

FOREIGN COLLABORATIONS IN INDIA

A Study of Patterns in the Pre and the Post- liberalisation Era

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ABSTRACT

Developing countries like India have been using import of technology through foreign collaboration as a strategy to bridge the technological gaps in the country, to expedite economic development. There have not been many studies, however, to understand its impact and implications for technological capacity building of the country, and the deficiencies to be overcome for deriving the maximum benefits from collaborations. Experience also shows that many a collaborations have failed to fetch results as expected, and many have run into rough weather in implementation. There is thus, a need for comprehensive, systematic studies on the subject to help the decision makers at various levels in the industry and government.

This study, based upon authentic databases available from the Indian Investment Centre, New Delhi and Centre for monitoring Indian Economy makes an effort to address some of the above issues. It analyses the patterns of foreign collaborations in India, spanning a period of 50 years from 1951 to 2000, divided into two parts, the pre and post liberalization era. The study reveals significant patterns in terms of the level of collaboration (both in terms of number and value), the nature of collaborations and the patterns by industry, partner countries and trade blocks. The study also reports significant, albeit, preliminary findings on the patterns by individual Indian firms in the corporate sector. The findings indicate that prima facie the trends are indicating that the country's dependence on import of technology is increasing, which is not congenial for enhancing its global competitiveness congenial for sustainable, mutually beneficial international trade and that this may not be in the best interest of even the developed world. The study suggests the need for developing alternative strategies for technological and managerial competence building as a key to sustainable and mutually beneficial international trade.

4.0 FOREIGN COLLABORATIONS IN INDIA: A Study of Patterns in the Pre and Post Liberalisation Era

4.1 Introduction

Developing countries like India have been using import of technology through foreign collaboration as a strategy to bridge the technological gaps in the country, to expedite economic development¹. There have not been many studies, however, to understand its impact and implications for technological capacity building of the country, and the deficiencies to be overcome for deriving the maximum benefits from collaborations. Experience also shows that many a collaborations have failed to fetch results as expected, and many have run into rough weather in implementation². There is thus, a need for comprehensive, systematic studies on the subject to help the decision makers at various levels in the industry and government.

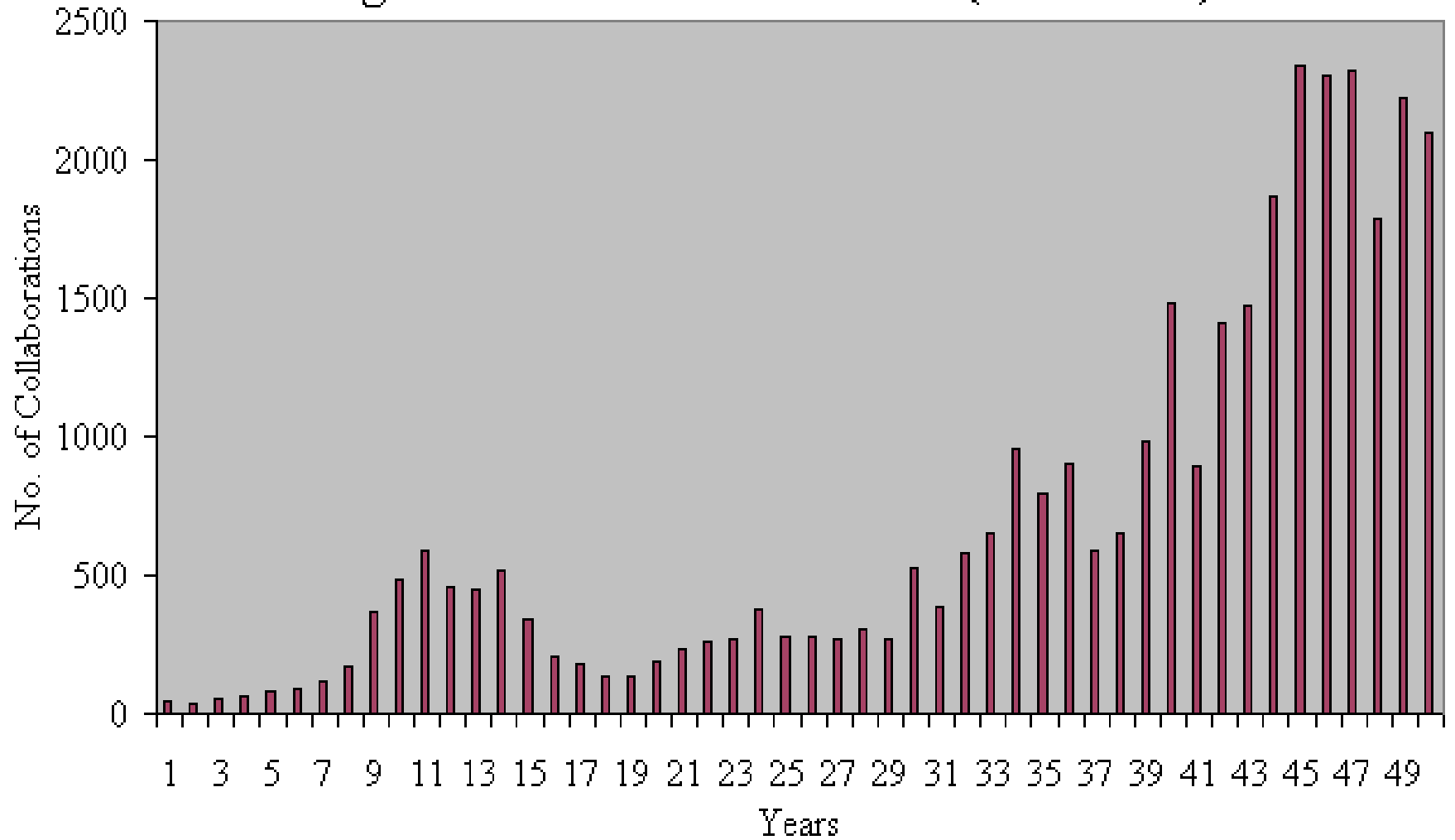
This study makes an effort to address some of the above issues. It analyses the patterns of foreign collaborations in India, spanning a period of 50 years from 1951 to 2000, divided into two parts, the pre and post liberalization era. The study reveals significant patterns in terms of the level of foreign collaborations in India (both in terms of number and value), the nature of collaborations, the patterns by partner countries and trade blocks and by industry sectors. The study also reports significant, albeit, preliminary findings on the patterns by individual Indian firms in the corporate sector. The findings raise certain questions on the technological capacity building of India and the staleness of corporate strategies of Indian firms to meet the emerging challenges of global competition. It also reflects on the role being played by Indian corporate leaders in turning India into more of a global market than making it a global player. The paper also points out the need for close monitoring of the foreign collaborations and for developing relevant databases in public domain to facilitate systematic, comprehensive studies for practicing managers as well as policy makers.

The data sources for the study are primarily the information available at the Indian Investment Centre, New Delhi and the PROWESS databases developed by the Centre for monitoring Indian Economy (CMIE). Two other data bases by title CAPEX and FS2001 from CMIE have also been used for the analysis in section 6 and 7 respectively.

4.2 Number Foreign Collaborations in the Pre and Post-liberalization Era

The number of foreign collaborations has been increasing on a cyclical manner in the first forty years, from 1951-91, starting with a meager 44 collaboration in the year 1951, it increased to 592 in the year 1961 and then suddenly to 402 in 1962, the year in which India faced war with China. The number of collaborations hovered around the same figure.

Foreign Collaborations in India (1951-2000)



until 1965, when India faced war with Pakistan, when number dropped further to 343. This was followed with further decline due to political turmoil and rapid changes in government policies, marked with stricter regulatory requirements. The trend continued more or unchanged during 1970s, when the country underwent dramatic changes in political arena, with the imposition of emergency followed by short lived Janata Party government at the Centre. Eighties, however, saw the return to the rising trend, which became steeper and steeper in the 1990s, Total number of collaborations in the eighties equaled the total number of collaborations in the three decades of 1950s, 1960s and 1970s. The period 1991-2000 saw total number of collaborations in the decade surpassing the total number of all the collaborations in the 4 decades preceding it. Indeed, the total number collaborations in the 9 years of post- liberalization (1992-2000) period is observed to be 17810, while in the 41 years of pre- liberalization (1951-91), there were only 15105 foreign collaborations. *India is thus banking on expert technological support for goods and services at an accelerated pace than in the pre-liberalization era. The rise in number is substantial in the post liberalization era, 10-fold compared to the decade of 1950s, 5- fold compared to the decades of 1960s and 1970s and 2-fold compared to the decade of 1980s.*

Table 1
Year-wise no. of Foreign Collaboration in India

Year	# of Collaborations	Year	# of Collaborations	Year	# of Collaborations	Year	# of Collaborations	Year	# of Collaborations
1951	44	1961	592	1971	232	1981	388	1991	891
1952	40	1962	452	1972	263	1982	579	1992	1407
1953	53	1963	443	1973	264	1983	653	1993	1476
1954	61	1964	521	1974	374	1984	955	1994	1864
1955	81	1965	343	1975	274	1985	798	1995	2337
1956	92	1966	203	1976	273	1986	906	1996	2303
1957	119	1967	179	1977	268	1987	590	1997	2325
1958	169	1968	131	1978	307	1988	648	1998	1786
1959	368	1969	138	1979	268	1989	979	1999	2224
1960	478	1970	185	1980	527	1990	1481	2000	2098
Total	1505		3187		3055		7976		18709

4.3 Collaborating Countries

An interesting development is observed in terms of number of countries with whom India

Table 2
Number of Collaborating Countries in the Pre and Post-liberalisation Era

# collaborations	Pre-liberalisation (1951-91)		Post- liberalisation (1992-2000)	
	No.of Countries	Cumulative	No.of Countries	Cumulative
≥ 3000	2	2	1	1
≥ 1000 but <3000	2	4	4*	5*
≥ 500 but <1000	3	7	6	11
≥ 100 but <500	6	13	13	24
≥ 50 but <100	6	19	8	31
≥ 10 but <50	4	23	27	59
≥ 1 but <10	2	25	55	113

including NR's which was nil in pre-liberalization era.

Table 3
Foreign Collaborations in the Pre and post-liberalisation Era

Rank	Country	Block	Foreign Collaboration upto 1991						Year									Total
			51-60	61-70	71-80	81-90	91	Total	1992	1993	1994	1995	1996	1997	1998	1999	2000	
1	USA	NAFTA	272	662	641	1517	177	3269	303	299	348	469	438	459	383	481	470	3650
2	GERMANY	EC	201	489	603	1375	194	2862	184	169	217	252	260	254	193	208	202	1939
3	UK	EC	618	922	602	1129	137	3408	169	172	193	201	204	204	152	193	163	1651
4	NRI							0	50	125	168	141	175	121	105	141	188	1214
5	JAPAN		88	269	253	709	72	1391	98	93	135	146	158	147	138	157	104	1176
6	NETHERLANDS	EC	25	54	47	155	52	333	56	56	89	146	116	103	75	116	90	847
7	MAURITIUS							0		8	8	71	95	141	101	146	205	775
8	ITALY	EC	42	82	114	418	60	716	61	55	86	121	93	114	86	92	63	771
9	FRANCE	EC	41	143	175	373	40	772	55	52	60	68	89	77	72	88	82	643
10	SWITZERLAND		65	177	215	344	52	853	74	62	56	85	73	92	53	60	57	612
11	SINGAPORE	ASEAN						0	31	41	64	65	66	86	51	71	74	549
12	KOREA (S)							0	45	35	40	60	63	82	49	62	31	467
13	AUSTRALIA							0	31	30	39	43	50	61	43	45	32	374
17	HONGKONG	ASEAN						0	9	16	26	34	30	32	19	28	35	229
14	CANADA	NAFTA	7	28	20	28	15	98	21	16	18	39	33	35	18	21	24	225
15	DENMARK	EC	19	30	26	78		153	16	16	16	28	23	24	18	23	27	191
16	AUSTRIA	EC	0	28	20	93	16	157	16	33	36	34	27	12	12	13	6	189
18	SWEDEN	EC	32	51	59	176	30	348	25	11	22	23	20	14	25	27	8	175
19	BELGIUM	EC	19	24	26	55	7	131	9	9	12	18	31	30	17	20	21	167
20	ISRAEL							0	3	8	14	55	29	19	13	9	3	153
21	MALAYSIA	ASEAN						0	3	7	11	20	15	39	13	21	17	146
22	TAIWAN							0	15	20	19	17	14	9	9	9	7	119
23	THAILAND	ASEAN						0	7	8	20	15	23	9	6	9	7	104
24	SPAIN	EC	0	1	9	29	5	44	9	8	7	11	10	11	14	20	12	102

has foreign collaborations. In the 41 years of pre-liberalization era, the foreign collaborations were limited to 25 countries only. ***In the post liberalization era, the number of countries, with whom India has entered into foreign collaboration, swelled to 112 (see exhibit 1 for details), a dramatic over 4-fold rise indeed.***

It would be noticed from the table 2 that the number of countries with whom India has very large number of collaborations (more than 1000 each) during the 41 years of pre-liberalisation era (1951-91) and the 9 years of post- liberalization era (1992-2000) has not changed substantially, except that ***NRI have engaged in a big way in the post liberalization era.*** But there has been a substantial rise in the number of countries with whom India did not have collaboration in the pre-liberalisation period, and has entered into collaboration only in the post liberalization era. This is true both for the 100-500 and below 100 collaborations categories. A look at exhibit I will reveal that ***foreign collaborations have been entered into even with very small countries,*** who are generally ***not considered to possess sound technological prowess*** to help bridge the technology gaps of India.

The data thus, indicates that in the post-liberalisation era, the country is entering into foreign ***collaborations for a variety of reasons rather than for importing technology to build industrial base or to bridge the technology gaps,*** most important among them being to increase variety for meeting the customers' choice of products and services, which is a major shift in pattern of collaborations in the post- liberalization period.

In term of level of collaborations in the post liberalization era (1992-2000) by number, USA tops the list followed by Germany, the Great Britain and Japan. This is followed by Netherlands, Mauritius (!), Italy, France and Switzerland. The next few places have been occupied by the ***south- east Asian countries,*** nearly. Singapore, Korea(s), Australia and Hong Kong, which did not have any collaborations in the pre-liberalization era, ***They have pushed other leading European countries namely Denmark, Austria,. Sweden & Belgium*** to the next lower position ***East European technology providers*** of pre- liberalization era, the giant like ***USSR, Hungry, Poland, Romania etc., are pushed down to positions lower than even the countries like Luxembourg,*** indicating a ***major shift in both, the geo-political considerations as well as the main purpose of foreign collaboration (bridging the technology gaps).***

Two more striking observations may be worth noting. Firstly, ***unlike the popular perception in the west, the foreign collaborations with east- European countries (U.S.S.R, Poland, Hungary, Romania, etc) have been far lower (10%total) than the western developed countries,*** which constituted the balance 90%. Secondly, the ***giants of Europe, namely Germany and the Great Britain have badly lost out to USA*** in terms of number of collaborations with India in the post liberalization era. Indeed, the entire ***west European block has now lost its business closeness with India to the USA*** and to some ***extent even to the south- east Asian countries*** as discussed later.

It would also be noted that from the table 3 in the ***1950s and 60s, U.K. alone had more collaboration with India than the U.S.A.*** and Germany. From 1970s onwards, it lost out to Germany and U.S.A. But still both (U.K. and Germany) had number of

collaborations very close to that with U.S.A. In the post liberalization era however, the **numbers of collaborations with U.S.A. exceeded the total number of collaboration with Germany and U.K. put together**. Another significant development observed is that while Netherlands has substantially increased number of collaboration (333 in 41 years to 847 in the 9 years of post-liberalisation period, Italy retained the number of collaborations more or less at the same level as in pre-liberalisation period (716 us 771), proportionately, **France has gone down** (772 in pre-liberalisation to 642 in post-liberalization). Likewise while Denmark, Austria and Belgium have almost equal number of collaborations in the pre-and post liberalization periods, proportionately **Sweden has gone down**.

On the other hand, the south-east Asian countries have emerged as a significant group of foreign collaborators, with Singapore, South Korea, Australia and Hong Kong becoming more significant than Denmark, Austria, Sweden, Belgium and Finland

4.4 Foreign Collaborations by Value

The foreign calibrations have also been analyses by value in terms of foreign equity. It will be seen from the table 4 that there has been a steep rise in the value of foreign collaboration in the post liberalisaation era. From table exhibit 4, it will also be seen that out of a total of 112 countries with whom India bas collaboration (see table 5), 21 countries have collaborations with 1% of total or more by value (i.e.; foreign equity), including U.S.A. & Canada, seven EU countries (U.K, Germany, France Netherlands, Italy, Belgium and Sweden), 4 south-east Asian countries (Malaysia, Singapore, Thailand and Hong Kong) and 8 others.

Table 4
Level of Foreign Collaboration in India by Value (Rs. in Million)

Year	Value
1992	26895
1993	88571
1994	141872
1995	324324
1996	361498
1997	548902
1998	307388
1999	283665
2000	340282
Total 1992-99	2423397

U.S.A. ranks number one (see table 5) with 25% share in foreign equity followed by Mauritius (!), U K (8%) and Japan (5%). South Korea (5%) Germany (4%). **France**,

Table 5

Foreign Collaboration by Value

Rs. in Million

Sno	Country	Block	Value	% Share	Sno	Country	Block	Value	% Share
1	USA	NAFTA	495942.4	25%	50	BRITISH VIRGIN ISLAN		817.77	0%
2	MAURITIUS		294532.5	15%	51	AFGHANISTAN		761.01	0%
3	UK	EC	162831.3	8%	52	IRAN		714.56	0%
4	JAPAN		97512.48	5%	53	BANGLADESH		516.85	0%
5	KOREA (S)		96967.45	5%	54	BAHAMAS		461.7	0%
6	NRI		91592.76	5%	55	ISLANDS OF NEVIS		315.0	0%
7	GERMANY	EC	82727.72	4%	56	LIECHENSTEIN		308.7	0%
8	AUSTRALIA		66141.34	3%	57	SRI LANKA		236.2	0%
9	MALAYSIA	ASEAN	55763.25	3%	58	CYPRUS		234.8	0%
10	FRANCE	EC	52103.54	3%	59	ARGENTINA		184.0	0%
11	NETHERLANDS	EC	46328.56	2%	60	CHANNEL ISLAND		130.7	0%
12	ITALY	EC	45128.81	2%	61	POLAND		119.2	0%
13	SINGAPORE	ASEAN	44791.35	2%	62	UKRAINE		81.6	0%
14	ISRAEL		42357.3	2%	63	ESTONIA		73.1	0%
15	BELGIUM	EC	39742.1	2%	64	HUNGARY		34.3	0%
16	CAYMEN ISLAND		37322.41	2%	65	TURKEY		32.2	0%
17	SWITZERLAND Total		27127.54	1%	66	YUGOSLAVIA		24.5	0%
18	UNINDICATED COUNTRY		25991.26	1%	67	JORDAN		23.2	0%
19	CANADA	NAFTA	25331.68	1%	68	ROMANIA		21.0	0%
20	THAILAND	ASEAN	24596.94	1%	69	GREECE	EC	20.4	0%
21	HONGKONG	ASEAN	21348.59	1%	70	ARMENIA		20.3	0%
22	SOUTH AFRICA		19041.27	1%	71	PAPUA NEW GUINEA		19.2	0%
23	SWEDEN	EC	17731.63	1%	72	BULGARIA		19.1	0%
24	SAUDI ARABIA		8117.52	0%	73	USSR		16.7	0%
25	CHINA		7121.7	0%	74	KAZAKHASTAN		15.0	0%
25	UAE		6887.88	0%	75	MALDIVES		14.3	0%
26	WEST INDIES		6474.29	0%	76	ICELAND		13.5	0%
27	PANAMA		6406.77	0%	77	JAMAICA		10.0	0%
28	KUWAIT		5850.94	0%	78	SOMALIA		10.0	0%
29	OMAN		5824.97	0%	79	VIETNAM	ASEAN	8.9	0%
30	BERMUDA		5377.29	0%	80	SCOTLAND		8.3	0%
31	DENMARK	EC	5322.91	0%	81	MONACO		6.7	0%
32	RUSSIA		4818.39	0%	82	BRAZIL		6.1	0%
33	QATAR		4570	0%	83	YAMAN		5.0	0%
34	INDONESIA	ASEAN	3918.28	0%	84	KENYA		4.9	0%
35	PHILLIPINES	ASEAN	3845.24	0%	85	CUBA		4.2	0%
36	CZECH REPUBLIC		2897.1	0%	86	SLOVAKIA		4.1	0%
37	NEW ZEALAND		2787.14	0%	87	LATVIA		3.6	0%
38	AUSTRIA	EC	2755.46	0%	88	JAPAN		3.6	0%
39	IRELAND	EC	2598.8	0%	89	EGYPT		3.2	0%
40	FINLAND	EC	2520.06	0%	90	MALTA		1.3	0%
41	LUXEMBOURG	EC	2511.79	0%	91	SYRIAN ARAB REPUBLIC		1.2	0%
42	MEXICO	NAFTA	2472.2	0%	92	TATARSTAN		0.5	0%
43	BAHRAIN		2029.59	0%	93	BELORUSSIA		0.5	0%
44	PORTUGAL	EC	1984.65	0%	94	SUDAN		0.3	0%
45	ISLE OF MAN (UK)		1612.83	0%	95	NEPAL		0.0	0%
46	NIGERIA		1505.4	0%	96	SPAIN	EC	0.0	0%
47	TAIWAN		1356.61	0%	97	URUGUAY		0.0	0%
48	GIBRALTAR		989.08	0%					
49	NORWAY		971.64	0%		Grand Total		2021794	100%

Netherlands, Italy and Belgium come close to ASEAN partners like Malaysia, Singapore, Thailand and Hong Kong. In effect what it means is that EU countries have placed less faith in India as a foreign collaborator for committing financially.

Table 6 shows that while percentage share in terms of value as compared to the number of collaborations, is higher in the case of U.S.A. (26% vs.22%) and ASEAN (8% vs. 3%), in case of EU countries, this is just the opposite (23 vs. 39%). In effect EU still has more focus on technological collaborations than equity based participation, a fact that is further buttressed by data given in the next section.

Table 6
Foreign Collaboration by Trade Blocks (No. vs. Value)

Blocks	By Number		By Value	
	Number	% of Total	Value	% of Total
NAFTA	3884	22%	523746	26%
EC	6876	39%	464308	23%
ASEAN	535	3%	154273	8%
Total	11295	63%	1142327	57%
Others	6515	37%	879467	43%
Grand Total	17810	100%	2021794	100%

4.5 Nature of Foreign Collaborations

The approvals of foreign collaborations have been classified in two classes; namely technological (without foreign equity participation) and financial (having Foreign equity participation). It will be seen from the data given in table 7 that out of a total of 17810 foreign collaborations approved during 9 years of post liberation period (1992-2000), only 6155 (45%) were technical collaboration and 11642 (65%) were financial ones (see exhibit 3 for details).

Table 7
Foreign Collaborations in the Post-liberalisation Era by Type

YEAR	TYPE		TOTAL	FIN %
	FIN	TECH		
1992	639	768	1407	45%
1993	785	691	1476	53%
1994	1062	792	1854	57%
1995	1353	984	2337	58%
1996	1557	746	2303	68%
1997	1664	661	2325	72%
1998	1185	601	1786	66%
1999	1726	498	2224	78%
2000	1684	414	2098	80%
TOTAL	11642	6155	17810	65%

A closer look at the table would, however, also reveal that *there is a major change in the proportion of technological & financial collaborations in the post-liberalization*

period, the proportion of financial collaboration, which was only 45% in 1992, has jumped to 80% by 2000, ***a dramatic rise, indeed a paradigm shift***. Data is not available to analyse patterns in the pre-liberalisation era, but an earlier study indicates that the patterns were similar to those in 1992³.

The shift in the nature of foreign collaboration points towards increasing interest of foreign partners in ***playing an active role in the management of the Indian venture rather than being contended with sale of technology***. It also raises a possibility of concern of both (Indian and foreign) partners to do business together in India, than only Indian partners' desire for bridging technology gap. Another possibility, extending from this, which needs a more detailed examination, is that perhaps the ***foreign collaborations in post liberalization are more of partnerships for trading foreign goods and services with little value addition*** rather than high value addition seeking import of manufacturing technology, which has been the key concern in the pre-liberalization era. This possibility gets buttressed by change in the type of Indian partners as discussed in section 7.

4.6 Foreign Collaboration by Industry Sector

For analysing the patterns by industry sectors, CAPEX database from CMIE was used, which had the information on industry sub-sector for each collaboration. The database, however, had information on foreign collaboration only from June 1992 onwards. The information for the year 1992 was observed to be incomplete and hence has been ignored for this study

A look at foreign collaboration (see table 8) would show that there has been a spurt in foreign collaborations in almost all the industry sectors. No sector of industry has remained untouched with it. In as many as 45 (25%) industry sectors there have been more than 100 collaborations in 9 years (1993-2001). Another 32 industry sectors had 51- 100 collaborations in 9 years. There were only 29 sectors in which there were less than 10 collaborations during the decade.

Although a more detailed study is required to make a conclusive statement, the data indicates that ***there is still a steady trend in most of the sectors which are increasingly banking on foreign assistance*** rather than developing products and technology on their own (see exhibit iv for details). ***It is no indication of domestic capacity building for developing global competitiveness of India***, although it has enhanced domestic competition with all the global giants competing for market share here, pushing out domestic players, leading to over capacity creation. ***Running to global competitors for collaborations by industry at such a pace neither generates confidence that liberalisation is helping enhancement of India's global competitiveness*** though it provides an opportunity to be outsourcing point

Collaboration by Industry Sectors

1	Computer Software	1374	46	Computer Hardware	97	78	Tourism	49	135	Caustic Soda	9
2	Industrial Machinery (Excl. Chem. & Text.)	910	47	Glass & Glassware	96	79	Books & Newspapers	45	136	Broadcasting/Distribution of	9
26	Prime Movers	167	71	Castings & Forgings	57	103	Pesticides	27	160	Tv Serials/Films	1
3	Business Consultancy	853	48	Inorganic Chemicals	37	80	Cement & Asbestos Products	44	137	Pasteners	9
4	Domestic Electrical Appliances	730	49	Other Vehicles	37	81	Aluminium Products	43	138	Steel Wires	9
27	Other Organic Pharmaceuticals	527	72	Paints & Varnishes	37	104	Oil Cakes & Animal Feed	28	161	Jute Products	1
5	Chemicals	135	50	Health Services	30	82	Mutual Funds	43	139	Starches	8
28	Misc. Chemicals	497	73	Transformers	36	105	Woolen Textiles	25	162	Phthalic Anhydride	8
6	Misc. Electrical Chemical Machinery	144	51	Finished Steel	39	83	Cement	37	140	Tea	8
29	Machinery	476	74	Other Non-Ferrous	55	106	Other Fertilisers	24	163	Proyident Funds	1
34	Cosmetics & Toiletries	125	52	Metals	55	84	Clocks & Watches	22	141	Coffee	7
8	Other Recreational Misc. Other Services	457	53	Footwear	87	111	Soaps & Detergents	22	142	Explosives	7
35	Services	124	54	Products	87	112	Commercial Complexes	37	143	Plastic Sheets	7
36	Misc. Manufactured Minerals	123	55	Cotton & Blended	85	113	Air Transport	21	144	Soyabean Products	7
9	Articles	436	54	Yarn	85	86	Offshore Drilling	37	145	Textile Processing	7
37	Marine Foods	122	55	Lubricants, Etc.	85	114	Steel Tubes & Pipes	37	144	Soyabean Products	7
10	Hotels & Restaurants	371	56	Wires & Cables	83	87	Welding Machinery	31	145	Textile Processing	7
38	Rubber & Rubber Electronic Equipments	359	57	Paper Products	78	88	Cocoa Products & Confectionery	36	146	Bicycles	6
11	Products	117	57	Paper Products	78	88	Metal Tanks & Fabrications	39	147	Carbon Black	6
39	Other Agricultural Pumps & Compressors	113	58	Ceramic Tiles	77	116	Coal & Lignite	38	148	Civil Engineering	6
12	Products	341	58	Air-Conditioners &	77	89	Refractories	38	149	Ferro Alloys	6
40	Thermoplastics	113	59	Refrigerators	73	117	Dry Cells	18	150	Diversified	5
41	Consumer Electronics	106	60	Gems & Jewellery	69	118	Misc. Financial Services	18	151	Insurance Services	4
13	Services	313	60	Shipping	66	90	Other Misc. Non-Metallic	35	152	Railway Transport	4
42	Equipment	104	61	Plastic Packaging	66	119	Others	18	153	Sponge Iron	3
43	Stores & Distributions	186	62	Goods	65	120	Mineral Products	18	154	Sugar	4
14	Other General Purpose Electricity Generation	282	63	Dyes & Pigments	62	121	Electron Tubes	34	155	Acetic Acid	3
15	Machinery	103	64	Passenger Cars &	62	92	Bar Bearings	34	156	Housing Construction	3
44	Communication	277	65	Multi Utility	62	122	Aluminium Plastic Tubes & Pipes	33	157	Housing Finance Services	3
16	Equipment	277	66	Vehicles	62	93	Pre-Recorded And Recorded Motors & Generators	33	158	Plastic Amusement Parks/Entertainment Centres/Theatres	3
45	Synthetic Yarn	102	67	Switching Apparatus	62	122	Cassettes	17	159	Bakery & Milling Products	1
17	Food Processing	241	66	Tyres & Tubes	62	131	Grude Oil & Natural Gas	36			
18	Hire Purchase Financial Services	239	67	Two & Three	61	124	Paper	15			
			68	Whealers	61	125	Road Transport	15			
			69	Granite	60	126	Road Transport	15			
			70	Textile Machinery	60	127	Nitrogenous Fertilisers	36			
				Transport Support Services	60	126	Plastic Films	15			
					60	127	Structurals	15			
					60	128	Photographic Films	30			
					60	129	Banking Services	29			
					60	130	Commercial Vehicles	29			
					60	131	Commercial Vehicles	29			
					60	132	Tobacco Products	12			
					60	133	Digital Products	29			
					60	134	Storage Batteries	29			
					60	134	Stainless Steel	10			
24	Activities	205	69	Textile Machinery	60	101	Wood	29	158	Plastic Amusement Parks/Entertainment Centres/Theatres	3
25	Misc. Textiles	187	70	Transport Support Services	60	102	Bakery & Milling Products	28	159		1
										Total	16849

in availability of choicest products in domestic market. The data also raises questions about even the desirability of a large number of collaborations in many fields in view of sustained adverse trade balance⁵, mounting budget deficit of central and state governments⁶ and burgeoning external debt⁷. However, further comments are reserved for a later study with other contextual data.

4.7 Foreign Collaborations by Type of Indian Partners

The study also analyzed the foreign collaboration in the post liberalization era, by the type of Indian partners. Unfortunately data was not easily available for the pre-liberalization period. Efforts are on to extract the same to be able to give a more comprehensive understanding on the issue. But even the analysis of post-liberalization era data is important enough, as it points towards a significant pattern.

For the purpose of this analysis, two sources were used, One, the information available from Indian Investment Centre about the foreign collaborations for the years 1992-2000, The other was PROWESS database of Centre for Monitoring Indian, Economy, giving data on financial performance of Indian Corporates. From the latter database the “listed” companies’ sale value for the year 2000 was taken and the companies were arranged in descending order of their sales. Then the top 1000 companies were picked up. These top 1000 companies represented 89% of sales of all the listed companies (9). Foreign collaborations by these companies were noted, by combining it with the information from the first database. A major problem was faced in tallying the two databases because of differences in the way the data was typed (names of the companies) in the two databases.

Table 9
Foreign collaboration by (Top 1000) corporate Leaders

# total of collaborations	# of companies having collaborations	# of collaboration
17810	496	2358

From table 9 it will be seen that as many as 496 out of the top 1000 (i.e., 43%) industry leaders (by sales in the year 2000) have entered into foreign collaboration in the post liberalization period, a large number indeed. The data indicates that ***the industry leaders, even in the post- liberalization period are banking heavily on import of technologic to meet, and perhaps, enhance the demands of products and services, rather than developing new products and services and technological competencies, on their own.*** This is a serious development and has direct, adverse bearing on sharpening global competitiveness of Indian companies, both in the domestic and international markets.

A look at table 10 also shows the patterns of spread of the foreign collaboration. It will be noted from table that there are as many 6 companies which had more than 30 collaborations over a period of 9 years (1992-2000) of post-liberalization era, ***Perhaps***

no where else in the world this kind of phenomenon would be observed. Further, there were 29 others, who had 11 to 29 collaborations over the period, on the average one on more collaboration per year. Additionally, there were 47 companies that had 6-10 collaboration; at least one or more foreign collaboration every alternate year, on the average.

Table 10
Frequency Distribution of Foreign Collaboration by Top 1000 companies

# of collaborations	# companies*		# companies (cumulative)*
	Indian	Foreign	
≥30	6		6
21-30	7		13
11-20	22		25
06-10	47		72
01-05	185		267

Table 11
Detailed frequency Distribution of Foreign Collaboration by Corporate Leaders

#collaborations	# companies	#collaborations	# companies	#collaborations	# companies
1	73	11	5	24	1
2	42	12	1	27	3
3	29	13	3	28	1
4	21	14	3	29	1
5	20	15	3	36	1
6	13	16	1	38	1
7	12	17	2	60	1
8	6	18	3	71	1
9	10	19	1	74	1
10	6	23	1	127	1

It will also be seen from table 11 that 4 companies have astonishingly high number of collaboration (60 or more) and one company had on the average even 14 collaborations per year (127 in 9 years). These high numbers do not auger well for technological capability building internally, through domestic efforts.

An even more significant development is the fact that a large number of collaborate are taking place with Indian companies, which are small, having sale of less than Rs 44.6 crores in the year 2000, which do not find place in the PROWESS database. The FIRST SOURCE (2001) database of CMIE, giving details of 1,50,000 firms (both listed and unlisted) along with CAPEX database (giving the details of foreign collaborations from 1993 to 2002), however, provides a more comprehensive picture. From table 12 it will be seen that the total number of listed and unlisted large companies (with sales of Rs. 44.6 crores or more in the year 2001) numbering 1088 were having 3573 foreign collaborations. Thus over 14000 collaborations were by the firms having sales of less than Rs. 44.6 cr. in 2001. Further, as per the data available, the number of firms

reporting sales of Rs. 1 cr. and above in the year 2001(numbering 2437), had a total of 5818 collaborations out of 18695 collaboration. In other words, **over 13000 (estimated) foreign collaborations were by firms having less than Rs 1 cr. sales.** It reinforces the proposition that the collaborations are tending more towards trading than strengthening manufacturing capability as contended during the discussion on changing nature of collaboration in the previous section, although it requires validation with further studies.

Table 12
Industry Leaders and Foreign Collaborations

Rank	Sales in year 2000 (Rs. in Cr)	Listed Companies		Unlisted Comapnies		Total	
	≥	No. of Firms	No. of Collaborat.	No. of Firms	No. of Collaborat.	No. of Firms	No. of Collaborat.
Top 100	1731.1	46	466	9	32	55	495
Top500	315.4	276	1243	54	214	330	1632
Top1000	137.4	492	2185	113	361	605	2542
Top 2000	44.6	771	2826	317	767	1088	3573
Top5000	1.0	1269	3634	1168	2225	2437	5818

4.8 Foreign Collaboration in India Vs. Indian Joint Ventures Abroad

It is worthwhile to mention a bit about the comparative picture of global competitiveness of Indian industry in the pre and post- liberalization era. Two meaningful indicators of the same could be export/ import performance and the Indian business ventures abroad vs. foreign collaborations in India. Table 13 shows that the import/ export performance of India improved for a brief 3 years period after liberalization, but reverted back to the pre- liberalization period. Thus, **measured in terms of export/ import ratio, the global competitiveness of India has not increased during the decade of liberalization, economic reforms undertaken notwithstanding.**

A comparative picture of Indian business ventures abroad and foreign collaborations in India (see table 14) shows that although the Indian business ventures abroad have grown impressively in the post- liberalization period, but they are not commensurate with the level of foreign collaborations in India in the post- liberalisation period. It looks that the **overall global competitiveness of India, measured in terms of Indian business ventures abroad vs. foreign ventures in India, is not increasing (it is actually decreasing).** The policy measures taken so far are not proving good enough to check India from becoming more of global market only, rather than emerging as a global player.

Table 13

India' Export- Import Performance during 1971-2000

Year	Export	Import	Net	Export / Import Ratio (%)	Year	Export	Import	Net	Export/ Import Ratio (%)
1970-71	1890	2435	-545	78%	1985-86	9461	17294	-7833	55%
1971-72	2122	2759	-637	77%	1986-87	10413	17729	-7316	59%
1972-73	2579	2796	-217	92%	1987-88	12644	19812	-7168	64%
1973-74	2997	3646	-649	82%	1988-89	14257	23618	-9361	60%
1974-75	4006	5620	-1614	71%	1989-90	16955	24411	-7456	69%
1975-76	4830	6197	-1367	78%	1990-91	18477	27915	-9438	66%
1976-77	5750	6097	-347	94%	1991-92	18266	21064	-2798	87%
1977-78	6354	7051	-697	90%	1992-93	18869	24316	-5447	78%
1978-79	6817	9512	-2695	72%	1993-94	22683	26739	-4056	85%
1979-80	7817	12076	-4259	65%	1994-95	26855	35904	-9049	75%
1980-81	8445	16314	-7869	52%	1995-96	32311	43670	-11359	74%
1981-82	8697	15970	-7273	54%	1996-97	34133	48948	-14815	70%
1982-83	9490	16468	-6978	58%	1997-98	35680	41535	-5855	86%
1983-84	9861	16575	-6714	59%	1998-99	34298	47544	-13246	72%
1984-85	10061	15715	-5654	64%	1999-2000	37542	55383	-17841	68%

Table 14
Indian Business Ventures Abroad and Foreign Collaborations in India

	Upto 1991	'92	'93	'94	'95	'96	'97	'98	'99	Total Upto 1999
Indian JVs Abroad	244	72	104	92	82	116	101	101	111	1023
Indian Wholly Owned Subsidiaries Abroad	75	28	79	122	119	143	122	154	238	1080
Total Indian Business Ventures Abroad	319	100	183	214	201	259	223	255	349	2103
Foreign Collaboration in India	16836	1531	1476	1854	2337	2303	2325	1786	2224	32672

Table 15

Corporate Leader's Venturing Abroad and Foreign Collaboration

Total No. of Business Ventures Abroad				Foreign Collaborations between 1992-2000	
No. of Ventures	No. of Cos.	Cumulative Frequency	Distribution of Ventures	No. of Collaborations	No. of Companies
1	171	1+	909	1	73
2	154	2+	738	2	42
3	25	3+	430	3	29
4	17	4+	355	4	21
5	6	5+	287	5	20
6	6	6+	257	6	13
7	2	7+	221	7	12
8	4	8+	207	8	6
9	2	9+	175	9	10
10	2	10+	157	10	6
11	3	11+	137	11	5
12	3	12+	104	12	1
				13	3
				14	3
15	2	15+	68	15	3
				16	1
				17	2
18	1	18+	38	18	3
				19	1
20	1	20+	20	20	
				23	1
				24	1
				27	3
				28	1
				29	1
				36	1
				38	1
				60	1
				71	1
				74	1

A look at table 15 also indicates that ***industry leaders in general are not helping India emerge as a global player. Instead they are facilitating the process of India becoming more of a global market.*** For example, against only one company having 20 business ventures abroad, there are as many as 12 companies, which have engaged in foreign collaborations in India. Likewise against 12 companies which have 10 or more business ventures abroad, there are 40 who have entered into foreign collaborations.

4.9 Summary of Findings

The findings of the study indicate that major changes in patterns of foreign collaborations are taking place. These are not only significant, but also draw attention of policy makers and executive action. The main findings of the study are:

1. There has been a steep rise in number of collaborations (1992-2000). The total number of foreign collaborations in 9 years of post liberalization period (17810) has out numbered the total number of foreign collaborations (16614) in 41 years of pre-liberalization period. The number of collaborations in a single year in the post liberalization is almost equal to those in the whole of a decade in 1950s and two thirds of those in the decades of 1960s and 70s.
2. Dominance of U.S.A. is total now. In the race of collaborations with India, U.K and Germany, each of whom had higher number of collaborations than U.S.A up to 1970, have lost out to USA not only individually, but even collectively, Indeed, in the post liberalization period, EU countries have lost only, not only to USA, but even to some of the ASEAN countries in relative terms.
3. The number of countries with whom Indian has foreign collaborations increased from 25 in pre-liberalization period to 112 in the post-liberalization period.
4. The mix of foreign collaboration in terms of technological/ financial has undergone drastic change. The proportion of financial collaboration (indicating interest of foreign partner in playing active role in the Indian ventures has gone from less than 30% in the pre-liberalisation era (before 1991) to over 80% in the post liberalization era (after 1991).
5. The number of collaborations by small players (having sales less than Rs.44.6 crores in the year 2000) is substantially high, estimated to be around 11000 compared to those by leaders (sales Rs.44.6 crores or more), estimated to be around 3573. The shift is thus visibly towards low value addition trading than technology capability building.
6. Industry leaders in general do not demonstrate any change in their strategy (growing through import of technology) of pre-liberalization period. One could thus not expect global competitiveness of domestic companies to increase.
7. The spread of collaboration is across all the industry sectors, not all of them can be called desirable ones from the view of point of capacity building for global competitiveness.
8. Industry leaders in general are not helping India emerge as a global player. Instead they are facilitating the process of India becoming more of a global market.

4.10 Implications of Findings

A steep rise in the number of *foreign collaboration is a direct indication of the fact that country is increasingly banking on the other countries for the introduction of new products and technologies, rather than developing them through domestic efforts. This is in complete contrast to the pre-liberalisation policies of importing technology to enhance domestic technological capabilities of the country..* It can help in meeting the needs and serving the domestic market, but not so much in technology development for increasing competitiveness of India.

The infrastructure created may even help in becoming a global outsourcing point, but that will give reduce the status to that of a small, ancillary supplier, *who does not have any bargaining power (and hence can not expect capturing substantial portion of value created by him in the whole value chain, leave alone controlling the capture of value creation), and will always remain at the mercy of main product manufacturer.* It may help in earning a bit of foreign exchange to reduce foreign exchange crisis, but can in no way increase competitiveness to become a global player.

An alarmingly large number of small Indian partners, with high financial interest of foreign party, indicate that these are more of trading or marginal value addition outfits, engaged in distribution of foreign goods rather than potential major manufacturers with strong technological prowess. *They may neither have resources nor inclination to engage in R & D work to increase competitiveness of India,* but may only be interested in quick profits in the liberalised regime, when the going is good, and be instrumental in making India only a global market as well as cause drain on precious foreign exchange.

The *country needs to seriously engage in new product development* activity as outlined earlier, developing new product with local endowments and designs and vendor bases, branching off from the existing applications, developing technology for scaling up the products of Indian origin. It requires development of *attitudes and orientation of frame-bending and frame-braking*⁸ while thinking of organization innovations and new product development.

Importing technology at successive levels of up-gradation in the name of modernization and on the logic of “India does not need to reinvent the wheel” is not a tenable one. *New product development is not reinventing the wheel. If it is so, every developed country is doing so on an ongoing basis.* The present approach of *importing technology for “catching up by latching up”*¹⁰ *does not help in development of real technical expertise, but instead generates a myth, a misplaced belief and false sense of technical expertise, which fails to meet the demands of competition.*

Further, it must be *realized that the principles of science are more universal and generalisable than those related to the business. The moment one moves to application of the scientific principle to develop product and services, they tend to be less applicable due to the influence of the geo-political, socio-culture context of the*

Table 16

	1999- 200	1990- 91	1991-92	1992-93	1993-94	1994-95	1995-96	1996- 97	1997- 98	1998-99	1999- 200	2000- 01	2001- 02
A Current Account													
1. Merchandise	-17098	-9438		-4268	-4056	-9049	-11359	-14815	-16277	-13246	-17841	-14370	
2. Invisible	12935	-242		842	2898	5680	5460	10321	9804	9208	12143	11791	14054
a) Service	3856	980		1129	535	602	-186	851	1143	2165	4064	2478	4199
I) Travel	897	1064		1713	1725	1547	1546	2020	1477	1250	897	294	628
ii) Transportation	-665	110		-503	-332	-167	-158	-441	-726	-755	-703	-1257	-413
iii) Miscellaneous				-81									
b) Transfer													
I) Private	12256	2069		2773	5265	8093	8506	12367	11830	10280	12256	12798	12125
c) Income													
I) Investmt Income	-3695	-3752		-3423	-3270	-3431	-3205	-3307	-3520	-3569	-3695	-3918	-2728
Total of Current Account	-4163	-9680		-3526	-1158	-3369	-5899	-4494	-6473	-4038	-4698	-2579	1351
B. Capital Account													
1. Foreign Investment													
a) Direct	2167	97		315	586	1343	2133	2716	3202	2480	2167	2342	3905
b0 Portfolio	3024	3		242	3649	3579	2661	3312	1828	-68	3024	2760	2020
2. Loans													
a) External Assist.	901	2210		1856	1901	1528	883	1109	899	820	901	427	1204
b) Comm. Borrowing													
I) M.T./L.T.	313	2248		-358	607	1030	1275	2848	3999	4362	313	4011	-1147
c) S.T.	377	1075			-769	393	49	838	-96	-748	377	105	-890
3. Banking capital													
a) Comm. Banks													
I) Assets	790	-364		1073	-844	-962	-384	-870	-2195	-1397	790	-1768	1264
ii) Liabilities	-26	-269		-144	1297	164	218	-255	-190	-11	-26	36	382
iii) NRI Deposits	2140	1537		2001	1205	172	1103	3350	1125	1742	1540	2317	2754
b) Others	-177	-222		896	605	292	-175	4	367	1146	-177	-74	207
4. Ruppe Debt. Service	-711	-1193		-878	-1053	-983	-952	-727	-767	-802	-711	-617	-519
5. Other Capital	1508	1931		-10	1638	1977	-2537	-254	3800	1157	1508		
Total of Capital Account	10242	7056		3906	8895	8502	4078	11881	11924	8565	10444	9022	9545
C. Errors & Omissions													
D. Overall Balance	6402	-2492		-560	8537	5757	-1221	6793	4511	4222	6402	5856	11757
E. Monetary Movements													
a) IMF	-260	1214		1288	187	-1143	-1715	-975	-618	-393	-260	-26	
b) Fores. Reserves	-6142	1278		-728	-8724	-4644	2936	-5818	-3593	-3829	-6142	-5830	-11757
F. Total External Debt	75857	83801	85285	90023	92695	99000	93730	93470	94320	97231	98435		
of which Long Term	68356	75257	78215	83683	89068	94739	88696	86744	89274	93902			

Figures of 1999-2002 Table 43, RBI Bulletin, July, 2002

societies as well as the economic and technological status of the country. While the adoption of former form elsewhere in the world is not questionable, *adoption of the latter tend to be more societies as well as the economic and technological status of the country.* While the adoption of former form elsewhere in the world is not questionable, *adoption of the latter tend to be more irrelevant and difficult. Import of technology and product faces this challenge.* The design and development of new products and services and technology thereof, thus, becomes extremely critical.

The findings of the study also *have significant implications for the international trade of India, both from the view point of India as also from the view point of the partner countries.* From the Indian view point, the lock stock and barrel import of technology can does not lead to increase in its competitiveness, hence it would be increasingly difficult to finance the country's adverse balance of trade through capital account (see table 16 for details) and sustaining trade in this way can only lead to adverse terms of trade and, ultimately influencing the sovereignty of the country, about which there are growing apprehensions in the country. Further, this may lead to decrease in purchasing power for two reasons. One, it can (perhaps has) lead to increased asset creation (see table 17), disproportionate to the demands of country and what the domestic sources are able to bear, resulting in a slow down of the Indian economy (see table 18) as is being observed since 1997¹⁰.

Table 17
Mismatch Between Demand Growth and Asset Growth

Year	Asset Growth %	Sales Growth %	Mismatch %	Mismatch 1991-99
1991-92	122%	121%	1%	14%
1992-93	121%	120%	1%	
1993-94	121%	117%	5%	
1994-95	126%	129%	-3%	
1995-96	119%	124%	-5%	
1996-97	116%	112%	4%	
1997-98	117%	110%	8%	
1998-99	111%	108%	3%	
1999-2000	102%	113%	-11%	

Table 18
No. of Companies making Profit or Loss in various years

Year	Cos. Making Profit	Cos. Making loss	Cos. Neither making Profit nor Loss	Year	Cos. Making Profit	Cos. Making loss	Cos. Neither making Profit nor Loss
1991	1750	376	71	1996	4281	1151	270
1992	2025	420	105	1997	3906	1751	256
1993	2418	577	173	1998	3632	2105	249
1994	3288	499	247	1999	3571	2266	207
1995	4169	727	324	2000	3176	1725	194

It has also resulted in a huge amount of investment being locked in the assets of companies that are loss making or not reporting their performance¹¹. The amount

involves is the tune of almost Rs. 3,00,000 crores (see tables 19 and 20). This is associated with decreasing employment opportunities on account of large scale downsizing through Voluntary Retirement Schemes (VRS)/ closure of mills etc., so much so that in 2001-2002, some of young graduates of leading technical and management schools (turning out about 4000 graduates) were facing difficulties in getting proper employment^{12,13}.

Secondly *such imports also do not promise to increase in employment that is associated with the manufacture and sales of locally developed products/ services*. Because, the part of employment that gets generated in the product/ service design and technology development (embryonic stage) processes, is absent when “proven” technology is imported for domestic sales. *That is why despite as many foreign collaborations in 9 years of post-liberalisation as in the 41 years of pre-liberalisation period, unemployment of even “skilled” manpower continues to be critical issue.*

Table 19
Assets Created During Post Liberalisation Era
by Companies Existing in 1991 & Established During 1992-2000
But Locked in the Companies Making Loss/ Not Reporting Performance
(Rs. In Crores)

GFA Profit Making	GFA Loss Making	GFA Not reporting	GFA Total
	191890	106818	298708

Table 20
Total Assets Locked in the Companies Making Loss/ Not Reporting Performance
(Rs. In Crores)

GFA Profit Making	GFA Loss Making	GFA Not reporting	GFA Total
	248973	135689	384662

All the above factors can only result in reduced purchasing power in large democracies like India. *Perception of India as growing market for the products and services of the developed world, which at times is thought of as a tool to overcome their economic recessions may, thus, turn out to be a mirage in the long run¹⁴.*

Alternative strategies to develop technical and managerial competencies are, thus, necessary to enable India develop new products through local natural endowments and vendor bases. That will help in increasing purchasing power on a sustainable basis on the one hand, and enable development of their own products and services for international exchange on the other, which alone can sustain international trade, on a long term basis, as equal partners. Serious efforts and policy interventions are required from the industry, policy makers and technical and management institutions towards the same^{15,16}. *The present approaches, it is apprehended, can only retrograde to international trade on the pre-colonial format; which was marked with adverse terms*

of trade for colonies and with the divide of the world into capital intensive and labour intensive categories. That format is unacceptable to the under-privileged nations and is fraught with other attendant consequences in a more informed world of today, with enhanced local destructive power.

The findings also raise a fundamental question on the development of technology for scaling up the manufactured items. Manufacturing technologies could be capital intensive (machine content higher) or labour intensive (labour content higher). The economic development models describe how the mix or combination of man and machine goes on changing as man and machine become costlier. The developed countries from where we import technologies have higher labour costs (as they have shortage of labour), hence develop production technologies that are inherently capital intensive. The technology matches very well with the developed countries socio-economic context. However, when it comes to the developing countries like, it has an obvious mismatch with the socio-economic conditions here. ***We thus run a capital intensive technology in a labour intensive manner. It can't lead to efficiency of operations comparable to original creators of products and services and to large scale generation of employment.*** Further, it runs into all kinds of difficulties on account of problems of maintenance of equipment as exemplified by the computer hardware today

It is lucrative, however, as it is softest option. It does not require all the painstaking effort of technology development. One can not, however, expect the Indian companies to compete effectively with the multinational corporations, who have developed such technologies, even in the domestic market, leave alone facing competition globally. The use of capital intensive technology also has the advantage of having superior quality, because of finish and consistency. This creates a false sense that manufacture without imported technology can't have world class product. India has not been able to make much of headway in developing labour intensive technologies. This has deprived it from benefiting from its ability to design and develop new products, as the manufacturing could not be scaled up to a level to benefit from economies of scale. If India has to protect its domestic market, it can not do so by imitation. The development of labour intensive technologies alone can halt the march of multinational capture the domestic market.

Can India do it? The answer is not simple. But the power of the concept of labour intensive technology and India's capacity to develop it, is well manifested by "Lijjat Papad". Unfortunately the temptation to make a fast buck never allowed Indian companies to make sincere and genuine efforts towards the same. The development of labour intensive technologies is all the more important in view of serious infrastructure constraints of the country that is needed for centralised production methods for benefiting from the economies of scale. The labour intensive technologies can not be developed so much by the scientists as the labour and facilitator unions. It is the group work with concern for all without losing sight of basic business concern; to cover up all costs. It is one more area which needs and fallen into the domain of workers and unions, to provide strengths to the organisation for long term survival.

4.11 Conclusions

Developing countries like India have been using import of technology through foreign collaboration as a strategy to bridge the technological gaps in the country, to expedite economic development. There have not been many studies, however, to understand its impact and implications not only from the Indian point of view, but also from the point of view of sustainable, mutually beneficial international trade.

This study, based upon authentic databases available from the Indian Investment Centre, New Delhi and Centre for monitoring Indian Economy, makes an effort to address some of the above issues. It analyses the patterns of foreign collaborations in India, spanning a period of 50 years from 1951 to 2000, divided into two parts, the pre-liberalisation (before 1991) and post liberalization (1991 onwards) era. The study reveals significant patterns in terms of the level of collaboration (both in terms of number and value), the nature of collaborations and the patterns by partner countries and trade blocks. The study also reports significant, albeit, preliminary findings on the patterns by individual Indian firms in the corporate sector. The findings indicate that the trends are not congenial for sustainable, mutually beneficial international trade and that this may not be in the best interest of even the developed world.

The findings indicate that the country is not making much headway in design and development of new product and technology realizing the benefits of economies of scale. It also creates a mismatch between the products and technology developed and the natural resource endowment of the country, the vendor base and the labour availability. It is difficult to understand how, being inherently capital intensive, the imported technologies can provide competitive advantage in a country having labour as abandoned resource. They help in meeting the domestic requirement but in the process only are making India a global market not a global player. The issue of development of new products and technology, especially the labour intensive one, needs urgent attention to guard against the surrender of domestic market to global players from rest of the world and marching to the markets of other parts of the global at least to the extent required for mitigating the foreign exchange requirements.

The findings presented in the paper suggest that alternative strategies to develop technical and managerial competencies are necessary to enable the developing countries engaging in new products development through local, natural endowments and vendor bases. That will help in increasing purchasing- power on a sustainable basis on the one hand, and enable development of their own products and services for international exchange on the other, which alone can lead to international trade with the various developed and developing countries, on a sustainable basis, as equal partners.

4.12 References

1. **Foreign Collaborations in Indian Industry**, Fourth Survey Report, (1985), Reserve Bank of India, Bombay, pp 5-10
2. For example see the case of collaborations in two wheelers and 4 wheelers, private airlines etc.

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Exhibit 1
Foreign Collaborations in the Pre and post-liberalisation Era

Rank	Country	Block	Foreign Collaboration upto 1991						Year									Total
			51-60	61-70	71-80	81-90	91	Total	1992	1993	1994	1995	1996	1997	1998	1999	2000	
1	USA	NAFTA	272	662	641	1517	177	3269	303	299	348	469	438	459	383	481	470	3650
2	GERMANY	EC	201	489	603	1375	194	2862	184	169	217	252	260	254	193	208	202	1939
3	UK	EC	618	922	602	1129	137	3408	169	172	193	201	204	204	152	193	163	1651
4	NRI						0	50	125	168	141	175	121	105	141	188	1214	
5	JAPAN		88	269	253	709	72	1391	98	93	135	146	158	147	138	157	104	1176
6	NETHERLANDS	EC	25	54	47	155	52	333	56	56	89	146	116	103	75	116	90	847
7	MAURITIUS						0	8	8	71	95	141	101	146	205		775	
8	ITALY	EC	42	82	114	418	60	716	61	55	86	121	93	114	86	92	63	771
9	FRANCE	EC	41	143	175	373	40	772	55	52	60	68	89	77	72	88	82	643
10	SWITZERLAND		65	177	215	344	52	853	74	62	56	85	73	92	53	60	57	612
11	SINGAPORE	ASEAN					0	31	41	64	65	66	86	51	71	74	549	
12	KOREA (S)						0	45	35	40	60	63	82	49	62	31	467	
13	AUSTRALIA						0	31	30	39	43	50	61	43	45	32	374	
17	HONGKONG	ASEAN					0	9	16	26	34	30	32	19	28	35	229	
14	CANADA	NAFTA	7	28	20	28	15	98	21	16	18	39	33	35	18	21	24	225
15	DENMARK	EC	19	30	26	78		153	16	16	16	28	23	24	18	23	27	191
16	AUSTRIA	EC	0	28	20	93	16	157	16	33	36	34	27	12	12	13	6	189
18	SWEDEN	EC	32	51	59	176	30	348	25	11	22	23	20	14	25	27	8	175
19	BELGIUM	EC	19	24	26	55	7	131	9	9	12	18	31	30	17	20	21	167
20	ISRAEL						0	3	8	14	55	29	19	13	9	3	153	
21	MALAYSIA	ASEAN					0	3	7	11	20	15	39	13	21	17	146	
22	TAIWAN						0	15	20	19	17	14	9	9	9	7	119	
23	THAILAND	ASEAN					0	7	8	20	15	23	9	6	9	7	104	
24	SPAIN	EC	0	1	9	29	5	44	9	8	7	11	10	11	14	20	12	102
26	UNINDICATED COUNTRY						0		5	5	4	13	9	15	24	15	90	
25	FINLAND	EC	2	6	14	41	5	68	12	14	9	18	13	8	5	7	3	89
27	CHINA						0	6	14	10	14	9	6	4	13	7	83	
28	EURO ISSUES (GDR)						0			22	5	14	11	7	6	17	82	
29	UAE						0	11	5	8	5	10	13	8	9	9	78	
30	RUSSIA						0	7	9	17	15	6	3	5	7	4	73	
31	NORWAY		4	9	14	37	3	67	8	5	4	11	9	10	6	9	71	
32	IRELAND	EC	1	0	6	8	0	15	1	5	8	16	11	6	4	4	9	64
33	BRITISH VIRGIN ISLAN						0	4	2	2	4	3	8	3	7	6	39	

34	PHILLIPINES								3	6	8	16	5	1				39
35	SRI LANKA							0		1	4	4	8	8	6	3	5	39
36	NEW ZEALAND							0	4	2	6	7	7	1	5		4	36
37	SAUDI ARABIA							0	2	8		1	3	6	4	7	4	35
38	BERMUDA							0	1	1	1	4	3	2	5	7	8	32
39	SOUTH AFRICA							0	1		2	2	5	4	4	7	3	28
40	LUXEMBOURG	EC	1	1	9	7		18		2		6	6	4	2	4	3	27
41	OMAN							0		3	3	3	1	2	1	7	2	22
42	CZECH REPUBLIC							0		2		9	2	2	3	2		20
43	USSR		1	7	23	49	12	92	20									20
44	CAYMEN ISLAND							0		1	1		1	3	1	2	9	18
45	CYPRUS							0			2	2	1	3	2	3	5	18
46	KUWAIT							0	1	1	4	1	1	3	1	2	4	18
47	BAHRAIN							0	1	1	4		2	1	3	3	2	17
48	PORTUGAL	EC	0	0	0	3	3	6	3	1	2	2	3	3		2	1	17
49	HUNGARY		4	19	16	27	1	67		12	2			1	1			16
50	UKRAINE							0	4	1	3	2	2	3		1		16
51	POLAND		4	19	8	23	8	62	2	2		1	2	3	1	3	1	15
52	SLOVAKIA							0	5	4	1	2			1	1		14
53	WEST INDIES							0	1		1		1	3	4	3	1	14
54	INDONESIA	ASEAN						0	2	2	1	2	2	1	1		2	13
55	CHANNEL ISLAND							0			3	2	3	2	1		1	12
56	BRAZIL							0	6	1	1				2	1		11
57	ISLE OF MAN (UK)							0		1		1	3		3		3	11
58	PANAMA							0	1	2			1	2	1	2	2	11
59	BAHAMAS							0	1		2	1		3	1	1	1	10
60	MEXICO	NAFTA						0	2	4	1	1		1				9
61	IRAN							0					2		1	1	4	8
62	BANGLADESH							0						1	3	1	1	6
63	ROMANIA		0	4	3	7	0	14				1	1		2	1	1	6
64	SCOTLAND							0		1	1	1	2				1	6
65	EURO ISSUE (GDR)																5	5
66	JORDAN							0					1		1	2	1	5
67	MALDIVES							0			1				1	1	2	5
68	NIGERIA							0			2			2			1	5
69	BULGARIA							0	1			2		1				4
70	GREECE	EC	0	3	0	3	0	6				2				2		4
71	JAPAN.															1	3	4
72	LATVIA							0	2	1							1	4

73	SLOVENIA						0			1	1		1	1			4
74	TURKEY						0			1				1		2	4
75	ARGENTINA						0			1		1					3
76	GIBRALTAR		12	73	44	62	191				1				2		3
77	LIECHENSTEIN						0				1		2				3
78	MALTA						0	1				2					3
79	NEPAL						0			1		2					3
80	QATAR						0	1					1		1		3
81	AFGHANISTAN						0		1				1				2
82	ARMENIA						0		1			1					2
83	CROATIA						0	1	1								2
84	ESTONIA						0		1			1					2
85	HAWAI ISLANDS						0			1	1						2
86	ICELAND						0					1	1				2
87	ISLANDS OF NEVIS						0									2	2
88	KENYA						0						1			1	2
89	LEBANON						0			2							2
90	PHILIPPINES	ASEAN					0									2	2
91	SUDAN						0					1	1				2
92	VIETNAM	ASEAN					0					1			1		2
93	YUGOSLAVIA		0	18	6	18	2	44	1			1					2
94	BELORUSSIA						0		1								1
95	BERUMUDA						0								1		1
96	CHILE						0			1							1
97	CUBA						0									1	1
98	EGYPT						0						1				1
99	JAMAICA						0					1					1
100	JAPAN+M6422						0									1	1
101	KAZAKHASTAN						0		1								1
102	LIECHTENSTEIN						0								1		1
103	MALDOVA						0				1						1
104	MODRING						0		1								1
105	MONACO						0								1		1
106	PAPUA NEW GUINEA						0				1						1
107	SALANGOOR						0		1								1
108	SAN SALVADOR						0					1					1
109	SOMALIA						0								1		1
110	SYRIAN ARAB REPUBLIC						0							1			1

111	TATARSTAN							0				1						1
112	URUGUAY							0	1									1
113	VENEZEULA										1							1
114	YAMAN							0								1		1
	Total		1458	3119	2953	6764	891	15185	1407	1476	1854	2337	2303	2325	1786	2224	2098	17810

Exhibit 2
Foreign Collaborations in the Post Liberalisation Era by Type

By Rank of Country in Terms of Number of Collaborations						By % of Financial Collaboration						
Rank by no.	COUNTRY	TYPE		Total	FIN %	Rank by no.		COUNTRY	TYPE		Total	FIN %
		FIN	TECH						FIN	TECH		
1	USA	2327	1323	3650	64%	44	1	CAYMEN ISLAND	18		18	100%
2	GERMANY	1063	876	1939	55%	47	2	BAHRAIN	17		17	100%
3	UK	981	670	1651	59%	59	3	BAHAMAS	10		10	100%
4	NRI	1203	11	1214	99%	61	4	IRAN	8		8	100%
5	JAPAN	527	649	1176	45%	62	5	BANGLADESH	6		6	100%
6	NETHERLANDS	583	264	847	69%	65	6	EURO ISSUE (GDR)	5		5	100%
7	MAURITIUS	742	33	775	96%	66	7	JORDAN	5		5	100%
8	ITALY	382	389	771	50%	67	8	MALDIVES	5		5	100%
9	FRANCE	388	255	643	60%	68	9	NIGERIA	5		5	100%
10	SWITZERLAND	372	240	612	61%	76	10	GIBRALTAR	3		3	100%
11	SINGAPORE	453	96	549	83%	79	11	NEPAL	3		3	100%
12	KOREA (S)	291	176	467	62%	80	12	QATAR	3		3	100%
13	AUSTRALIA	242	132	374	65%	81	13	AFGHANISTAN	2		2	100%
14	HONGKONG	195	34	229	85%	82	14	ARMENIA	2		2	100%
15	CANADA	138	87	225	61%	84	15	ESTONIA	2		2	100%
16	DENMARK	119	72	191	62%	86	16	ICELAND	2		2	100%
17	AUSTRIA	80	109	189	42%	87	17	ISLANDS OF NEVIS	2		2	100%
18	SWEDEN	91	84	175	52%	90	18	PHILIPPINES	2		2	100%
19	BELGIUM	118	49	167	71%	91	19	SUDAN	2		2	100%
20	ISRAEL	84	69	153	55%	92	20	VIETNAM	2		2	100%
21	MALAYSIA	128	18	146	88%	94	21	BELORUSSIA	1		1	100%
22	TAIWAN	57	62	119	48%	95	22	BERUMUDA	1		1	100%
23	THAILAND	71	33	104	68%	97	23	CUBA	1		1	100%
24	SPAIN	58	44	102	57%	98	24	EGYPT	1		1	100%
25	UNINDICATED COUNTRY	73	17	90	81%	99	25	JAMAICA	1		1	100%
26	FINLAND	38	51	89	43%	101	26	KAZAKHASTAN	1		1	100%
27	CHINA	28	55	83	34%	102	27	LIECHTENSTEIN	1		1	100%
28	EURO ISSUES (GDR)	80	2	82	98%	105	28	MONACO	1		1	100%
29	UAE	66	12	78	85%	106	29	PAPUA NEW GUINEA	1		1	100%
30	RUSSIA	54	19	73	74%	109	30	SOMALIA SYRIAN ARAB REPUBLIC	1		1	100%
31	NORWAY	47	24	71	66%	110	31	TATARSTAN	1		1	100%
32	IRELAND	48	16	64	75%	111	32	URUGUAY	1		1	100%
33	BRITISH VIRGIN ISLAN	31	8	39	79%	112	33	YAMAN	1		1	100%
34	PHILLIPINES	21	18	39	54%	114	34					
35	SRI LANKA	35	4	39	90%	4	35	NRI	1203	11	1214	99%
36	NEW ZEALAND	17	19	36	47%	28	36	EURO ISSUES (GDR)	80	2	82	98%
37	SAUDI ARABIA	34	1	35	97%	37	37	SAUDI ARABIA	34	1	35	97%
38	BERMUDA	30	2	32	94%	7	38	MAURITIUS	742	33	775	96%
39	SOUTH AFRICA	17	11	28	61%	41	39	OMAN	21	1	22	95%
40	LUXEMBOURG	25	2	27	93%	38	40	BERMUDA	30	2	32	94%
41	OMAN	21	1	22	95%	40	41	LUXEMBOURG	25	2	27	93%
42	CZECH REPUBLIC	8	12	20	40%	35	42	SRI LANKA	35	4	39	90%
43	USSR	16	4	20	80%	45	43	CYPRUS	16	2	18	89%
44	CAYMEN ISLAND	18		18	100%	46	44	KUWAIT	16	2	18	89%
45	CYPRUS	16	2	18	89%	21	45	MALAYSIA	128	18	146	88%
46	KUWAIT	16	2	18	89%	53	46	WEST INDIES	12	2	14	86%
47	BAHRAIN	17		17	100%	14	47	HONGKONG	195	34	229	85%
48	PORTUGAL	11	6	17	65%	29	48	UAE	66	12	78	85%
49	HUNGARY	9	7	16	56%	54	49	INDONESIA	11	2	13	85%
50	UKRAINE	11	5	16	69%	11	50	SINGAPORE	453	96	549	83%

51	POLAND	5	10	15	33%	57	51	ISLE OF MAN (UK)	9	2	11	82%
52	SLOVAKIA	5	9	14	36%	58	52	PANAMA UNINDICATED COUNTRY	9	2	11	82%
53	WEST INDIES	12	2	14	86%	25	53	USSR	73	17	90	81%
54	INDONESIA	11	2	13	85%	43	54	BRITISH VIRGIN ISLAN	16	4	20	80%
55	CHANNEL ISLAND	8	4	12	67%	33	55	IRELAND	31	8	39	79%
56	BRAZIL	3	8	11	27%	32	56	GREECE	48	16	64	75%
57	ISLE OF MAN (UK)	9	2	11	82%	70	57	JAPAN.	3	1	4	75%
58	PANAMA	9	2	11	82%	71	58	LATVIA	3	1	4	75%
59	BAHAMAS	10		10	100%	72	59	RUSSIA	3	1	4	75%
60	MEXICO	6	3	9	67%	30	60	BELGIUM	54	19	73	74%
61	IRAN	8		8	100%	19	61	NETHERLANDS	118	49	167	71%
62	BANGLADESH	6		6	100%	6	62	UKRAINE	583	264	847	69%
63	ROMANIA	3	3	6	50%	50	63	THAILAND	11	5	16	69%
64	SCOTLAND	2	4	6	33%	23	64	CHANNEL ISLAND	71	33	104	68%
65	EURO ISSUE (GDR)	5		5	100%	55	65	MEXICO	8	4	12	67%
66	JORDAN	5		5	100%	60	66	ARGENTINA	6	3	9	67%
67	MALDIVES	5		5	100%	75	67	LIECHENSTEIN	2	1	3	67%
68	NIGERIA	5		5	100%	77	68	NORWAY	2	1	3	67%
69	BULGARIA	1	3	4	25%	31	69	AUSTRALIA	47	24	71	66%
70	GREECE	3	1	4	75%	13	70	PORTUGAL	242	132	374	65%
71	JAPAN.	3	1	4	75%	48	71	USA	11	6	17	65%
72	LATVIA	3	1	4	75%	1	72	KOREA (S)	2327	1323	3650	64%
73	SLOVENIA		4	4	0%	12	73	DENMARK	291	176	467	62%
74	TURKEY	2	2	4	50%	16	74	CANADA	119	72	191	62%
75	ARGENTINA	2	1	3	67%	15	75	SWITZERLAND	138	87	225	61%
76	GIBRALTAR	3		3	100%	10	76	SOUTH AFRICA	372	240	612	61%
77	LIECHENSTEIN	2	1	3	67%	39	77	FRANCE	17	11	28	61%
78	MALTA	1	2	3	33%	9	78	UK	388	255	643	60%
79	NEPAL	3		3	100%	3	79	SPAIN	981	670	1651	59%
80	QATAR	3		3	100%	24	80	HUNGARY	58	44	102	57%
81	AFGHANISTAN	2		2	100%	49	81	ISRAEL	9	7	16	56%
82	ARMENIA	2		2	100%	20	82	GERMANY	84	69	153	55%
83	CROATIA		2	2	0%	2	83	PHILLIPINES	1063	876	1939	55%
84	ESTONIA	2		2	100%	34	84	SWEDEN	21	18	39	54%
85	HAWAI ISLANDS		2	2	0%	18	85	ROMANIA	91	84	175	52%
86	ICELAND	2		2	100%	63	86	TURKEY	3	3	6	50%
87	ISLANDS OF NEVIS	2		2	100%	74	87	KENYA	2	2	4	50%
88	KENYA	1	1	2	50%	88	88	YUGOSLAVIA	1	1	2	50%
89	LEBANON		2	2	0%	93	89	ITALY	1	1	2	50%
90	PHILIPPINES	2		2	100%	8	90	TAIWAN	382	389	771	50%
91	SUDAN	2		2	100%	22	91	NEW ZEALAND	57	62	119	48%
92	VIETNAM	2		2	100%	36	92	JAPAN	17	19	36	47%
93	YUGOSLAVIA	1	1	2	50%	5	93	FINLAND	527	649	1176	45%
94	BELORUSSIA	1		1	100%	26	94	AUSTRIA	38	51	89	43%
95	BERUMUDA	1		1	100%	17	95	CZECH REPUBLIC	80	109	189	42%
96	CHILE		1	1	0%	42	96	SLOVAKIA	8	12	20	40%
97	CUBA	1		1	100%	52	97	CHINA	5	9	14	36%
98	EGYPT	1		1	100%	27	98	POLAND	28	55	83	34%
99	JAMAICA	1		1	100%	51	99	SCOTLAND	5	10	15	33%
100	JAPAN+M6422		1	1	0%	64	100	MALTA	2	4	6	33%
101	KAZAKHASTAN	1		1	100%	78	101	BRAZIL	1	2	3	33%
102	LIECHTENSTEIN	1		1	100%	56	102	BULGARIA	3	8	11	27%
103	MALDOVA		1	1	0%	69	103	SLOVENIA	1	3	4	25%
104	MODRING		1	1	0%	73	104	CROATIA		4	4	0%
105	MONACO	1		1	100%	83	105	HAWAI ISLANDS	2	2	0%	
106	PAPUA NEW GUINEA	1		1	100%	85	106	LEBANON	2	2	0%	
107	SALANGOOR		1	1	0%	89	107	CHILE	2	2	0%	
108	SAN SALVADOR		1	1	0%	96	108		1	1	0%	

109	SOMALIA	1		1	100%	100	109	JAPAN+M6422		1	1	0%
110	SYRIAN ARAB REPUBLIC	1		1	100%	103	110	MALDOVA		1	1	0%
111	TATARSTAN	1		1	100%	104	111	MODRING		1	1	0%
112	URUGUAY	1		1	100%	107	112	SALANGOOR		1	1	0%
113	VENEZEULA		1	1	0%	108	113	SAN SALVADOR		1	1	0%
114	YAMAN	1		1	100%	113	114	VENEZEULA		1	1	0%
	GRAND TOTAL	11655	6155	17810				GRAND TOTAL	11655	6155	17810	

Exhibit 3
Foreign Collaborations Over the Years (1992-2001)

Industrywise Growth

	Indname	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
1	Computer Software	45	63	75	117	159	161	238	441	169	1468
2	Business Consultancy	29	43	72	96	133	82	153	122	557	1287
3	Industrial Machinery (Excl. Chem. & Text.)	88	139	168	178	113	80	59	57	39	921
4	Automobile Ancillaries	38	47	88	88	142	110	108	66	65	752
5	Misc. Manufactured Articles	32	58	54	48	66	65	33	34	149	539
6	Drugs & Pharmaceuticals	45	62	78	74	75	57	43	61	51	546
7	Misc. Other Services	37	47	34	67	60	52	60	79	85	521
8	Misc. Chemicals	46	76	66	79	64	47	51	54	38	521
9	Misc. Electrical Machinery	42	89	99	100	73	24	21	14	25	487
10	Other Telecommunication Services	2	3	48	23	15	21	44	121	132	409
11	Hotels & Restaurants	31	35	49	46	61	50	46	33	44	395
12	Electronic Equipments	42	22	36	44	48	45	39	62	45	383
13	Other Agricultural Products	43	46	72	46	22	19	39	47	20	354
14	Electronic Components	38	30	33	38	29	25	26	46	34	299
15	Electricity Generation	8	6	11	28	85	34	55	47	28	302
16	Communication Equipment	39	54	80	35	26	24	7	8	9	282
17	Hire Purchase Financial Services	9	19	31	36	24	19	45	48	24	255
18	Food Processing	26	37	47	29	46	28	7	15	22	257
19	Readymade Garments	20	28	31	23	36	31	24	21	15	229
20	Machine Tools	19	29	24	40	33	25	25	18	12	225
21	Other Construction Activities	8	20	24	50	29	28	26	17	14	216
22	Floriculture	16	37	99	42	11	9	4	4	1	223
23	Other Metal Products	27	24	28	26	31	14	22	28	14	214
24	Misc. Textiles	21	22	36	26	29	17	17	15	12	195
25	Prime Movers	14	28	37	30	23	10	12	6	7	167
26	Domestic Electrical Appliances	21	16	23	19	17	20	15	22	11	164
27	Chemical Machinery	21	14	16	15	24	23	14	14	8	149
28	Other Organic Chemicals	27	23	36	15	13	9	10	8	6	147
29	Other Machinery	11	13	16	14	13	10	24	26	12	139
30	Other Plastic Products	10	13	6	15	21	22	23	17	11	138
31	Refinery	6	7	19	33	10	17	20	20	6	138
32	Minerals	9	6	6	29	18	12	15	22	13	130
33	Cosmetics & Toiletries	8	24	19	20	23	13	9	4	9	129
34	Other Recreational Services		8	12	29	18	17	13	23	9	129
35	Rubber & Rubber Products	11	14	13	22	15	9	15	11	10	120
36	Marine Foods	41	43	23	6	4	2	1	1	1	122
37	Pumps & Compressors	13	8	12	15	11	22	9	15	11	116
38	Storage & Distribution	3	7	9	10	21	16	19	17	12	114
39	Consumer Electronics	6	13	22	14	11	11	13	12	4	106
40	Other General Purpose Machinery	19	7	12	12	9	11	14	15	8	107
41	Health Services	6	5	10	12	17	13	11	10	21	105
42	Material Handling Equipments	12	15	8	10	20	15	9	8	7	104
43	Other Vehicles	16	7	13	6	13	13	12	13	13	106
44	Computer Hardware	15	18	10	8	6	13	14	11	7	102
45	Glass & Glassware	2	9	13	17	14	14	11	10	12	102
46	Inorganic Chemicals	27	9	14	7	12	6	14	5	7	101
47	Other Leather Products	10	17	13	10	8	16	5	8	5	92
48	Finished Steel	12	12	17	18	17	9	3	1	2	91
49	Footwear	13	15	15	10	13	7	6	5	5	89
50	Lubricants, Etc.	15	7	3	11	15	15	9	8	6	89
51	Cotton & Blended Yarn	9	10	9	14	10	12	8	10	4	86
52	Paper Products	8	12	17	14	11	7	4	4	5	82
53	Ceramic Tiles	10	13	14	15	6	5	6	6	4	79
54	Air-Conditioners & Refrigerators	4	12	3	10	11	10	7	11	5	73
55	Gems & Jewellery	2	9	12	7	8	12	9	6	7	72

56	Shipping	6	4	1	7	17	8	11	11	8	73
57	Passenger Cars & Multi Utility Vehicles	3	5	8	7	8	9	18	3	9	70
58	Dyes & Pigments	5	9	9	7	10	7	5	6	8	66
59	Plastic Packaging Goods	6	16	14	8	11	5	1	1	4	66
60	Switching Apparatus	8	9	6	4	8	11	8	5	6	65
61	Paints & Varnishes	5	8	6	8	9	11	3	4	10	64
62	Castings & Forgings	6	8	4	14	6	12	2	3	7	62
63	Granite	18	8	11	7	5	2	3	6		60
64	Other Non-Ferrous Metals	9	6	15	5	3	3	7	2	9	59
65	Commercial Complexes		2	2	2	3	7	9	10	17	52
66	Cloth	4	10	13	5	9	3	2	3	3	52
67	Poultry & Meat Products	14	10	5	7	7	1	4	3	2	53
68	Books & Newspapers	3	3	4	9	7	2	5	9	7	49
69	Synthetic Yarn	13	21	8	3	4	1		1		51
70	Industrial Gases	7	3	3	13	9	4	4	5	2	50
71	Cement & Asbestos Products	2	4	4	14	6	3	5	6	4	48
72	Aluminium Products	4	6	3	6	7	3	3	7	5	44
73	Mutual Funds	7	12	7	6	8	2		1		43
74	Metal Tanks & Fabrications	3	1	1	11	6	5	2	4	7	40
75	Clocks & Watches	4	5	7	7	3	1	3	5	4	39
76	Motors & Generators	9	4	2	3	3	4	2	4	8	39
77	Cement	7	5	3	3	8	2	3	3	5	39
78	Ball Bearings	6	4	3	3	7	8		3	4	38
79	Refractories	7	6	5	5	1	5	4	2	2	37
80	Steel Tubes & Pipes	4	8	2	4	6	5	3	3	2	37
81	Cocoa Products & Confectionery	5	5	4	5	3	4	5	4	1	36
82	Liquors	5	4	10	4	3	2	1	3	4	36
83	Misc. Financial Services								15	17	32
84	Paper	2	4	1	5	6	6	6	2	2	34
85	Aluminium	4	3	3	8	4	2	4	5		33
86	Banking Services		2	1		5	5	3	11	4	31
87	Dairy Products		7	1	7	6	3	2		4	30
88	Nitrogenous Fertilisers	5	5	14	4	1	1	1			31
89	Storage Batteries	2	5	10	3	2	1	2	1	5	31
90	Beer	7	9	4	2	1	2	1	2	2	30
91	Courier Services	1	3	4		7	6	7		2	30
92	Pesticides	2	4	2	3	4	5	1	5	2	28
93	Bakery & Milling Products	2	2	6	4	4	3	5	1	1	28
94	Oil Cakes & Animal Feed	3	3		3	3	2	6	4	4	28
95	Other Fertilisers	1	1	2	2	7	5	3	3		24
96	Air Transport	1	2		3	5		2	8	2	23
97	Silk Textiles	1	1	1	7	7	1	1	2	3	24
98	Synthetic Fabrics	1	5	5	2	5	3	2		1	24
99	Road Transport			1	1	2	5	1	5	6	21
100	Other Misc. Non-Metallic Mineral Products		1	1	1	2	2	2	8	4	21
101	Soaps & Detergents	5	3	1	3	3	2	1	4		22
102	Offshore Drilling	6	5	5	3	1		1			21
103	Coal & Lignite	1		3	3	3	2	1	4	3	20
104	Plastic Resins	4	3	4	3	1	1	1	2		19
105	Crude Oil & Natural Gas	1	1		2	3		3	4	3	17
106	Dry Cells	2	4	4	3	3	2				18
107	Insurance Services							1		14	15
108	Plastic Tubes & Pipes	1	3	2	5	4	1		1	1	18
109	Electronic Tubes	2	1	5	3	1	1		4		17
110	Pre-Recorded And Recorded Cassettes	5		2	3	2	1	3	1		17
111	Investment Services						1	2	2	10	15
112	Plastic Films	3	1	4	2	5				1	16
113	Structurals	2		1	3	2	6			1	15
114	Photographic Films	1		5	2	1		3	2		14

115	Commercial Vehicles			1	2	2	3	4		1	13
116	Pig Iron	3	2	3	2		1				11
117	Stainless Steel			2	1	2	1	2	2	1	11
118	Abrasives		1	2	1		6				10
119	Caustic Soda	1	2		2	2	1		1	1	10
120	Electricity Distribution	1		1		4		1	1	1	9
121	Fasteners	1		1	3			2	2		9
122	Soyabean Products	2	3		2					2	9
123	Steel Wires	3	1	2	1	1			1		9
124	Sugar	1			1				1	5	8
125	Amusement Parks/Entertainment Centres/Theatres								1	4	5
126	Civil Engineering								2	5	7
127	Starches			2	1	3		1		1	8
128	Carbon Black	1				3		1	1	1	7
129	Coffee	2		1	1	1		1	1		7
130	Explosives		2			1		2	1	1	7
131	Plastic Sheets	1	2	1	1	1		1			7
132	Bicycles	1		3						2	6
133	Ferro Alloys	1		2	2		1				6
134	Diversified					1	3	1			5
135	Housing Finance Services					1			2	2	5
136	Other Forms Of Primary Plastic		1					2		2	5
137	Railway Transport				1		1	1		1	4
138	Sponge Iron		1		1		1				3
139	Acetic Acid		1					1	1		3
140	Housing Construction				2			1			3
141	All India Development Institutions (Dfis)									1	1
142	Broadcasting/Distribution Of Tv Serials/Films									1	1
143	Equipment Leasing Services									1	1
144	Irrigation									1	1
145	Jute Products					1					1
146	Other Loan Services										0
147	Phthalic Anhydride			1							1
148	Provident Funds				1						1
	Grand Total	1385	1730	2109	2138	2142	1675	1745	2037	2116	17077