

# Indian Innovation Policy & Innovation System: *Evolution & Context*

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# Indian Innovation System before 1991

- **Self-reliance** became an end in itself
  - Efficiency & productivity under-emphasised
- **Public sector** - fountainhead of indl devpt
  - Locus of complex tech acquisition
- **Private sector constrained**
  - Restrictions on growth & diversification (licensing),
  - Technology & capital flows (import, forex controls)
  - [Also limited competition!]

# Indian Innovation System before 1991

- **Reservation for small sector**
  - **Govt dominance of R&D activity**
    - Source of finance & location of R&D work
    - Big allocations to vertically integrated strategic sectors (atomic energy, space, defence)
    - Network of National Labs (CSIR, Defence, etc.)
  - **Recognition of importance of higher technological learning**
    - IITs, RECs, but weak links with industry
- ⇒ ***Strong technological capabilities but not manifested in the industrial sector***

# Policy Reforms

- Response to crisis
  - But addressed some structural issues
- Deregulation of licensing, imports, exports, technology flows
- Stated desire to inject “the desired level of technological dynamism in Indian industry”
- **Focus on Economic Growth**
- Recent emphasis on *more inclusive* growth

# Structure of the Indian Economy

	Share in GDP (%)		Growth per annum		
	1990-91	2001-02	1995-96	2001-02	2002-03
Service	43.7	53.0	10.5	6.8	7.1
Industry	25.4	21.8	11.6	3.3	6.0
Agri	30.9	25.2	-0.9	5.7	-3.2
Total	100	100	7.3	5.6	4.3

<b>INDIA</b>	1980s	1990s	2000
Poverty Incidence %	44.5	36.0	26.1
Literacy rate 7+ %	44	52	65
Life expectancy at birth (years)	56	60	61
Infant mortality 0-4 years (per 1000)	115	79	68
Access to improved water source %	N.A.	68	78
Households with toilets %	N.A.	30	36
<i>Source: World Bank</i>			

# Indian Innovation System after 1991

- **Explosive growth in services**
  - Software sector successful in leveraging resource base to exploit market opportunity
  - Today, >\$10B in exports, 2% of GDP
  - New IT-enabled services sector
    - *But difficult to break out of low value-addition*
  - Telecom, financial services helped by IT, but no major technological innovation involved



# Indian Innovation System after 1991

- **Liberalization opportunity for orgns to build on capabilities, find markets that value their outputs**
  - Capabilities enhanced in select sectors – pharmaceuticals, automobile components, two-wheelers
  - Demand growth, regulation, competition & role models are drivers of innovation
  - Increased focus on quality
  - More companies ↑ on the competitiveness continuum
- **Lack of synergies between manufacturing & services**

# IIS After 1991: Other Dimensions

- **Engg Education: Huge expansion (quality?)**
  - 1990      339 instns              87,000 places
  - 2002    1208 instns             360,000 places
  - All 171 new instns surveyed deficient!
- **Entrepreneurship**
  - Higher status, at least in new economy
- **Geographical Clustering**
  - “Balanced devpt” → Urban concentration
- **Labour Movement**
  - Loss of bargaining power
- **Agriculture, Healthcare sectors need attention**

# IIS After 1991:

## Govt. Support for Tech Innovation

- Programmes to support private industrial sector
  - Absorption of technology from TIs/labs (PATSER)
  - Scaling-up of indigenous technology (HGT)
  - Innovators → Technology-based entrepreneurs (TePP)
  - New technology development/commercialisation (NMITLI/TDB)
- Tax benefits
  - Income tax, excise & customs duties
- National expenditure on R&D remains in range of 0.7-0.8% of GNP
  - But private sector contribution up from 13.8% to 21.6%
  - R&D intensity of Indian industry ~ 0.52% (1998-99)

## Research & Development Expenditure in India

	National R&D expenditure as % of GNP	% Share of private sector industry in national R&D expenditure
1990-91	0.79	13.8
1991-92	0.78	NR
1992-93	0.76	NR
1993-94	0.79	16.2
1994-95	0.73	19.9
1995-96	0.71	21.7
1996-97	0.72	26.1
1997-98	0.77	22.9
1998-99	0.81	21.6

Source: *Research & Development Statistics 2000-01*, Department of Science & Technology, Government of India, May 2002.  
(NR=not reported)

# Annual Spending on Tech Innovation related to Industry

	Rs. Million	US\$ m
• By Industry	32,000	727
By Government:		
• CSIR	10,000	227
• NMITLI	400	9
• TDB	600	13.5
• PATSER	100	2.25
• HGT, others	100	2.25

[Approx. figures]

# Features

- Schemes cover entire innovation chain
- Total govt support for innovation in indl sector
  - (excluding value of tax breaks, CSIR)
  - Rs. 1.2 billion per year
  - ~ 1% of total govt R&D funding!
- This funding is spread over multiple projects
- Multiplicity of schemes, funding mechanisms
- Preference for existing companies (cf. start-ups)
- Focus on technologies from national labs?

# The Political Economy of Indian Innovation Policy

## *Industry*

- Quality, cost competitiveness urgent priorities - innovation not on main agenda of industry bodies
- NASSCOM focused on interest of large software services companies
- Small sector has lost clout in FDI-driven economic model

# The Political Economy of Indian Innovation Policy

## ***Government***

- Believes in “let markets work”
- Sees government role as removing constraints in business functioning, attracting investment
- Policy-making dominated by economists holding this view
- Influenced bodies like the Planning Commission as well



# The Political Economy of Indian Innovation Policy

***Government: How have the new schemes originated?***

- Modification of existing schemes or initiatives of individual policy makers with ideas & influence
- Generally, from S&T ministries

# Recent Developments Spur Optimism

- “Full amount of R&D cess will be made available to TDB” – Indian Finance Minister
- Showcasing of industrial sector R&D on Technology Day
- India-Israel R&D Cooperation Agreement

# Conclusions

- Increase awareness of potential benefits of policy support for high-tech ventures
- New models (public-private partnerships?) that allow flexibility & accountability
- Diffusion and commercialisation of strategic sector innovations
- Small country environment in large country like “small company in large company”
- Complementarities, right partners

For further details, and a list of references,  
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