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AI-driven Reforms 3.0: Artificial Intelligence as Public Digital Infrastructure for India's Next Growth Phase

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Recent Developments:

- Experts have proposed **Reforms 3.0**, a roadmap that places **Artificial Intelligence (AI)** at the centre of India's next phase of economic transformation by treating AI as a **public digital infrastructure**.
- The proposal aims to achieve a sustained **Bharat Rate of Growth** of more than **8%** over the next decade by shifting India from a technology consumer economy towards a **sovereign AI ecosystem**.
- The Government of India has already launched the **IndiaAI Mission** with an objective to build an AI innovation ecosystem through public-private partnerships, improved computing access, indigenous capabilities and responsible AI development.
- India is also strengthening semiconductor capabilities through the **India Semiconductor Mission**, aimed at developing a domestic semiconductor and electronics ecosystem.

Concept of Reforms 3.0 and Bharat Rate of Growth:

Evolution of India's Economic Reform Journey:

- **Reforms 1.0 (1991):** Initiated after the **Balance of Payments crisis**, introducing **Liberalisation, Privatisation and Globalisation (LPG)** reforms that accelerated economic growth.
- **Reforms 2.0 (Post 2010s):** Focused on building **Digital Public Infrastructure (DPI)** through platforms such as biometric identity systems, **Unified Payments Interface (UPI)** and affordable mobile internet.
- **Reforms 3.0:** Represents a shift from physical and basic digital infrastructure towards **cognitive infrastructure**, where AI becomes a key driver of productivity, innovation and economic growth.

Meaning of Bharat Rate of Growth:

- Historically, India's growth rate remained around **3.5% to 4%** for several decades after independence, often referred to as the **HindRate of Growth**.
- The proposed **Bharat Rate of Growth** aims to achieve an inclusive, technology-driven growth rate of **8% or above** through AI-enabled productivity improvements and innovation.

Key Proposals under AI-driven Reforms 3.0:

National AI Token Policy:

- India should introduce a **National AI Token Policy** within the next few years to make advanced AI computing resources accessible to researchers, startups and educational institutions.
- The policy proposes **Public-Private Partnerships (PPPs)** with global cloud and technology companies to develop sovereign AI infrastructure.
- Similar to the **Jio effect** in telecommunications, affordable AI access can democratise cognitive computing.

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- Proposed measures include:
- Free AI research tokens for premier institutions such as **Indian Institutes of Technology (IITs)** and **Indian Institute of Science (IISc)**.
- **Application Programming Interface (API)** sandboxes for startups.
- AI literacy programmes in schools.

Subsidising Cognitive Capacity:

Need for Greater AI Research Investment:

- India spends only around **0.65% of GDP** on **Research and Development (R&D)**, significantly lower than countries such as:
- Israel,
- South Korea,
- United States,
- China.
- Experts suggest shifting a portion of traditional physical subsidies towards **cognitive subsidies** that enhance knowledge, computing power and innovation capacity.

Affordable AI Access Model:

- Providing AI access to universities, research institutions and schools would require a relatively small share of national expenditure compared with existing welfare subsidies.
- Such investment can create:
- AI-skilled workforce,
- Research capacity,
- Startup innovation,
- Indigenous AI solutions.

Building Sovereign AI Infrastructure:

Need for Domestic AI Capability:

- India should host major open-source AI models along with indigenous AI models on domestic infrastructure to reduce dependence on foreign AI platforms.
- Dependence on external **Application Programming Interfaces (APIs)** creates strategic risks because access restrictions can affect national AI capabilities.
- AI infrastructure should be treated as a strategic national capability similar to critical sectors such as space and nuclear technology.

Infrastructure Requirements:

- Large-scale AI deployment requires:
- High availability systems with minimal downtime,
- Low-latency access across Tier-2 and Tier-3 cities,
- Strong data security and domestic data residency frameworks.
- Building such infrastructure is essential for making AI accessible beyond metropolitan areas.

Diversifying AI Compute Hardware:

Challenge of Hardware Dependency:

- AI development requires massive computing power through specialised chips and processors.

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- Excessive dependence on a limited number of global hardware suppliers can increase costs and create strategic vulnerabilities.

Proposed Hardware Strategy:

- A balanced hardware ecosystem has been suggested:
- **40%:** Domestic inference workloads through alternative AI processors.
- **30%:** Academic research and model training through specialised processing units.
- **30%:** High-performance graphics processors for advanced training and compatibility.

Public-Private Partnerships and Market Leverage:

Using India's Market Advantage:

- India's large consumer base can act as a strategic advantage while negotiating with global technology companies.
- The government can provide:
 - Land,
 - Energy access,
 - Data policy support, in exchange for cloud infrastructure and computing capacity.

Cross-Subsidisation Model:

- Enterprise-level AI services can financially support affordable AI access for:
 - Education sector,
 - Research institutions,
 - Public services.

Developing Indic AI Ecosystem:

Language and Inclusion:

- India needs foundational AI models optimised for all **22 Scheduled Languages**.
- **Indic AI** can expand AI benefits to:
 - Rural communities,
 - Local governance,
 - Agricultural sector,
 - Healthcare services,
 - Regional legal systems.
- Language-focused AI development can reduce the digital divide created by English-dominated AI systems.

Challenges to AI-driven Reforms 3.0:

Compute-Energy-Climate Trilemma:

- AI data centres require significantly higher electricity consumption compared with traditional cloud infrastructure.
- Large-scale AI expansion may increase pressure on:
 - Power systems,
 - Water resources,
 - Climate commitments.
- India must balance AI growth with its **Net Zero target of 2070**.

Semiconductor Supply Chain Vulnerability:

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- Advanced AI requires specialised semiconductor chips, but India currently lacks advanced semiconductor fabrication capability.
- Dependence on global chip supply chains creates vulnerability due to:
- Geopolitical tensions,
- Export restrictions,
- Supply disruptions.
- The **India Semiconductor Mission** aims to build a stronger domestic semiconductor ecosystem and reduce import dependence.

Political Economy of Subsidy Reform:

- Shifting resources from traditional subsidies towards AI and knowledge infrastructure may face political resistance.
- Reducing existing welfare expenditure can create social and political challenges, especially in rural areas.

Tokenisation Bias in AI:

- Current Large Language Models (LLMs) often process Indian languages less efficiently than English.
- This creates a **token cost disadvantage**, increasing computing requirements and making AI access more expensive for Indic languages.

Deficit in Algorithmic Governance:

- AI deployment is advancing faster than legal and regulatory frameworks.
- Major governance concerns include:
- Data protection,
- Algorithmic bias,
- Deepfake regulation,
- AI accountability,
- Intellectual Property Rights (IPR) related to training data.
- Effective implementation of the **Digital Personal Data Protection Act, 2023** remains important for responsible AI governance.

Last-Mile AI Infrastructure Challenge:

- Delivering AI services beyond major cities requires strong:
- Edge computing networks,
- 5G connectivity,
- Optical fibre infrastructure.
- Uneven digital connectivity in rural areas can limit inclusive AI adoption.

India's Existing Initiatives Supporting AI Economy:

Major Government Programmes:

- **IndiaAI Mission:** Builds AI innovation ecosystem, computing access, startups and responsible AI development.
- **India Semiconductor Mission:** Develops semiconductor manufacturing, design and supply chain capabilities.
- **National Supercomputing Mission:** Expands high-performance computing capacity.
- **BHASHINI:** Promotes language translation technologies for Indian languages.
- **Digital Public Infrastructure:** Provides scalable digital platforms for public services.

Way Forward:

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Building an Inclusive AI-powered Economy:

- India should focus on affordable AI access, indigenous innovation and responsible governance rather than only technology adoption.
- Government's role should be to create enabling policies, regulatory frameworks and infrastructure so that private innovation can scale.
- A combination of:
 - Skilled human capital,
 - Strong digital infrastructure,
 - Domestic AI capability,
 - Stable policy environment,
- can help India achieve sustained high growth.

UPSC Value Addition:

Important Concepts:

- **Artificial Intelligence:** Technology enabling machines to perform tasks requiring human-like intelligence such as learning, reasoning and decision-making.
- **Public Digital Infrastructure:** Shared digital platforms created for large-scale public and economic use.
- **Sovereign AI:** National capability to develop, control and deploy AI systems with reduced external dependence.
- **Cognitive Infrastructure:** Knowledge-based infrastructure involving data, computing power, research and innovation.
- **AI Governance:** Framework of laws, ethics and institutions ensuring safe and accountable AI use