The Future of Indian industry

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The future of Indian industry

- The future of Indian industry - four "mores"
  - more ethical
  - more international
  - more technology-focused
  - more collaborative as good corporate citizens

- The global context
  - a "stepping-back from the world" world
  - a historic opportunity for india
    - India can step up - drawing on core national strengths
    - Indian industry must play its part

For India to lead

- Indian industry must be more
  - Ethical – the CII Governance Code
  - International
    - open to Imports as the best way of enhancing exports
    - Investment in emerging markets - 1000 mncs with Indian roots
      - In CII we have started with 120
  - Technology-focused - the rest of this presentation
  - Collaborative as good corporate citizens

- An engaged and open India
  - not only open to trade, but adopting the mantle of unilateral free trade
  - an India that welcomes talent from everywhere
  - from cultural diversity comes .... cultural diversity

Investing more in Technology

- Both current and previous government have targeted raising the share of manufacturing in GDP from 15% to 25%. Without success over 25 years.
- Given that the reforms since 1991 were aimed at unleashing Indian Industry, why wasn't it done better?
- The answer lies in investment in technology
- For various historical reasons, Indian industry is skill and capital intensive
- Investment in R&D has not significantly changed since liberalization

Manufacturing Value-added % by sector over time in South Korea, China and India

Country	Sector	1970	1980	1990	2000	2010
China	Food, beverages and tobacco	-	10	15	14	12
	Textiles and clothing	-	18	15	11	10
	Machinery and transport equipment	-	19	16	14	24
	Chemicals	-	11	13	12	11
	Other manufacturing	-	42	42	48	43
India	Food, beverages and tobacco	13	9	12	13	10
	Textiles and clothing	21	21	15	13	9
	Machinery and transport equipment	14	17	17	16	19
	Chemicals	14	14	14	21	15
	Other manufacturing	39	39	42	38	48
Korea	Food, beverages and tobacco	26	17	11	8	6
	Textiles and clothing	17	19	14	8	4
	Machinery and transport equipment	7	9	30	41	50
	Chemicals	11	10	9	10	7
	Other manufacturing	40	44	36	33	32

R & D as % of GDP over time

Country	R&D % GDP in 1980	R&D % GDP in 1984	R&D % GDP in 1988	R&D % GDP in 1992	R&D % GDP in 1996	R&D % GDP in 2000	R&D % GDP in 2004	R&D % GDP in 2011	R&D % GDP in 2014
South Korea	0.6	1.2	1.9	2.1	2.2	2.2	2.5	3.8	4.3
Taiwan	NA	NA	NA	NA	1.8	NA	2.6	3.0	3.0
Singapore	0.3 (1981)	0.5	0.9	0.9 (1990)	1.3	1.8	2.1	2.2	2.2
China	NA	NA	0.7	0.6	0.6	0.9	1.2	1.8	2.1
Brazil	NA	NA	NA	0.8 (1994)	0.8	1.0	0.9	1.2	1.2
India	0.6	0.8	0.9	0.7	0.6	0.7	0.7	0.8	0.9
Mexico	NA	0.6	0.2	0.2	0.3	0.3	0.4	0.4	0.5
Thailand	0.4	0.3	0.2 (1987)	0.2 (1991)	0.1	0.2	0.3	0.4	NA

Who does the R&D?

Country	Total R&D Expenditure (USD billion)	Corporations (% of Total)	Public Research Institututes (% of Total)	Universities (% of Total)
United States	482	71	11	18
China	203	77	16	7
Japan	156	78	8	14
Germany	110	68	15	17
France	64	65	13	22
United Kingdom	54	64	8	28
Korea	51	78	11	11
Canada	34	50	9	41
Australia	32	56	11	33
Russia	30	60	30	10
India	17	35	61	4
World	1500	71	12	17

How India differs

- Indian industry invests 0.3% of GDP in R&D compared to 1.5% globally
  - R&D intensive sectors, R&D intensity, and global R&D giant firms
- Research done in the higher education system is 0.04% of GDP in India compared to 0.4% globally
- The problem is not how much public spending on research (0.6% in India compared to 0.6% globally) but where it is done – autonomous R&D labs
  - the world does its public research in the higher education sector for many good reasons
  - the apprentice-journeyman benefit
  - teaching and research both benefit
  - we would simultaneously enrich our public research while hugely boosting our development of human capital

Industrial R & D by Sector for the top 2500 global R & D spenders

Rank	Sector	R&D expenditure 2014 USD (million)	R&D % of Total (for top 2500 spenders)	Total No. of Companies	No. of Indian Companies	No. of Chinese Companies	No. of Korean Companies	No. of US Companies
1	Pharmaceuticals & Biotechnology	145401	18%	316	8	21	10	161
2	Automobiles & Parts	125136	16%	155	6	28	10	24
3	Technology Hardware & Equipment	124813	16%	316	0	37	7	130
4	Software & Computer Services	83743	10%	275	5	32	4	161
5	Electronic & Electrical Equipment	60773	8%	229	0	39	9	50
6	Industrial Engineering	32300	4%	199	1	30	2	41
7	Chemicals	27817	3%	133	1	10	7	38
8	Aerospace & Defence	26829	3%	56	0	6	0	19
9	General Industrials	23417	3%	96	0	15	7	24
10	Health Care Equipment & Services	17361	2%	100	0	5	0	60
	Top 3 Sectors	395350	50%	787	14	86	27	315
	Top 10 Sectors	667590	83%	1875	21	223	56	708
	Total (2500 Firms)	801749		2500				

R&D Intensity by Sector (2014-15)

Sector	Company	Reported R&D Intensity	Top 2500 Global Average R&D Intensity
Pharmaceuticals & Biotechnology	Dr. Reddy'S Laboratories Ltd.	11.8	18
	Cadila Healthcare Ltd.	9.5	
	Lupin Ltd.	8.9	
	Cipla Ltd.	8.2	
	Sun Pharmaceuticals Industries Ltd.	7	
Auto	Tata Motors Ltd.	6.1	5
	Mahindra & Mahindra Ltd.	3.7	
	Bajaj Auto Ltd.	1.7	
	Ashok Leyland Ltd.	1.4	
	Maruti Suzuki India Ltd.	1.3	
Software and Computer Services	Ramco Systems Ltd.	27	18
	Infosys Ltd.	1.3	
	H C L Technologies Ltd.	1.1	
	Tata Consultancy Services Ltd.	0.9	
	Polaris Consulting & Services Ltd.	0.5	

R&D Intensity by Sector (2014-15) contd.

Chemicals	Syngenta India Ltd.	3	5
	U P L Ltd.	1.4	
	Reliance Industries Ltd.	0.3	
	Hindustan Unilever Ltd.	0.2	
	Indian Oil Corpn. Ltd.	0.1	
Industrial Engineering	Bharat Heavy Electricals Ltd.	3.3	4
	B E M L Ltd.	2.7	
	Escorts Ltd.	2.2	
	T R F Ltd.	1.8	
	Cummins India Ltd.	0.6	
Electronics and Electrical Components	Electronics Corporation Of India Ltd.	3.6	7
	Crompton Greaves Ltd.	0.9	
	Bharat Electronics Ltd.	0.5	
	Philips India Ltd.	0.3	
Technology Hardware and Equipment	Zen Technologies Ltd.	16.6	14
	Genus Power Infrastructures Ltd.	10.6	
	Astra Microwave Products Ltd.	3.7	
	I T I Ltd.	2.1	
	Bharat Dynamics Ltd.	0.8	
General Industrials	Hindustan Aeronautics Ltd.	6.7	3.2
	Titan Company Ltd.	0.2	
Oil and Gas	Oil India Ltd.	0.7	0.5
	Oil & Natural Gas Corpn. Ltd.	0.5	
	Cairn India Ltd.	0	
Construction and Materials	Larsen & Toubro Ltd.	0.4	1.7
	Indian Hume Pipe Co. Ltd.	0.3	
	V A Tech Wabag Ltd.	0.1	
	Rail Vikas Nigam Ltd.	0	

Top 25 R &D Spending Firms world-wide

Global rank	Name	Country	Sector	R&D expenditure (US dollars, billion)
1	VOLKSWAGEN	Germany	Automobiles & Parts	17.3
2	SAMSUNG	South Korea	Electronic & Electrical Equipment	16.1
3	MICROSOFT	US	Software & Computer Services	13.1
4	INTEL	US	Technology Hardware & Equipment	12.5
5	NOVARTIS	Switzerland	Pharmaceuticals & Biotechnology	10.8
6	GOOGLE	US	Software & Computer Services	10.7
7	ROCHE	Switzerland	Pharmaceuticals & Biotechnology	9.8
8	JOHNSON & JOHNSON	US	Pharmaceuticals & Biotechnology	9.2
9	TOYOTA	Japan	Automobiles & Parts	9.0
10	PFIZER	US	Pharmaceuticals & Biotechnology	9.0
11	GENERAL MOTORS	US	Automobiles & Parts	8.0
12	MERCK US	US	Pharmaceuticals & Biotechnology	7.9
13	FORD	US	Automobiles & Parts	7.5
14	DAIMLER	Germany	Automobiles & Parts	7.4
15	HUAWEI	China	Financial Services	7.2
16	CISCO SYSTEMS	US	Technology Hardware & Equipment	6.7
17	ROBERT BOSCH	Germany	Automobiles & Parts	6.6
18	APPLE	US	Technology Hardware & Equipment	6.5
19	SANOFI	France	Pharmaceuticals & Biotechnology	6.3
20	HONDA	Japan	Automobiles & Parts	6.0
21	BMW	Germany	Automobiles & Parts	6.0
22	ORACLE	US	Software & Computer Services	6.0
23	QUALCOMM	US	Technology Hardware & Equipment	5.9
24	SIEMENS	Germany	Electronic & Electrical Equipment	5.8
25	IBM	US	Software & Computer Services	5.7
	Total			217.0

India needs to transform its R&D system

- Rapidly grow the share of industry in national R&D to global levels (35% to 70%)
- While growing R&D as a share of GDP to global levels (0.9% to 2%)
- While GDP itself grows rapidly (8 – 10%)

- What does transformation look like?
  - Consider South Korea between 1970 and 1990
  - Or China between 1996 and 2014

R & D and Industrial R & D in India and South Korea

	1970	1980	1990	2000	2010	2014
India						
R&D as % of GDP	0.35%	0.6%	0.6%	0.7%	0.8%	0.9%
Share of Industry in total R&D	15%	20%	25%	30%	33%	35%
Korea						
R&D as % of GDP	0.4%	0.8%	1.9%	2.7%	3.7%	4.2%
Share of Industry in total R&D	13%	36%	81%	74%	75%	78%

R & D and Industrial R & D in India and China

	1996	2000	2005	2010	2014
India					
R&D as % of GDP	0.6%	0.7%	0.8%	0.8%	0.9%
Share of Industry in total R&D	25%	30%	30%	35%	35%
China					
R&D as % of GDP	0.6%	0.9%	1.3%	1.7%	2.1%
Share of Industry in total R&D	43%	60%	68%	73%	77%

Top R & D spenders in South Korea, China and India

India				China				Korea			
S.No.	Company	Sector	R & D Expenditure (US $ Million)	S.No.	Company	Sector	R & D Expenditure (US $ Million)	S.No.	Company	Sector	R & D Expenditure (US $ Million)
1.	TATA MOTORS	Auto	360	1.	HUAWEI	Technology Hardware	7,182	1.	SAMSUNG	Electronic & Electrical	16,087
2.	SUN PHARMA	Pharma	319	2.	PETROCHINA	Oil & Gas	2,325	2.	LG	Electronic & Electrical	3,428
3.	MAHINDRA	Auto	251	3.	ZTE	Technology Hardware	1,830	3.	HYUNDAI	Auto	1,889
4.	RELIANCE	Chemicals	199	4.	CHINA RAILWAY	Construction & Materials	1,725	4.	SK HYNIX	Technology Hardware	1,573
5.	DR REDDY'S	Pharma	195	5.	CHINA RAILWAY CONSTRUCTIO N	Construction & Materials	1,543	5.	KIA S	Auto	1,107
6.	LUPIN	Pharma	179	6.	LENOVO	Technology Hardware	1,265	6.	SAMSUNG ELECTRO	Electronic & Electrical	558
7.	HAL	General	171	7.	BAIDU	Software	1,240	7.	KOREA ELECTRIC POWER	Electricity	540
8.	BHEL	Industrial	166	8.	TENCENT	Software	1,233	8.	POSCO	Metals	523
9.	CIPLA	Pharma	138	9.	SAIC MOTOR	Auto	1,214	9.	HYUNDAI MOBIS	Auto	487
10.	INFOSYS	Software	99	10.	CSCE	Construction & Materials	1,009	10.	KT	Technology Hardware	473

Top 10 Software Companies in India & China

INDIA					CHINA			
S.No.	Company	R & D Expenditure (US $ Million)	Sales (US $ Million)	R & D as a % of Sales	Company	R & D Expenditure (US $ Million)	Sales (US $ Million)	R & D as a % of Sales
1	TATA CONSULTANCY SERVICES LTD.	145	15106	1.0	TENCENT	1131	12856	8.8
2	WIPRO	40	7547	0.5	DIGITAL CHINA	70	8782	0.8
3	INFOSYS LTD.	96	7422	1.3	BAIDU	1137	7989	14.2
4	H C L TECHNOLOGIES LTD.	29	2735	1.1	AISINO	51	3230	1.6
5	LARSEN & TOUBRO INFOTECH LTD	9	771	1.2	NETEASE.COM	216	1908	11.3
6	ORACLE FINANCIAL SERVICES SOFTWARE	48	678	7.1	QIHOO 360 TECHNOLOGY	405	1386	29.2
7	ROLTA INDIA LTD.	33	583	5.6	LESHI INTERNET INFORMATION & TECHNOLOGY CORPORATION	131	1101	11.9
8	MINDTREE LTD.	3	581	0.6	DHC SOFTWARE	29	822	3.6
9	POLARIS CONSULTING & SERVICES LTD.	2	267	0.6	YOUKU TUDOU	66	678	9.8
10	3I INFOTECH LTD.	1	216	0.4	SHANGHAI BAOSIGHT SOFTWARE	78	659	11.8

Our historic opportunity

- A transformed innovation system can deliver a transformed Indian industry
  - The share of manufacturing might even grow
  - And open markets world-wide
- Good corporate citizenship to harvest India's demographic dividend by including 1.3 B in our growth
  - Education and Skills
    - Primary, secondary and higher education reform
    - Skills in job-creating sectors – construction and informal services
  - This can create thirty years of growth for industry – in India and the world
- Cultural diversity can attract talent from everywhere

Technology Imports into India compared, 1960 – 1998

Year	Japan	Korea*	Brazil	India	Israel	Mexico
1960	95	-	-	-	-	-
1965	170	0.2	-	-	-	-
1970	430	10	-	-	-	-
1975	710	20	-	-	-	-
1980	1,440	100	300	-	-	-
1985	2,075	303	150	25	50 (1987)	230 (1987)
1990	6,040	1,360	150 (1989)	70	70	380
1995	9,400	2,385	530	90	160	480
1998	9,000	2,370	1,075	200	210	450

Charges for the Use of Intellectual Property (2014)

Country Name	Payments ($US Million)	Receipts ($US Million)	Deficit/Surplus ($US Million)
United States	42124	130361	88237
China	22614	676	-21937
Japan	20942	37336	16395
United Kingdom	11225	19826	8601
Korea	10546	5167	-5379
Germany	9311	14993	5681
Russia	8021	666	-7356
Brazil	5923	375	-5548
India	4849	659	-4190