RVVeKommunicate

POLICY PULSE

A MONTHLY NEWSLETTER

NOVEMBER 2023
VOL. 41

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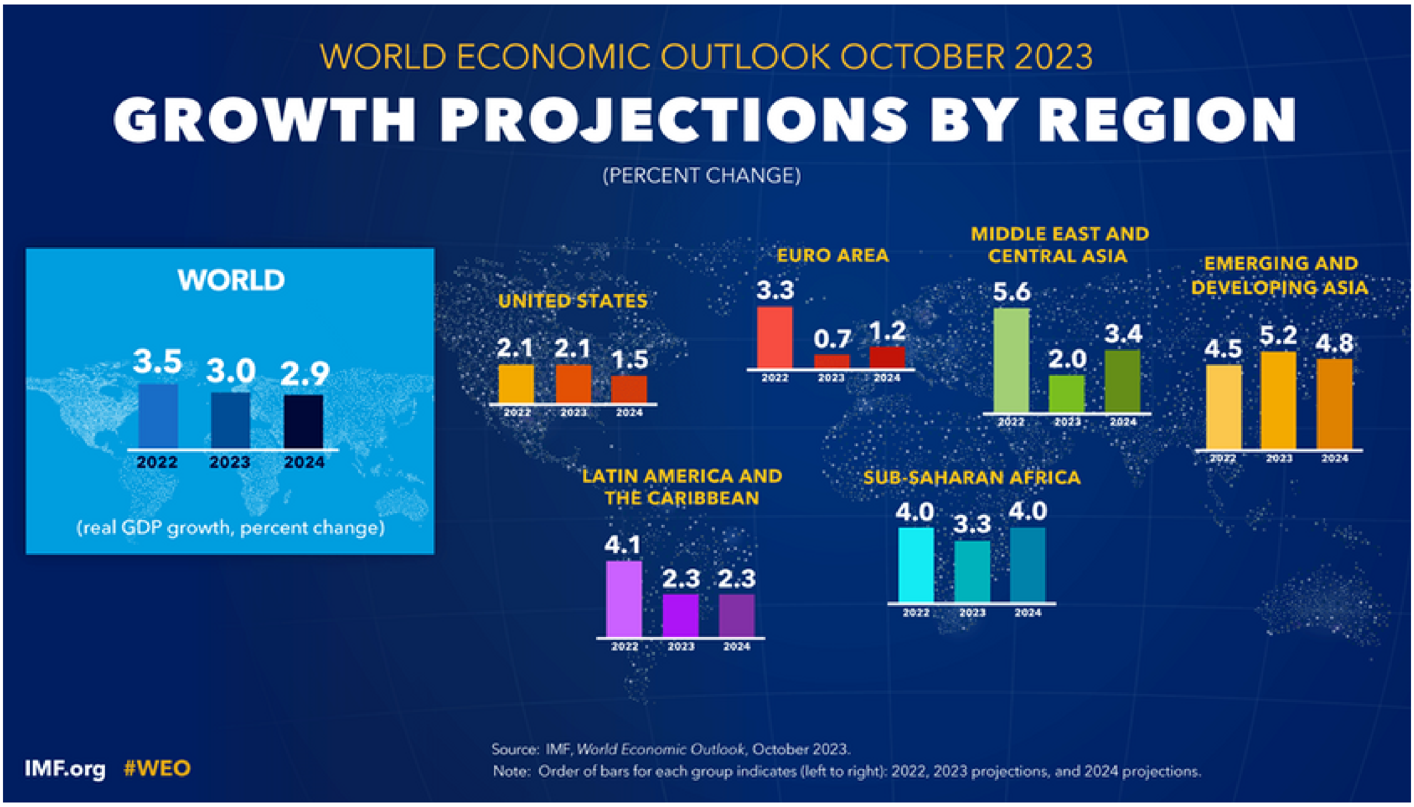
ECONOMY
GLOBAL ECONOMY

The World Economy in October 2023



Global economy remains on a slow path to recovery

As October 2023 unfolds, the global economy remains on a slow path to recovery, with growing regional disparities and a limited margin for policy error. The latest data reveals a complex economic landscape characterized by sluggish growth, evolving political risks, and persistent inflation. This article delves into the key challenges facing the world economy, emphasizing the need for reform and coordinated policies to achieve sustainable growth and address pressing issues.

- **2023 to Witness a Deceleration in Global Economic Growth**: The baseline forecast for 2023 indicates a gradual deceleration in global economic growth. The world is expected to experience a decline from 3.5 percent growth in 2022 to 3.0 percent in 2023 and 2.9 percent in 2024, falling well below the historical average of 3.8 percent observed from 2000 to 2019. Advanced economies are predicted to slow from 2.6 percent in 2022 to 1.5 percent in 2023 and 1.4 percent in 2024, largely due to tightening fiscal policies.

In contrast, emerging market and developing economies are expected to sustain modest growth, with a decrease from 4.1 percent in 2022 to 4.0 percent in both 2023 and 2024. However, substantial private sector investments are necessary to bolster development in these regions, particularly in sectors such as renewable energy.

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- **Challenges in Developing Economies Calls for Increased Investments:** Despite the pressing need for private sector investment in developing economies, there are notable barriers, including political risks in some of these countries. The call for a trillion dollars of investment in renewable energy (Mr. Ajay Banga, World Bank) for emerging markets highlights the urgency of this situation. Collaborative efforts involving governments, multilateral development banks, and the private sector are essential to bridge this funding gap and drive sustainable development.
- **Urgent Need for Reforming the Global Financial System:** The United Nations Conference on Trade and Development (UNCTAD) has released a report that underlines the urgency for reforming the global financial system and adopting practical policies to address issues like inflation, inequality, and sovereign debt. According to Rebeca Grynspan, UNCTAD Secretary-General, achieving financial sustainability requires a balanced policy mix encompassing fiscal, monetary, and supply-side measures. It is also crucial to address the deepening asymmetries in the international trading and financial system.
- **Robust Consumer Spending Helping US in Economic Recovery:** The United States stands out as a notable case in the global economic recovery. Despite rising interest rates, the U.S. economy has managed a "soft landing" characterized by a controlled economic slowdown. This achievement can be attributed to robust consumer spending, avoiding fiscal austerity measures, and active monetary intervention earlier in the year. However, investment concerns linger, largely due to extended high interest rates.

Divergent Scenarios in Europe and China

Europe appears to be facing the potential risk of slipping into a recession, in view of with rapid monetary policy tightening and strong headwinds. Major economies in the region are slowing down, with Germany already experiencing contraction. Stagnant or falling real wages compounded by fiscal austerity are contributing to this economic challenge. China, while showing signs of recovery from the previous year, confronts issues related to weak domestic consumer demand and private investment. Nonetheless, the nation has more fiscal policy leeway compared to other major economies, offering opportunities to address these challenges.

Inequality and Sustainable Development Goals

A critical concern remains the persistent economic inequality, particularly in developing countries that are disproportionately affected by monetary tightening in more advanced economies. This widening wealth gap poses a significant threat to the fragile economic recovery and the attainment of the Sustainable Development Goals (SDGs).

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In October 2023, the global economy is found to be at a crossroads, with many challenges to address. The need for coordinated policies, reform of the global financial system, and private sector involvement in developing economies is evident. Policymakers must find a balance between fiscal, monetary, and supply-side measures to ensure financial sustainability and drive productive investment. As the world grapples with divergent regional trends, addressing issues of inequality, inflation, and sovereign debt becomes imperative to secure a more stable and equitable future.

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Despite Challenges Indian Economy Remains Internally Robust

As we step into October 2023, the Indian economy finds itself in a complex and evolving landscape. Recent data and surveys suggest that economic growth has hit a roadblock, with various factors contributing to the challenges it faces. However, we observe contrasting views and findings from the FICCI Economic Outlook Survey, the RBI's monetary policy announcement, and the latest data from the IMF, shedding light on the state of the Indian economy in this month.

Economic Growth Projections

According to the FICCI Economic Outlook Survey, India's economic growth is estimated to slow to 6.3 percent in the current financial year. This marks a notable deceleration from the 7.2 percent growth recorded in the previous year. The primary culprit behind this decline is a sharp deceleration in the farm sector growth. Agriculture sector growth is expected to slip to 2.7 percent in 2023-24, down from the 4 percent recorded in the previous year. The report attributes this slowdown to the El Nino effect, which disrupted the spatial distribution of rainfall during the monsoon season, significantly impacting the agriculture sector.

In contrast, the industry and services sectors are anticipated to grow at relatively better rates of 5.6 percent and 7.3 percent, respectively, in the current financial year. However, the report also highlights persistent headwinds affecting the overall economic outlook. Geopolitical stress, slowing growth in China, the lagged impact of monetary tightening, and below-normal monsoons are identified as potential downside risks to India's growth prospects.

FICCI's survey results indicate that the median GDP growth is expected to slow down to 6.1 percent and 6 percent in the second and third quarters of 2023, respectively, following a robust growth rate of 7.8 percent in the first quarter of the financial year.

Survey Insights and Inflation Concerns

The FICCI Economic Outlook Survey, conducted in September 2023, gathered insights from leading economists representing various sectors, including industry, banking, and financial services. Participants in the survey expressed concerns about the trajectory of inflation. While the Consumer Price Index (CPI) based inflation rate may have peaked, experts noted that there are lingering upside risks to prices.

Domestic Economic Activity Displaying Resilience

On October 6, 2023, the RBI Governor, Shaktikanta Das, announced the bi-monthly monetary policy. In his address, he observed that domestic economic activity is displaying resilience, largely driven by strong domestic demand, in contrast to the global economic landscape. This indicates that despite the challenges, India's economy is proving to be internally robust.

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RBI’s observation on resilience of Indian economy corroborated by the International Monetary Fund Observation from the RBI on resilience of Indian economy is corroborated by the International Monetary Fund (IMF). The IMF's latest growth projection for India comes in the wake of official data released in August, which showed that the Indian economy expanded by 7.8 percent in the April-June quarter. This figure was marginally higher than street estimates, with private consumption witnessing a significant increase, growing at 6.0 percent, compared to the 2.8 percent recorded in the preceding quarter.

October 2023 presents a mixed bag of economic indicators for India. While the FICCI survey highlights the challenges in the agriculture sector and the persisting downside risks, the RBI's assessment underscores the strength of domestic demand. The IMF's recent projection suggests that India's economy continues to show resilience.

As India navigates these economic waters, it will be essential for policymakers and stakeholders to remain vigilant, addressing the issues facing the agriculture sector, monitoring inflation trends, and continuing to promote growth in the industry and services sectors. In this uncertain economic climate, adaptability and strategic decision-making will be key to steering India's economy on a stable and sustainable path in the months to come.

India's Stand on Data Localisation Vindicated at the WTO

In a big boost to India's long-held position against global rules on e-commerce, the US has withdrawn its proposal on e-commerce rules at the WTO's Joint Statement Initiative (JSI) on e-commerce meeting on 25th October 2023. The withdrawn US proposal was made in 2019 by the Trump regime, and it called for free cross-border data transfers without data localisation requirements and restricting mandatory software source code disclosure.

"Given the US's dominant role in the global digital landscape, this decision (to withdraw the digital trade proposal) is poised to spark a worldwide reassessment of national e-commerce policies, potentially reshaping the future of digital trade agreements. The key issues will be ensuring ample policy space and revisiting national digital trade strategies," according to Global Trade Research Initiative (GTRI).

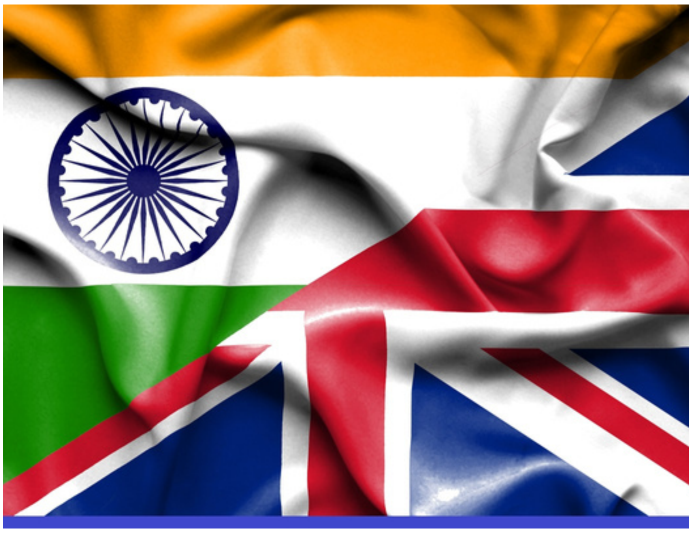
This new development on digital trade validates India's approach to the subject. It is mentioned that India has never been part of the JSI on e-commerce, which is a plurilateral grouping of a limited number of WTO members. India's objections were on the ground of concerns that such rules may strengthen the dominance of large e-commerce companies and go against smaller local companies.

On the other hand, the US' change in position on the matter is likely to be a dampener for on-going efforts of the JSI members includes many developed nations such as the EU, Switzerland, Australia, New Zealand, Japan, Korea, and Canada, to highlight the need for global rules on e-commerce at the WTO 13th Ministerial Conference (MC13) in February 2024.

FREE TRADE AGREEMENT/ BILATERAL DISCUSSIONS

INDIA

India and UK FTA to be signed by month-end



During the G20 leaders' summit meeting, UK Prime Minister Rishi Sunak and Indian Prime Minister Narendra Modi agreed to speed up and finalise the two countries' "ambitious" trade talks. It was also anticipated that the two leaders would meet again when Sunak visits India. However, with no set date for Sunak's visit and the negotiations still ongoing, a new schedule for the FTA's conclusion remains an unknown.

A recent research report by the GTRI notes that there may be "only limited benefits" for India regarding merchandise goods from the proposed FTA, as many of its exports to the U.K. already enjoy low/zero tariffs.

With regard to conclusion of the Agreement, while some sources indicate that the two countries have already established a broad agreement on negotiations including items such as vehicles and whisky at the end of July 2023, and Britain appears to be willing to ease some visa restrictions for Indian professionals, other sources indicate that the trade negotiations won't be concluded until December, when India's state elections take place.

According to other reports, the United Kingdom is seeking advantages for electric vehicle imports, dispute resolution for international tax issues through an investment protection package, and improved market access. India is also thought to be lobbying for extended post-study visas for individuals who travel to the United Kingdom to study. These issues might also be delaying in the conclusion of the Agreement.

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EU-Japan Concluded High-Level Economic Dialogue

The European Union and Japan have recently entered into an agreement on cross-border data transfers, which is expected to boost commerce. The accord might help influence global data standards.

FREE TRADE AGREEMENT/ BILATERAL DISCUSSIONS

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According to the European Commission, the agreement will benefit businesses in a variety of industries, including financial services, transportation, manufacturing, and e-commerce, by allowing them to handle data without burdensome and costly administration.

Valdis Dombrovskis, Executive Vice-President and Commissioner for Trade observes, '*This deal marks a major step forward in terms of boosting the growth of the digital economy. Data is a vital cog of today's businesses and supply chains. It is the lifeline of many sectors, enabling them to thrive and bring our economies into the digital era. In the EU only, data economy represented 2.6% of our GDP in 2019, and it is expected to almost triple by 2025. That is why this is a landmark deal; it is essential to ensure the free flow of data with trust and to help us shaping global rules on data flows. Today, we are setting high standards for the future development of our economies and societies.*'

It will prevent protectionist limitations, such as rules requiring localization, while permitting authorities to interfere in areas like cyber-security, privacy, and personal data.

In 2015, the two countries signed a free trade deal but left the data flow issue unresolved. They have now filled that gap after a year of talks from October 2022.

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Sustainable Production and Consumption - Centre launches two programmes

The Ministry of Environment, Forests, and Climate Change has launched two programmes under the LiFE initiative, demonstrating the country's proactive commitment towards sustainability, climate change, and promoting eco-friendly behaviours. The Ecomark Scheme and the Green Credit Programme (GCP) are two programmes that aim to promote eco-friendly practices that are based on tradition and conservation and align with the LiFE concept.

LiFE- lifestyle for the Environment

The concept of 'Lifestyle for the Environment (LiFE) was introduced by Prime Minister Narendra Modi at COP26 in Glasgow on 1st November 2021, calling upon the global community of individuals and institutions to drive LiFE as an international mass movement towards "mindful and deliberate utilisation, instead of mindless and destructive consumption" to protect and preserve the environment.

Both initiatives mark significant steps in promoting sustainable living, environmental conservation, and embodying eco-friendly practices in India through individual and collective choice. They align with global sustainability goals and reflect the government's commitment to conservation and protection of the environment.

Green Credit Program (GCP): Incentivizing Environmental Actions

During the Union Budget 2023-24, Nirmala Sitharaman announced to launch 'Green Credit Programme (GCP)'. A key message from the Budget speech was the focus on 'Green Growth', which is one of the seven goals for the Centre through the 'Amrit Kaal' of the ensuing 25 years. The total outlay allotted was Rs 35,000 crore for achieving energy transition at the net-zero commitments.

The GCP is proposed to be launched at the national level to leverage a competitive market-based approach for Green Credits. It aims to incentivize voluntary environmental actions of various stakeholders. The GCP will encourage private sector industries, companies, and other entities to meet their obligations from other legal frameworks.

The GCP covers eight types of activities, out of which, initially, it will concentrate on two main initiatives: afforestation and water conservation.

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To ensure the effectiveness and integrity of the programme, the Indian Council of Forestry Research and Education (ICFRE) will act as the program administrator. They will develop guidelines, processes, and procedures for implementation, including establishing thresholds and benchmarks for each Green Credit activity.

Stakeholder consultation will be held after draft methodologies for granting Green Credits are created and will be notified. These approaches establish standards for every procedure or action to guarantee fungibility across industries and minimal environmental impact.

Ecomark Scheme: Promoting Eco-Friendly Products

In line with the LiFE approach, the MoEF&CC has amended the Ecomark rules with the objective that consumers can make choices among products and thereby opt for eco-friendly products in their design, process, etc.

It provides accreditation and labelling for household and consumer products that meet specific environmental criteria while maintaining quality standards as per Indian norms. Products accredited under the Ecomark Scheme will adhere to specific environmental criteria, ensuring minimal environmental impact. It will build consumer awareness of environmental issues and encourage eco-conscious choices. It will also motivate manufacturers to shift towards environmentally friendly production. The scheme seeks to ensure accurate labelling and prevent misleading information about products.

The Central Pollution Control Board administers the Ecomark Scheme in partnership with the Bureau of Indian Standards (BIS), which is the national body for standards and certification.

In addition, under GCP, manufacturers who obtain the Ecomark label can contribute to generating Green Credits. This shows a direct relation that encourages manufacturers to adopt eco-friendly production methods and increases the demand in the market.

The Bureau of Indian Standards (BIS) is the implementing agency for the Eco Mark Scheme under the BIS Act, 1986. It provides the criteria eligible, assesses and certifies the products for which a manufacturer can use the Eco Mark.

BIS will consider the following criteria while determining product is eligible or not:

- Production or process including source of raw material;
- Use of natural resources;
- Likely impact on the environment;
- Effect & extent of emissions/waste arising from the production process;
- Disposal of the product and its packaging;

- Compliance with Extended Producer Responsibility regulations (where applicable);
- Utilization of waste and recycled materials;
- Suitability for recycling;
- Substitution of hazardous substances with safer ones.

Draft Notification Proposing Amendments to the Plastic Waste Management Rules, 2016

The Ministry of Environment, Forest and Climate Change's recent issuance of a draft notification proposing amendments to the Plastic Waste Management Rules, 2016, holds great significance in addressing the escalating plastic waste crisis in India. These amendments aim to revamp the existing rules to adapt to the changing landscape of plastic usage and waste management.

The revised draft regulations emphasise the inclusion of a separate category as 'Category-V' for biodegradable plastics, which intends to avoid confusion and tackle environmental challenges such as the rise of gutkha, pan masala, and tobacco packaging sachets.

Furthermore, it emphasises the significance of EPR compliance as well as the importance of collection back systems for used multi-layered plastic sachets.

They introduce new definitions and clarifications for various terms, including importer, manufacturer, multi-layered packaging, and plastic packaging. Further, there are also provisions for exemptions. The notification exempts carry bags and sachets used for storing, packing, or selling gutkha, tobacco, and pan masala from the thickness requirements. This exception applies to both compostable and biodegradable plastics. The move aims to provide flexibility to manufacturers of these products while ensuring that they adhere to the necessary environmental standards.

Local bodies and Gram Panchayats are also given clear responsibilities, highlighting the importance of involving grassroots institutions in the fight against plastic pollution. The creation of new rules for Panchayati Raj Institutions at the district level further empowers local authorities to take action against the use of single-use plastic items and assess waste management infrastructure.

To ensure compliance and quality control, the amendments introduce sample testing and certification requirements. These measures are designed to ensure that biodegradable plastics meet the necessary standards and that the use of compostable plastics aligns with environmental considerations.

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The BIS will prescribe colour coding/ marking to differentiate between biodegradable and compostable plastics. This aims to determine their respective end-of-life scenarios.

These moves may offer the potential for the development of a circular economy that can lead by example, a reduction in plastic pollution, and a holistic approach to waste disposal.

Rajasthan Adopts Stakeholder-driven Renewable Energy Policy

Rajasthan has come out with the Rajasthan Renewable Energy Policy, 2023, intending to further renewable energy (RE) integration into the state's power grid and develop 90 GW of renewable energy capacity in the state by 2030. Out of the total 90 GW of renewable energy capacity to be developed in the state by 2030, while Solar projects will constitute 65 MW, Wind and hybrid will contribute 15 MW, and the remaining 10 MW will come from Hydro, Pump Storage Plant (PSP), and Battery Energy Storage Systems (BEES).

According to the Central Electricity Authority, as of 30 September 2023, the renewable energy source (RES) installed capacity of Rajasthan was 25373.49 MW.

The policy aims to promote innovative technologies and approaches for the simultaneous generation of wind and solar power, as well as the adoption of emerging technologies such as storage systems, including PSPs and BESS. It also aims to promote EV Charging Stations with RE. Rajasthan Renewable Energy Corporation (RREC) has been designated the nodal agency for registering, approving and implementing renewable projects for four years.

The state governance is committed to striving to make rooftop photovoltaic (PV) solar power systems more accessible. It intends to turn district offices and key regions into "Green Energy Cities" by installing solar rooftop systems. Grid-connected rooftop PV solar power plants, will also be permitted under net metering arrangements, with DISCOMs allowing solar rooftop capacity increases of up to 50% of the capacity of the distribution transformer in the area. Under the RESCO (Renewable Energy Service Company) model, government buildings can also house rooftop solar power plants.

Further, the policy provides extra lucrative for the industrial and big-scale renewable energy projects of the state, a facilitation charge of 50,000 per hectare per year that will apply to the sale of power to an entity outside of Rajasthan DISCOMs. On the other hand, developers can provide 7 percent of generated power free of cost to DISCOMs in exchange for this charge.

According to experts, the state may achieve the set target before 2030, with the incentives provided to the developers. In addition, the state has vast untapped potential in terms of intense solar radiation.

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Brazil to Enforce ISSB Standards from 2026

Brazil has announced that it will implement the International Sustainability Standards Board (ISSB) sustainability requirements. The compliance will first be voluntary from early 2024 and then mandatory as of January 1, 2026. According to the recent announcement by the Securities and Exchange Commission (CVM) and the Ministry of Finance, Brazil, public firms must provide yearly statements about sustainability and climate change beginning in 2026.

Brazil is the latest country to declare the acceptance of the new standards, following statements from the United Kingdom and Australia.

The CVM states that mandatory sustainability reporting for public enterprises will start in 2026, while optional reporting by investment funds and public companies will start in 2024 by IFRS standards. Beginning of 2027, financial statements must be released concurrently with the publishing of sustainability reports or within three months of the fiscal year's conclusion, whichever comes sooner.

According to the CVM, the new reporting criteria will assist global investors in analysing risks and opportunities, decreasing information costs, optimising capital allocation, and making decisions consistent with sustainable and responsible values.

Origin of International Sustainability Standards Board (ISSB)

The International Sustainability Standards Board (ISSB) was formed on 3 November 2021 by the Trustees of the IFRS Foundation at COP26 in Glasgow, following strong market demand for its establishment. The ISSB is developing standards that will result in a high-quality, comprehensive global baseline of sustainability disclosures focused on the needs of investors and the financial markets.

The ISSB has international support with its work to develop sustainability disclosure standards backed by the G7, the G20, the International Organization of Securities Commissions (IOSCO), the Financial Stability Board, African Finance Ministers and Finance Ministers and Central Bank Governors from more than 40 jurisdictions.

The ISSB has set out four key objectives for global baseline of sustainability disclosures:

- to develop standards for a global baseline of sustainability disclosures;
- to meet the information needs of investors;
- to enable companies to provide comprehensive sustainability information to global capital markets; and
- to facilitate interoperability with disclosures that are jurisdiction-specific and/or aimed at broader stakeholder groups.

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Brazil's Minister of Finance, Fernando Haddad, said: *"This will generate a virtuous cycle of greater transparency and commitment, allowing the possibility of measuring the issue because there needs to be a global institutional metric so that the market is global."*

The ISSB of the International Financial Reporting Standards Foundation (IFRS) officially launched its new global sustainability and climate disclosure standards in June 2023. This announcement is expected to be a foundation for future sustainability reporting regulations globally and is a significant step towards integrating sustainability reporting into the larger financial reporting process. The new rules will take effect in January 2024 for yearly reporting periods, and companies will start disclosing information in 2025 by the standards.

OPINION COLUMN

Getting Inside Economics

Aditya Sinha

The Role of Macroeconomic Indicators in Shaping the Economy

Macroeconomic indicators are powerful instruments that provide essential insights into the health and performance of an economy. These indicators are the economic equivalent of vital signs, offering an accurate picture of the overall well-being of a nation's financial system. They are essential for governments, businesses, and investors as they help in understanding economic trends and serve as a foundation for formulating strategies and policies.

Significance of macroeconomic indicators and the pivotal role they play in shaping the economy is described below.

- **Gross Domestic Product (GDP):** Gross Domestic Product, commonly known as GDP, serves as one of the cornerstones of macroeconomic analysis. It quantifies the total value of goods and services produced within a country's borders during a specified time frame. This indicator is vital as it measures the economic growth and size of a nation's economy. A rising GDP indicates economic expansion, while a declining GDP signals contraction. GDP data enables economists to evaluate the overall health of an economy, making it a crucial barometer of economic performance.

- **Inflation Rate:** Inflation, the rate at which the general price level of goods and services increases, is another key macroeconomic indicator. A moderate level of inflation is generally seen as healthy for an economy because it stimulates spending and investment. However, high or unpredictable inflation can erode purchasing power, create uncertainty, and lead to economic instability. Central banks closely monitor inflation rates to determine appropriate monetary policies and maintain price stability.

- **Unemployment Rate:** The unemployment rate represents the percentage of the workforce currently without a job. It is a critical indicator for assessing labour market conditions and overall economic health. High unemployment rates can be indicative of economic distress, as they signify underutilization of human capital and reduced consumer spending. In contrast, low unemployment rates are associated with a robust job market and greater consumer confidence, driving economic growth.

- ·**Balance of Trade:** The balance of trade, or trade balance, reflects the difference between a country's exports and imports. A trade surplus occurs when a nation exports more than it imports, while a trade deficit occurs when imports surpass exports. This indicator has significant implications for a nation's currency and foreign exchange rates. A trade surplus can lead to a stronger currency, making exports more expensive and imports cheaper. Conversely, a trade deficit can weaken the national currency, potentially affecting international trade and investment.

- **Consumer Confidence Index:** The Consumer Confidence Index gauges the sentiments of consumers regarding their financial well-being and the overall state of the economy. High consumer confidence is often associated with increased consumer spending, a crucial driver of economic growth. When consumers feel positive about their economic prospects, they are more likely to spend, invest, and stimulate economic activity. Conversely, low consumer confidence can lead to reduced spending, potentially causing economic slowdowns.

- **Government Debt:** Government debt, typically expressed as a percentage of GDP, signifies the amount of money a government owes. High levels of government debt can lead to budget deficits, increased borrowing costs, and fiscal challenges. This macroeconomic indicator is essential for policymakers when making decisions regarding fiscal policies and resource allocation.

- **Interest Rates:** Interest rates, set by central banks, play a significant role in macroeconomics. Changes in interest rates impact the borrowing costs for businesses and consumers.

Lowering interest rates can stimulate economic growth by making borrowing more affordable, while raising interest rates can cool down an overheated economy, controlling inflation. Central banks use interest rates as a primary tool for influencing the money supply and regulating economic conditions.

- **Money Supply:** The money supply represents the quantity of money circulating within an economy. Central banks manage the money supply to influence economic conditions. An increase in the money supply can boost economic activity by providing liquidity, while a decrease can help control inflation by reducing the amount of money available for spending and investment.

(The writer is an Senior Research Analyst at VeKommunicate)

OPINION COLUMN

Smart Manufacturing

Akriti Kumari

Drive Technology

Drive technology is generally understood to mean the supply of energy to a machine and the control of the various drive elements, i.e., the generation of movement by means of power transmission.

Drive technology is used in machine construction and automation technology, e.g., in converters, motors, inverter cabinet systems, transmission motors, couplings, generators, semiconductor technology, metrology machines, glass and wood processing machines and communications technology. In addition to these fields, drive technology is also used in the aerospace industry, machine tools, packaging machines and medical technology.

As a technical discipline, drive technology is concerned with overall ways of generating movement and supplying the energy and transmission systems that this requires. The main focus in this context is on the energy source, the propulsive source and the targeted operation of the system's subcomponents. In some areas of application – in particular in the field of motor vehicle engineering – the powertrain also plays a central role; this component serves the purpose of transferring energy and represents the link between multiple system components.

Drive technology systems also perform much important work in small spaces. It is only thanks to them that machine tools and packaging machines are able to produce consumer goods economically and at constant quality. Precision gears play a forward-looking role in medical engineering, where they are integrated into therapeutic instruments to help patients regain vital functions, such as leg and hand mobility. Other fields of application, in addition to those described above, include semiconductor technology, machines used in the fields of measuring apparatus, glass and wood processing, and communications engineering.

In addition to the above, Drive Technology plays an important role in machine and plant engineering in the context of factory automation in the context of Industry 4.0. Preventive Maintenance (preventive maintenance), Predictive Maintenance (predictive maintenance) or Condition monitoring (Machine condition monitoring) is integrated into countless mechanical and electrical applications. Sensors, encoder and communication technology have found their way into engines, transmissions, Rolling and even clutch or brakes.

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However, one drive is not like another – the type of drive plays a decisive role in determining its optimum use. Relevant drive constructions include the electric type, based on electric motor technology, as well as pneumatic and hydraulic designs. The latter two come from the field of fluid technology and enable energy to be transmitted by means of either compressed air or hydraulic fluids, respectively.

The advantages generally associated with electrical drive technology include uncomplicated handling, precise control, and low maintenance costs. The characteristic of this type of drive is that it functions by converting electrical energy to mechanical energy, and the operation and functionality of the drive can be regulated to keep them working at a constant level despite variations in the dynamic conditions in which they are employed. Thanks to their progressive development, this type of drive technology is suitable for use in both small devices and large structures. It is highly likely that this area of electric drive technology will undergo an expansion of its applications thanks to the need for renewable energies, which promises to be a sustainable new field for these devices.

(The writer is an Senior Research Analyst at VeKommunicate)

OPINION COLUMN

Environment Equity

Saloni Goyal

AI and Waste Management

With recent advancements, the idea of artificial intelligence (AI) is spreading. The Internet of Things (IoT) Technologies, along with AI, are transforming every element of human life. The World Bank also estimates that worldwide waste generation might reach 3.4 billion tonnes annually. AI as a technology can be applied to waste management practices to achieve efficiency and optimisation.

The role of AI in waste management can streamline in complete value chain, starting from waste collection and community smart waste bins, which assist in waste separation as per the materials.

Waste Management: Indian Scenario

According to government estimates, municipal solid waste produced across the country each year is around 62 million tonnes, which could reach to 165 million tonnes by 2030.

Waste management often incorporates a wide range of technical, climatic, environmental, demographic, and socioeconomic elements. Using traditional methods, such as complicated nonlinear systems and unstructured supply chains, is difficult to understand and optimise. AI tools have lately gained traction in providing alternative computational approaches to solving solid waste management (SWM) concerns. AI has successfully dealt with ill-defined situations, learned from experience, and dealt with ambiguity and insufficient data.

Within India, some companies have started developing AI products like waste sorters for processing plants and for cleaning water bodies. For example, Kabadiwalla Connect brought technology into the equation, piloting AI-powered solutions to connect waste collectors with recycling facilities and empowering the informal sector to decentralize waste management.

The company did a pilot project in Chennai where they created a Point of Sale (PoS) device for a scrap shop to register waste pickers as suppliers and authorize their transactions. The shop was handling about 800 kilograms of plastic each month. The company put a QR code on each bag of sack, which can be traced down to the original order. In addition, has also distributed smart bins for 1,500 households in Chennai. The Internet of Things (IoT) system helps track the quality and volume of segregation at each apartment, helping waste pickers plan their collections.

Recently, Meghalaya as a state introduced AI to solve the state's growing waste problems. The state has adopted AI-powered robotic technology to keep its tourist hotspot, Umiam Lake, free of pollutants.

Given the significant quantum of waste being produced and the increasing population of India, the use of AI in waste management can have huge rewards for the entire ecosystem and additionally require huge investment, which could be done through Public-Private Partnerships.

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