA	14,17	14,14	15,18
D16S539	11,12	11,12	11,12
CSF1PO	10,13	12,13	11,12
TPOX	8,11	8,11	8,11
Yindel	-	2	2
D8S1179	13,14	14,15	13,15
D21S11	29,33.2	29,33.2	28,32.2
D18S51	14,15	15,17	14,14
DYS391	-	10	10
D2S441	9,10	10,10	10,11
D19S433	13,13	13,13	13,13
THO1	7,8	7,9	6,9
FGA	24,24	24,27	23,27
D22S1045	11,17	11,17	11,17
D5S818	10,12	12,15	12,15
D13S317	8,12	12,12	11,12
D7S820	8,12	11,12	11,13
SE33	13,29.2	13,29.2	19,29.2
D10S1248	13,15	14,15	14,14
D1S1656	14,14	14,17.3	8,15.3
D12S391	21,24	17,21	17,17.3
D2S1338	19,22	21,22	19,21
AMELOGENIN	X,X	X,Y	X,Y

Y-CHROMOSOMAL STR DNA PROFILES OF THE INDIVIDUALS

Locus	Patient	Donor
DYS576	17	17
DYS389I	13	13
DYS635	23	23
DYS389II	29	29
DYS627	19	19
DYS460	10	10
DYS458	16	16
DYS19	14	14
YGATAH4	11	11
DYS448	21	21
DYS391	10	10
DYS456	17	17
DYS390	23	23
DYS438	9	9
DYS392	11	11
DYS518	40	40
DYS570	16	16
DYS437	14	14
DYS385	12,16	12,16
DYS449	31	31
DYS393	12	12
DYS439	11	11
DYS481	23	23
DYF387S1	36,39	36,39
DYS533	11	11

Levirate is the custom in which a woman who is widowed or one whose husband is mentally or physically incapacitated has children fathered by her husband's brother

Levirate marriages in India

Projit Bihari Mukharji, a historian of science at the University of Pennsylvania and Ashoka University in Haryana, ably discussed the practice of levirate marriage in India in his 2022 book 'Brown Skins, White Coats Race Science in India, 1920-66.'

Mukharji cited the pioneering anthropologist and writer Irawati Karve (1905-1970) when he wrote that she spoke "of the three debts that any Hindu man owed and upon the repayment of which his ultimate liberation depended. These debts were respectively to the gods, the sages, and the ancestors.

Each of these ... required the making of regular offerings. These offerings could only be made by a son. Hence, the function of a son was the making of ancestral offerings, rather than the maintenance of a biological or genetic lineage."

This pushed families to explore all possible ways, including levirate, to beget a son.

Mukharji added that families are reluctant "to divulge information... not simply... by a modern desire to avert scandal. Rather, it was because, within an older customary framework of kinship, 'descent' itself worked differently and to other ends. ... The refusal... to share sexual information was tacitly rooted in a more radical refusal to accept a narrowly biologised notion of inheritance."

Unfortunately, in the end, DNA analysis appears to have allowed the "narrow biologised notion of inheritance" to win for no reason other than that DNA just doesn't know when to shut up. And if this isn't a problem enough, consider what it could mean for the laws we have – or don't – to protect our genetic privacy.

(D.P. Kasbekar is a retired scientist.kasbekardp@yahoo.co.in)

Oxford study lauds PRAGATI system for fast-tracking projects

The Hindu Bureau
NEW DELHI

The report says that PRAGATI system symbolises India's commitment to overcoming bureaucratic inertia

A study by Oxford University's Saïd Business School has lauded Prime Minister Narendra Modi's PRAGATI infrastructure monitoring system for accelerating 340 projects worth $205 billion across the country and bringing about economic transformation.

The study titled "From Gridlock to Growth: How Leadership Enables India's PRAGATI Ecosystem to Power Progress" was authored by Soumitra Dutta, dean at the SBS, and co-authored by associate fellow Mukul Pandya. It was presented at a symposium hosted by the Indian Institute of Management, Bangalore, on Monday.

The study looked at factors including close monitoring of infrastructure projects and their completion since 2015 through the PRAGATI system, an acronym for Pro-Active Governance and Timely Implementation of projects.

"The platform symbolises India's commitment to overcoming bureaucratic inertia and fostering a Team India mindset and culture of accountability and efficiency," says the report. "PRAGATI has brought together diverse stakeholders from Central and State governments onto a single platform and this collaborative approach has been instrumental in addressing some of the complex challenges in infrastructure development, from land acquisition to inter-ministerial coordination," the report says.

The report adds that the economic impact of PRAGATI is evident. According to studies by the Reserve Bank of India and the National Institute of Public Finance and Policy, for every rupee spent on infrastructure, India sees a gain of ₹2.5 to ₹3.5 in GDP. "By fast-tracking projects that provide services like roads, railways, water, and electricity, PRAGATI has improved the quality of life for millions of Indians. It has incorporated sustainability into its core operations, facilitated faster environmental clearances and promoted the use of green technologies. This holistic approach ensures that India's development is both inclusive and sustainable," the report says.

Deals for 26 Rafale-M jets, 3 Scorpene submarines to be signed: Navy chief

Dinakar Peri
NEW DELHI

Navy chief Admiral Dinesh Tripathi on Monday acknowledged that the country's second nuclear ballistic missile submarine, *INS Arighaat*, successfully fired a Submarine Launched Ballistic Missile (SLBM) a few days back. In another important remark on the country's strategic nuclear programme, he said the first of the two nuclear attack submarines (SSN) to be indigenously designed and manufactured is expected to be ready by 2036-37.

Two multi-billion dollar deals under negotiation with France to procure 26 Rafale-M fighter jets and three additional Scorpene-class conventional submarines are in advanced stages and could be signed next month, the Navy chief said in response to a question at the annual press conference ahead of Navy Day.

India is in negotiation with France over a multi-billion dollar deal to procure 26 Rafale-M fighter jets soon. K. MURALI KUMAR

"It is just matter of completing the formalities of the acquisition process and we expect that if not this month, next month hopefully, this [Scorpène submarines] and Rafale-M deals should be signed."

On the deal for 26 Rafale-M jets, he said it was "one level short of taking it to the CCS [Cabinet Committee on Security]" for clearance, which will be followed by contract-signing. "It is a government-to-government deal and hence I expect it to happen fast," he said.

The deal for three Scorpene submarines is a repeat order to Mazagon Dock Shipbuilders Ltd. (MDL), which is building them in partnership with Naval Group of France. Of the six submarines from the earlier contract, five have been inducted and the last one is expected to be commissioned later this month.

On the nuclear ballistic missile submarines (SSBN), Admiral Tripathi said the first one, *INS Arihant*, had done a number of deterrence patrols.

The second, *INS Arighaat*, which was commissioned recently, is undergoing trials, including missile test, he said.

"We did carry out test of missile... Launch was successful. Concerned agencies are examining as to what trajectory the missile took," he said on the recent K4 SLBM test with a range of 3,500 km from *INS Arighaat*.

Navy to hold operational exercise in Jan.

The Hindu Bureau
VISAKHAPATNAM

An "operational demonstration" by the Indian Navy will be organised by the Eastern Naval Command (ENC) on January 4, 2025, at R.K. Beach here instead of the annual Navy Day demonstration on December 4, Flag Officer Commanding-in-Chief Eastern Naval Command Vice-Admiral Rajesh Pendharkar has said here on Monday.

Addressing a press conference, Vice-Admiral Pendharkar said that in line with the Union government's policy of organising celebrations in different cities and historical locations, this year's Navy Day 2024 celebrations will be organised by the ENC in Odisha on December 4.


Rajesh Pendharkar

This year's Navy Day exercise by ships, submarines and aircraft of ENC would be organised at Golden Beach in Puri, Odisha. The President of India will be the chief guest. All arrangements have been made too, he added.

"However, it is not to say that the people of Vizag will miss this annual activity. For residents of Visakhapatnam, we plan to organise an operational demo at R.K. Beach on January 4, 2025. Chief Minister N. Chandrababu Naidu is scheduled to be the chief guest on the occasion. In addition, other events planned in Visakhapatnam as part of the Navy Week celebrations such as band concert, visit of naval ships by children, interaction with veterans and the much-awaited Navy Marathon will be held on Beach Road on December 15," he said.

Speaking on the ENC's progress over the last one year and development activities, he said in the past year, three ships of the ENC were deployed in the Arabian Sea to augment overall naval efforts. *INS Sumitra* and *INS Sumedha*, along with Marine Commandos, played a stellar role in securing the release of 59 personnel from hijacked vessels, and apprehension of 20 Somali pirates.

INS Shivalik was involved in real-time combat situations, wherein the ship provided Anti-Missile Defence cover to merchant vessels being attacked by Houthi rebels.

Factory activity expansion index slips to 11-month low of 56.5 in November

Vikas Dhoot
NEW DELHI

Private sector industrial activity appears to be on a relatively weak wicket even in the third quarter of 2024-25, scotching hopes of a quick rebound from the sharp tumble in the July-September quarter when manufacturing growth slipped to a mere 2.2%, and GDP grew at a seven-quarter low pace of 5.4%.

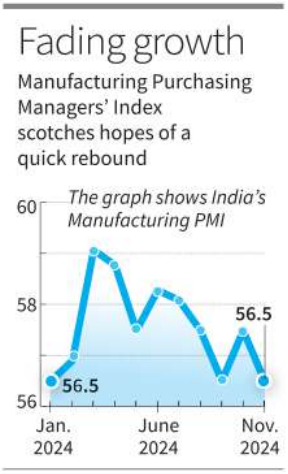
Factory activity expansion in India's private sector fell to a joint 11-month low in November, while firms raised prices at the swiftest pace in over 11 years as input cost pressures began to bite, as per the survey-based HSBC India Manufacturing Purchasing Managers' Index (PMI). The index reading fell to 56.5 from 57.5 in October – a reading of over 50 indicates a rise in activity levels.

Output levels at surveyed factories grew at the slowest pace since December 2023. For the first time since August 2017, factories also reported an uptick in their stocks of finished goods, breaking a seven-odd-year sequence of such piled-up stocks declining every month. This signals a mismatch of sorts between production levels and end-users' demand through last month.

Ray of hope

New business orders and production levels increased at a softer pace as favourable demand conditions clashed with fierce competition and price pressures. Fresh export orders gained pace to surge at the highest pace in four months, spurring some optimism that goods exports may see yet another healthy uptick after October's 28-month high growth of 17.25%.

Officials had attributed the revival in exports to improved demand from developed markets for the Christmas festivities this year. The 400-odd firms surveyed for the index reported gains in orders from Bangladesh, mainland China, Colombia, Iran, Italy, Japan, and Nepal, apart from major markets such as the U.S. and U.K.



These companies also cited higher outlays on freight, labour, and materials that they passed on to clients, as input cost inflation intensified to the highest level since July.

Producers continued to buy additional inputs to build inventories of raw materials, but the rise in such purchases was the weakest in just under a year, S&P Global, which conducts the PMI surveys, noted.

Incidentally, employment levels continued to be ramped up for the ninth successive month, albeit at a lower scale than in October.

While the PMI reading was down slightly in November, it was still firmly within expansionary territory, and the four-month peak in new export orders led the manufacturing sector's growth in November, said Pranjul Bhandari, chief India economist at HSBC.

A WAKE-UP CALL
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