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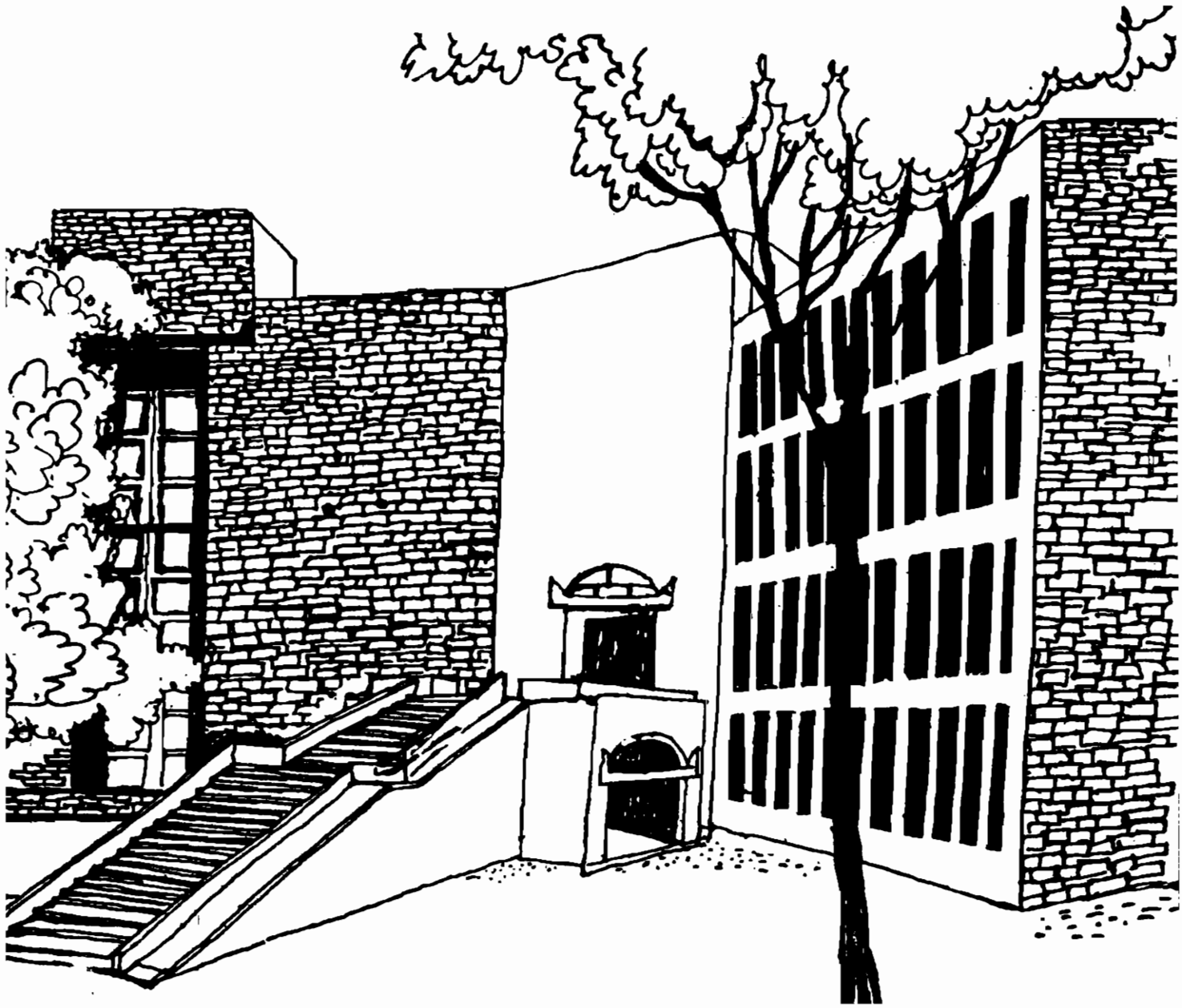

Indian Auto Component Industry: Learning to Export and Grow

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Indian Auto Components Industry

-Learning to Export and Grow*

1. Introduction

Over the past four decades the Indian auto components industry has acquired an independent status for itself. Initially the automobile manufacturers set up their own facilities for producing the parts needed to assemble the vehicles or imported them. As volumes increased, they subcontracted and encouraged independent entrepreneurs to set up ancillary units to produce some of the parts. They provided technical support and at times financial support to these units. They also developed vendors to substitute imports. With further increase in the volume of vehicles, replacement demand for the parts increased and it created opportunities for independent companies to set up units on their own. Even the captive units started looking for independent opportunities. As the auto parts came to be standardized, they started supporting several automobile units. The local companies collaborated with leading international manufacturers of standard components and started meeting the needs of both original and replacement demand. The growth of the components industry was supported further by the entry of new vehicle manufacturers. Some efforts were made to develop export markets as well. With successful breakthroughs in the international markets, the potential of the industry to earn foreign exchange came to be recognized by both the government and the entrepreneurs. With this the components industry carved out an independent space for itself.

By 1992, there were 200 units in the large and medium sectors and about 5000 units in the small sector, making a wide range of auto components.They cater to the needs of a wide range of vehicles ranging from mopeds to motor cycles, and passenger cars to heavy commercial vehicles. The units have tended to concentrate in the Southern and northern regions. Unfortunately the growth is also characterized by the emergence of spurious components manufacturers.

See exhibit 1 for a classification of auto components.

1.1 This report

In this report we present an overview of the industry and the findings of the field and mail surveys. We have had indepth discussions in 21 companies in the industry. At the time of writing the report industry firm questionnaires 18 companies were complete in most respects. The response to our mail survey was relatively encouraging. Out of 150 companies to whom the questionnaires were sent 35 companies responded. To supplement our data we had discussions with the officials of Indian Automobile Components Association (ACMA) and ACMA centre for Technology. We had discussions with one TI officials related to the automobile industry. The field and mail survey insights have been strengthened by secondary sources of information - company annual reports, brochures, bulletins of the industry associations and articles in academic journals, and business dailies and magazines.

1.2 An Idea of the Sample

1.2.1 Field survey sample

We interviewed executives in 23 autocomponents companies. We were able to obtain almost complete questionnaire data from 18 companies. These companies came primarily from the large and medium segments of the autocomponents industry. There were 8 companies each in the large and medium

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* The expansions of the abbreviations and acronyms used are given in Appendix 1.

sectors. Only two companies were from the small scale sector. Only one company out of the 18 was less than five years old. Others were well established and were more than 10 year old. Of these, 12 companies were more than 25 year old. The ownership pattern also differed. 8 companies were family owned companies, 4 were public limited companies, 2 were public limited companies with dominant shareholders, and one was a part of a conglomerate. There was one subsidiary company of a multi-national and one joint venture without foreign investment.

1.2.1.1 Employment categories

Ten (55.56%) out of the eighteen companies employed more than 500 persons. The distribution of employment across field sample companies was as in table 1.1.

Table 1.1

Employment distribution of field survey firms

Employment category	No. of firms	Percentage
51-100	1	5.56
101-300	2	11.11
301-500	5	27.98
501-1000	3	16.67
1001-3000	7	38.89

1.2.1.2 Growth experience

6 companies out of 14 had grown faster than average companies. Only two companies had grown sufficiently well. They reported their growth rate to be negligible. It is significant to note that all the sample companies reported that they were growing. Not a single company experienced decline. See table 1.2 for details.

Table 1.2

Growth experience of field sample companies

Rate	No. of firms	Percentage
Negligible	2	14.29
Moderate	6	42.86
Rapid	5	35.71
Phenomenal	1	7.14

1.2.2 Mail survey sample

Mail survey questionnaires were sent to 150 companies and we received responses from 35 (23.33%) companies.

The respondents belonged to 8 different employment categories. The dominant group employed between 101 to 300 persons. Only one company had employed more than 5000 persons. Four companies had employed less than 50 persons. Details are in table 1.3.

The age profile of respondents is given in table 1.4.

Though the concentration is on the younger age group of 0-10, there is a spread from 10 years to 50 years. 24 companies (68.6%) were private domestic companies while 10 companies were private firms with foreign capital. Engineers and scientists were founders in 20 out of the 35 companies. 8 companies were started by general entrepreneurs while the remaining were started by others.

Ninetyfive percent of the respondents had achieved more than average growth rate. Only 5.7 per cent of the companies experienced lower growth rate. The distribution of the growth rate of sales is given in table 1.5.

In terms of cluster of companies, 60 percent of the respondents indicated that there was clustering around their location and 40 per cent of the companies constituting 14 companies in the sample felt that there was no clustering.

Thus we have a heterogeneous sample. It has given some interesting insights. The details of our findings are presented in the following sections.

Table 1.3

Distribution of Employment among Mail Survey Respondents

Employment category	No. of Companies	Percentages
<50	4	11.4
51-100	2	5.7
101-300	16	45.7
301-500	4	11.4
501-1000	3	8.6
1001-5000	5	14.3
> 5000	1	2.9

Table 1.4

Age profile of respondents

Age category	No. of companies
0-10	12
10-20	5
20-30	7
30-40	8
40-50	2

2. Role of the Government in Building the Industry

Table 1.5

Growth experience of mail sample companies

Growth rate	Frequency	Percentage
Negligible	2	5.7
Moderate growth	3	17.00
Rapid growth	4	13.00
Phenomenal growth	5	3.00

In building the autocomponents industry the government of India has played three roles. As a policy maker it has protected the industry from foreign competition and at the same time regulated the expansion of the industry through licencing and other controls in the initial stages. In the recent past it has liberalized the industry and encouraged growth through exports. As an institution builder it has set up institutions to provide technical services and trained manpower to the industry. As an entrepreneur it has set up a vehicle manufacturing unit not only to generate demand but also to upgrade the quality of the components and build a potential for exports. These roles are detailed in the following sections

2.1 Key policies

Till recently, the Government of India had taken a very restrictive view of the automobile industry. This affected the growth of the components industry. Except commercial vehicles investment.s in automobile sectors was considered a luxury. Opportunities for rapid expansion were few. Foreign technical collaboration was permitted selectively. The vehicle manufacturers, however, had to agree to a phased programme of indigenization. The producers had to take licences for producing difference types of vehicles. The licences issued by the Government of India set the upper limit for growth. The

industry was subject to other restrictive policies like Monopolies and Restrictive Trade Practices Act and Foreign Exchange Regulation Act.This policy produced a less dynamic slow growing automobile industry. While the international vehicles saw significant changes in respect of fuel efficiency, features offered and ergonomics, and overall the Indian vehicles remained nearly stagnated.

This affected the growth of the autocomponents industry. They were as less quality, cost and delivery conscious, and as slow growing as the vehicle manufacturers. The component industry, however, was benefitted by the phased programme of indigenization. The vehicle manufacturers either developed new vendor or strengthened the existing vendor. In the middle of the seventies the Government began to look at the automotive sector differently. It was seen not only as an employment generator but also as an engine of new technological growth. The trend towards liberalization set in. The auto component industry was among the first few industries to be liberalized. It was delicenced in 1975 itself. The units could expand without seeking fresh licence if they were not FERA or MRTP companies and if they financed their expansion without depending on financial institutes support. For the MRTP and FERA, the first step towards liberalization came with automatic licensing policy where the units could expand their capacity by 25% in a five year period without seeking fresh licence. The second step was the broadbanding of licences for the purpose of related diversification in 1985. This facilitated the utilization of given licences and installed capacity, for producing related range of products. This was followed by delicensing of the auto components industry even for FERA and MRTP companies. This facilitated the entry of others in the industry.

In the eighties the Government of India permitted technical and financial foreign collaborations in the automobile industry. The foreign collaborator could even own majority interest in the new company. The liberalized policy enabled the leading manufacturers in Japan to enter the industry in partnership with Indian companies. Table 2.1 provides an idea of the Japanese presence.

Table 2.1

Presence of Japanese Companies in the Indian Automobile Sector

Name of the company	Year of entry	Vehicle type	Nature of entry
Mazda		Light commercial vehicle	Joint venture
Mitsubhishi	1982	Light commercial vehicle	Joint venture
Nissan	1985	Light commercial vehicle	Joint venture
Toyota Motors Co	1984	Light commercial vehicle	Joint venture
Suzuki Motors Ltd	1982	Cars Motor cycles	Joint venture Joint venture
Honda Motor Co.	1984	Motor Cycle Scooter Motor cycle	Joint venture Joint venture Technical collaboration
Kawasaki	1984	Motor cycle	Technical collaboration
Yamaha	1983	Motor cycle	Technical collaboration

Source: ACMA Foreign Collaboration in the automotive industry 1991

To support the industry further, the Government of India identified auto components sector as an extreme focus area for exports. The spotlight, therefore, has been on exploiting fully the export potential of the industry.

Thus starting with broad-banding, the government policy changed in favour of total delicensing encouraging entry of new competitors into the industry.

The new policies facilitated not only the entry of new competitors into the auto components industry, but also diversification of existing entrepreneurs into other automobile components or strengthen their existing base.

2.2 Setting up of Institutions

The Government of India set up the Centre for Mechanical Engineering Research (CMERI) in 1958 to initiate research in mechanical engineering. The automobile engineering division of CMERI undertook research in design and testing of auto components and assemblies. One of the most documented successes of CMERI has been the development of an indigenous design of a low horse power tractor. The design was commercialized by a joint sector undertaking of the State of Punjab. Setting up the tractor unit created the basis for building new ancillary units in Punjab.

A cooperative research institution was set in 1975 by the automotive industry and the Government of India to provide service in engineering, product design. development, standardization and testing of automotive components and equipments to the automobile and components industry. This research unit by name Automotive Research Association of India (ARAI) has been set up as a society under the society's act. It has created facilities for vehicle evaluation, engine and engine components evaluation, analysis of materials, and developing emission standards. It has setup a technical library to provide technical information to the manufacturers. ARAI also conducts training programmes. It also undertakes research sponsored by international bodies like UNDP.

The membership of IARI as of 1992 was 46 .

Table 2.2 provides data on the sources of funds of IARI. The share of income from sponsored projects has increased from 35.6% in 1985 to 40.37% in 1992. The total income has increased from Rs. 10.4 million to Rs. 31.7 million in the corresponding period.

Table 2.2

Growth Pattern of sponsored income of IARI

(Rs. in million)

Years	Sponsored Income	Total Income %
1985	3.7	10.4
1986	4.3	12.7
1987	3.0	14.3
1988	3.3	14.4
1989	7.0	21.9
1990	7.7	26.3
1991	8.1	26.8
1992	12.8	31.7

2.3 Setting up a Manufacturing Unit

The Government also intervened directly by nationalizing Maruti Udyog, a defunct private sector small car manufacturing unit and gave it a new lease of life. It entered into financial and technical collaboration with SUZUKI, a Japanese vehicle manufacturer. This company demanded new standards of quality and technology from the auto components manufacturers. Starting with an 800 cc economy car, Maruti Udyog moved up the range to provide 1000 cc luxury car, jeeps and vans. It expanded its capacity from 40,000 to 1,40,000. It

even exported the vehicles to Europe. It has more ambitious plans of growth than many private sector companies in India.

The entry and growth of Maruti Udyog gave a major philip to the auto components industry in India. This aspect will be elaborated in a separate section.

2.4 Some Feedback on Government Policies

From both mail survey questionnaires and field surveys we obtained feedback on the use of government policies for encouraging industry and technological improvements. The results are presented in table 2.3. We find that a large majority of the respondents had not used the government incentives. Fiscal incentives, and standards and testing facilities programmes, followed by export incentives emerged as key policies of the government which had an impact on the company. The usage of export incentives and fiscal incentives is maximum among the industries.

Table 2.3

Usage of government policies

Policies	Rank	Mean beneficial impact	No. of firms using
Standards and testing	1	3.75	4
Export incentives	2	3.38	8
Fiscal incentives	3	3.22	9
Grants	-	-	1
Special technology loans	-	-	3
Training	-	-	3
Government procurement	-	-	1
Market protection	-	-	2

Table 2.4

Use of Government Policies

	Used	Not used	Total
Fiscal (tax) Incentives	18	16	34
Grants	11	13	34
Special Technology Loans	4	30	34
Training Incentives	3	31	34
Government Procurement	5	29	34
Standards/Testing/Certification Services	12	22	34
Market Protection for the Firm's Products	5	29	34
Export Incentives	20	14	34
Other (specify)	2	32	34

Table 2.5						
Impact of Government Policies						
Impact / Policies	1	2	3	4	5	Tota l
Fiscal (tax) Incentives	20	5	4	4	1	34
Grants	25	1	4	4	-	34
Special Technology Loans	32	-	1	1	-	34
Training Incentives	31	1	1	1	-	34
Government Procurement	30	1	3	-	-	34
Standards/Testing/Certification Services	22	2	4	4	2	34
Market Protection for the Firm's Products	31	1	1	-	1	34
Export Incentives	15	3	6	6	4	34
Other (specify)	32	-	-	2	-	34

2.4.1 Usage of government policy and firm characteristics

We have done a very preliminary statistical testing to see whether the firm characteristics have made any difference to the usage of government policies or not. The test results are presented in tables 2.6 to 2.14. The inferences with certain limitations are as follows.

The usage of government policy is influenced by the size of the firm, nature of ownership and background of chief executives. It is the export incentive which gets used more by the engineers and scientists, and grants are used more by the private domestic companies. Industry accumulation has influenced the use of export incentives. Rate of R & D expenditure has not made any difference to the usage of government policies. So is the case with rate of expenditure on technical training or the technical orientation of firms. The gap in technology capability has made difference to the choice of the standards, testing, and certification services. Special technology loans are obtained by companies which want to stay closer to the international leader. They also make use of training incentives. But it is those which see themselves as being further away from the leader that use training incentives.

Table 2.6

Usage of Government Policies by Size of Firm

	Large	Medium	Small	Chi Sq.	Sig.
FI	4 22.2 40.0	13 72.2 68.4	1 5.6 20.0	4.68	0.10
Grants	3 27.3 30.0	8 72.7 42.1	0 0.0 0.0	3.24	0.20
STL	0 0.0 0.0	4 100.0 21.1	0 0.0 0.0	3.58	0.17
TI	0 0.0 0.0	3 100.0 15.8	0 0.0 0.0	3.58	0.47
GP	0 0.0 0.0	4 80.0 21.1	1 20.0 20.0	2.45	0.29
S/T/CS	3 25.0 30.0	8 66.7 42.1	1 8.3 20.0	1.02	0.60
MPFFP	0 0.0 0.0	5 100.0 26.3	0 0.0 0.0	4.63	0.10
EI	8 40.0 80.0	11 55.0 57.9	1 5.0 20.0	4.97	0.08
Total	10	19	5		

Table 2.7
Usage of Government Policies by Ownership of Firms.

	PDC	PWFC	MGO	COOP.	OTH	Chi Sq.	Sig.
FI	8	9	0	0	0	8.51	0.004
	47.1	52.9	0.0	0.0	0.0		
	34.8	90.0	0.0	0.0	0.0		
Grants	5	5	0	0	0	2.64	0.10
	50.0	50.0	0.0	0.0	0.0		
	21.7	50.0	0.0	0.0	0.0		
STL	1	2	0	0	0	2.07	0.15
	33.3	66.7	0.0	0.0	0.0		
	4.3	20.0	0.0	0.0	0.0		
TI	1	2	0	0	0	2.07	0.15
	33.3	66.7	0.0	0.0	0.0		
	4.3	20.0	0.0	0.0	0.0		
GP	3	1	0	0	0	0.06	0.81
	75.0	25.0	0.0	0.0	0.0		
	13.0	10.0	0.0	0.0	0.0		
S/T/CS	8	3	0	0	0	0.07	0.79
	72.7	27.3	0.0	0.0	0.0		
	34.8	30.0	0.0	0.0	0.0		
MPFFP	3	1	0	0	0	0.06	0.81
	75.0	25.0	0.0	0.0	0.0		
	13.0	10.0	0.0	0.0	0.0		
EI	12	7	0	0	0	0.91	0.34
	63.2	36.8	0.0	0.0	0.0		
	52.2	70.0	0.0	0.0	0.0		
Total	23	10	0	0	0		

Table 2.8

Usage of Government Policies by Background of Chief Executive.

	SW	Ent	E/S	M/F	OTH	Chi Sq.	Sig.
FI	0	3	8	2	5	2.01	0.57
	0.0	16.7	44.4	11.1	27.8		
	0.0	37.5	50.0	66.7	71.4		
Grants	0	4	3	1	3	2.85	0.42
	0.0	36.4	27.3	9.1	27.3		
	0.0	50.0	18.8	33.3	42.9		
STL	0	1	1	0	2	2.78	0.43
	0.0	25.0	25.0	0.0	50.0		
	0.0	12.5	6.3	0.0	28.6		
TI	0	1	2	0	0	5.16	0.52
	0.0	33.3	66.7	0.0	0.0		
	0.0	12.5	12.5	0.0	0.0		
GP	0	2	2	0	1	1.26	0.74
	0.0	40.0	40.0	0.0	20.0		
	0.0	25.0	12.5	0.0	14.3		
S/T/CS	0	3	7	0	2	2.29	0.51
	0.0	25.0	58.3	0.0	16.7		
	0.0	37.5	43.8	0.0	28.6		
MPFFP	0	2	2	0	1	1.26	0.74
	0.0	40.0	40.0	0.0	20.0		
	0.0	25.0	12.5	0.0	14.3		
EI	0	4	8	1	7	6.48	0.09
	0.0	20.0	40.0	5.0	35.0		
	0.0	50.0	50.0	33.3	100.0		
Total	0	8	16	3	7		

Table 2.9
Usage of Govt. Policies by Industry Accumulation.

	Local	Non-Local	Chi Sq.	Sig.
FI	11 61.1 52.4	7 38.9 53.8	0.007	0.93
Grants	6 54.5 28.6	5 45.5 38.5	0.36	0.55
STL	3 75.0 14.3	1 25.0 7.7	0.34	0.56
TI	2 66.7 9.5	1 33.3 7.7	0.69	0.71
GP	4 80.0 19.0	1 20.0 7.7	0.83	0.36
S/T/CS	9 75.0 42.9	3 25.0 23.1	1.38	0.24
MPFFP	3 60.0 14.3	2 40.0 15.4	0.008	0.93
EI	10 50.0 47.6	10 50.0 76.9	2.85	0.09
Total	21	13		

Table 2.10
Usage of Government Policies by Rate of R&D expenditure

	Low - 1	2 - 5	6 - 10	11 - High	Chi Sq.	Sig.
FI	6 54.5 66.7	5 45.5 50.0	0 0.0 0.0	0 0.0 0.0	1.82	0.40
Grants	4 66.7 44.4	2 33.3 20.0	0 0.0 0.0	0 0.0 0.0	1.80	0.41
STL	1 50.0 11.1	1 50.0 10.0	0 0.0 0.0	0 0.0 0.0	0.12	0.94
TI	2 100.0 22.2	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	2.72	0.26
GP	2 66.7 22.2	1 33.3 10.0	0 0.0 0.0	0 0.0 0.0	0.74	0.69
S/T/CS	4 80.0 44.4	1 20.0 10.0	0 0.0 0.0	0 0.0 0.0	3.35	0.19
MPFFP	1 50.0 11.1	1 50.0 10.0	0 0.0 0.0	0 0.0 0.0	0.12	0.94
EI	6 54.5 66.7	4 36.4 40.0	0 0.0 0.0	1 9.1 100.0	2.22	0.33
Total	9	10	0	1		

Table 2.11

Usage of Government Policies by rate of expenditure on technical training

	Low - 1	2 - 5	6 - 10	11 - High	Chi Sq.	Sig.
FI	5	2	0	0	0.31	0.58
	71.4	28.6	0.0	0.0		
	55.6	40.0	0.0	0.0		
Grants	3	1	0	0	0.28	0.60
	75.0	25.0	0.0	0.0		
	33.3	20.0	0.0	0.0		
STL	1	1	0	0	0.21	0.65
	50.0	50.0	0.0	0.0		
	11.1	20.0	0.0	0.0		
TI	2	0	0	0	1.30	0.25
	100.0	0.0	0.0	0.0		
	22.2	0.0	0.0	0.0		
GP	2	0	0	0	1.30	0.25
	100.0	0.0	0.0	0.0		
	22.2	0.0	0.0	0.0		
S/T/CS	4	0	0	0	2.11	0.08
	100.0	0.0	0.0	0.0		
	44.4	0.0	0.0	0.0		
MPFFP	2	0	0	0	1.30	0.25
	100.0	0.0	0.0	0.0		
	22.2	0.0	0.0	0.0		
EI	5	2	0	0	0.31	0.58
	71.4	28.6	0.0	0.0		
	55.6	40.0	0.0	0.0		
Total	9	5	0	0		

Table 2.12

Usage of Government Policies by the strength of engineers and technicians

	Low-10	11-25	26-50	51-100	101-250	251-HIGH	Chi Sq.	Sig.
FI	3 17.6 42.9	4 23.5 57.1	6 35.3 75.0	3 17.6 75.0	1 5.9 33.3	0 0.0 0.0	6.52	0.26
Grants	2 18.2 28.6	2 18.2 28.6	4 36.4 50.0	0 0.0 0.0	2 18.2 66.7	1 9.1 33.3	4.56	0.47
STL	0 0.0 0.0	1 25.0 14.3	3 75.0 37.5	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	7.02	0.22
TI	0 0.0 0.0	1 33.3 14.3	1 33.3 12.5	0 0.0 0.0	1 33.3 33.3	0 0.0 0.0	6.96	0.73
GP	1 20.0 14.3	2 40.0 28.6	2 40.0 25.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3.28	0.66
S/T/CS	1 8.3 14.3	3 25.0 42.9	4 33.3 50.0	2 16.7 50.0	2 16.7 66.7	0 0.0 0.0	5.38	0.37
MPFFP	0 0.0 0.0	2 40.0 28.6	2 40.0 25.0	1 20.0 25.0	0 0.0 0.0	0 0.0 0.0	4.10	0.54
EI	3 15.8 42.9	4 21.1 57.1	5 26.3 62.5	2 10.5 50.0	3 15.8 100.0	2 10.5 66.7	3.10	0.68
Total	7	7	8	4	3	3		

Table 2.13

Usage of Government Policies by technology level in the domestic context

	VL	Low	Avg	AAvg	SAL	Chi Sq.	Sig.
FI	0 0.0 0.0	0 0.0 0.0	2 11.1 50.0	3 16.7 30.0	13 72.2 65.0	3.29	0.19
Grants	0 0.0 0.0	0 0.0 0.0	2 18.2 50.0	3 27.3 30.0	6 54.5 30.0	0.65	0.72
STL	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 25.0 10.0	3 75.0 15.0	0.77	0.68
TI	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	2 66.7 20.0	1 33.3 5.0	2.95	0.57
GP	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3 60.0 30.0	2 40.0 10.0	2.91	0.23
S/T/CS	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	6 50.0 60.0	6 50.0 30.0	5.10	0.08
MPFFP	0 0.0 0.0	0 0.0 0.0	1 20.0 25.0	1 20.0 10.0	3 60.0 15.0	0.52	0.77
EI	0 0.0 0.0	0 0.0 0.0	3 15.0 75.0	6 30.0 60.0	11 55.0 55.0	0.56	0.76
Total	0	0	4	10	20		

Table 2.14

Usage of Government Policies by technological capacity in the international context

	VL	Low	Avg	AAvg	SAL	Chi Sq.	Sig.
FI	0 0.0 0.0	1 5.6 25.0	10 55.6 58.8	6 33.3 60.0	1 5.6 100.0	4.83	0.31
Grants	0 0.0 0.0	1 9.1 25.0	5 45.5 29.4	4 36.4 40.0	1 9.1 100.0	3.48	0.48
STL	0 0.0 0.0	0 0.0 0.0	1 25.0 5.9	2 50.0 20.0	1 25.0 100.0	9.52	0.05
TI	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	2 66.7 20.0	1 33.3 100.0	14.99	0.06
GP	1 20.0 50.0	1 20.0 25.0	1 20.0 5.9	1 20.0 10.0	1 20.0 100.0	9.36	0.05
S/T/CS	1 8.3 50.0	2 16.7 50.0	5 41.7 29.4	3 25.0 30.0	1 8.3 100.0	2.78	0.59
MPFFP	0 0.0 0.0	1 20.0 25.0	1 20.0 5.9	2 40.0 20.0	1 20.0 100.0	7.76	0.10
EI	1 5.0 50.0	3 15.0 75.0	9 45.0 52.9	6 30.0 60.0	1 5.0 100.0	1.45	0.84
Total	2	4	17	10	1		

3. Industry Structure and Performance

3.1 Structure of the Industry

As presented earlier there are 200 large and medium manufacturers of auto components and more than 5000 small manufacturers. They can be broadly classified into OEM suppliers and suppliers to trade. some of the OEM suppliers also supply to the trade. Another type of classification on is on the basis of the proprietary nature of the technology. There are firms manufacturing proprietary items. There are also others who are manufacturing common items.

Unfortunately the industry also has manufacturers of spurious items.

The industry is well spread over, though the concentration is in the North and South.

3.1.1 Modes of entry and growth of companies

The industry has attracted companies with varying backgrounds. The mixed background of the respondents has been presented already. 20 out of 35 companies were started by engineers and scientists. Some illustrations are given below

Entry from a related business - OEM route:
A well established large forging company started its operations by supplying forgings to diesel engine manufacturers, with technical support from its customers. It diversified its range of forgings to meet the needs of medium and heavy duty commercial vehicle industry. The entry of Japanese light commercial vehicles manufacturers created new opportunities for expansion. It upgraded its quality through inhouse efforts and customer feedback, and supplied to the Japanese joint ventures. It used the experience to build export markets. this company has modernized itself to meet the export order for axles. It has entered into a technical collaboration with an American company. It is in the process of getting the ISO-9000 certification.

A Joint Venture with customer:
The indigenization programme of Maruti Udyog created an opportunity for an engineer with background in auto component manufacturing. He approached Maruti with a proposal for a joint venture. He obtained technical collaboration with a leading steering systems manufacturer in Japan. The Japanese company started with technical collaboration and expanded it to have a stake in the equity of the company. The Japanese manufacturer is now helping this company to set up a plant to supply mechanical steering to the global markets from India. The company is diversifying into axles and seats. Even its workers are being trained on the shop floors of Japanese collaborator. It is preparing itself for the ISO-9000 certification. It has hired the services of an external consultant.

Small parts shop to OEM supply:
An engineer from the military services started an engine parts shop in the western region. He was identified as a supplier of parts by a joint venture company set up to manufacture diesel engines. It received technical support from the customer and an exposure to the operations of the collaborator. It learnt from its mistakes and established itself as an engine parts supplier to the OEMS and trade. It responded to the indigenization efforts of Maruti Udyog and acquired competence to meet the necessary quality standards. It is also thinking of exports. It is in the initial stage of getting the ISO-9000 certification. Its employees are receiving training in inhouse programmes. Few employees were trained in programmes organized by the Confederation of Indian Industry.

Techno Entrepreneurship. From employees to employers: (OEM route):
Three engineers from a company supplying shell castings to the two wheeler industry decided to start their own small scale venture after the company closed down its business due to labour problems. Initially, they supplied castings to the same buyers. An opportunity for expansion arose with the indigenization programme of one of the Japanese joint ventures in the two wheeler industry. The joint venture company provided the specification only. This company developed the dies and casting procedures to produce the shells. It learnt from feedback from the customer and emerged as a major supplier to the joint venture company. Building on its success, it approached another Japanese joint venture company in the North and obtained the orders. Building further, it has sent its samples to a foreign buyer. It hopes to make a major breakthrough in the export markets. It has hired an experienced Manager to help the company in obtaining the ISO-9000 certification.

From Academics to Business : - The OEM route - (Own efforts):
A professor of mechanical engineering decided to start a venture in automotive castings with the help of his brother in law. He became an OEM supplier to a two wheeler company. He built his business

on the strength of quality and competitive price. He was the first company to obtain the ISI mark in the small scale sector for his castings. The two wheeler company stopped its captive production of these castings as it could not sustain the quality. The professor stressed quality further. He made improvements in methods of castings, built simple jigs and fixtures, and even built his own special purpose machines. He kept abreast of technological developments in his business by visiting comparable or advanced foundries abroad. He exported his castings to OEM buyers abroad. Today, he wants to increase his exports business further.

The OEM route - (collaboration + own efforts)
A well established business house found a gap between the supply and demand for dash board instruments, and applied for a licence. Having got the licence it obtained technology from one of the existing producers. The existing producer supplied the technology on the condition that the company would not compete with it. A major opportunity for supplying to OEM arose when the existing producer had to temporarily close down his operations due to labour problems. New opportunities arose with the indigenization programmes of both the two and four wheeler Japanese Joint Venture. These buyers gave the specifications only. The company received technical support from one of the component supplier to the Japanese company.

It learnt from the two wheeler experience and built the instruments for the four wheelers on its own. It developed semi-special purpose machines to facilitate production. It broke into the export markets by supplying speedometers to a sports bike manufacturer in Finland. He received subsidy from a bank in India. The company has obtained the ISO-9000 certificate to boost its exports.

From repairshop to leadership - From trade to (OEM + trade):
A semi literate worker started his business by repairing radiators. From repairs he moved to producing radiators for the 'trade' market. He built his business further by becoming an OEM supplier to a commercial vehicle manufacturer. The OEM buyer provided initial technical help. To improve quality and reduce cost, the company built its own special purpose machine tools. Today it is a very well established radiators manufacturer. It has grown on the strengths or its own efforts.

Thus we see that entries have been made by companies through either the OEM route or the trade route. The sources of technology have been self study, collaborator and customers. Only those who have responded to the needs of quality have strengthened their entry and exploited the new opportunities in the industry.

3.1.2 Nature of competition

Competition in the industry has ranged from being intense in the case of radiators and fasteners to being monopolistic in the case of steering gears or sparkplugs. Much depends on the nature of the items produced and the kind of markets it is aimed at. In the OEM market the competition is regulated by the OEM buyer. But in the trade segment it is intense. In the case of standard items like fasteners the competition is intense. But in the case of vital items like steering gears the competition is low. For engine parts the competition is oligopolistic.

The companies in the field survey sample considered their domestic market share to be important. 10 out of 15 respondents had a domestic share which could be considered as important. No company was a monopolist in its sector.

78% of the firms faced more than average competition in the domestic market from local firms. Only 22% were facing less than average competition. These were companies that made proprietary items.

3.1.3 Data from mail survey

In the domestic market, majority of the companies faced less than average competition. Only 8 (23.5%) out of 34 respondents have indicated that the competition faced by them was more than average while 26 (76.5%) companies indicated that the competition faced by them was less than average or average . But, in the international market, 23 (76.7%) companies out of 30 respondents faced more than average competition. The relative competitive dimensions can be seen from table 3.1

Table 3.1

Degree of Competition faced by Mail Survey Respondents

Degree of competition	Domestic market		International Market	
	Frequency	Percentage	Frequency	Percentage
1. (very low)	1	2.9	3	10
2.	14	41.2	nil	nil
3. average	11	32.4	4	13.3
4.	4	11.8	6	20.0
5. very high	4	11.8	17	56.7
6. Missing	1			

3.1.4 Data from field survey

In our discussion, we had asked the executives to rate the importance of various sources of competitiveness for their business. A ranking of the sources on the basis of mean importance is given in table 3.2.

The companies identified product quality and reliability as the prime sources of competitiveness in the industry. This is followed by competitive price and delivery time. This is understandable in the context of automotive industry where the OEM customer insists on quality, reliability, delivery time and price as the factors from his suppliers. There is very little scope in terms of new product development as a source of competitiveness. This is because the component design and nature of components is decided by the vehicle manufacturer. If the parts supplier takes initiative to develop a new product, and is not accepted by the vehicle manufacturer, it may not give any competitive advantage. Hence it ranks last as the source of competitive advantage.

Table 3.2

Ranking of Sources of Competitiveness

Source of competitiveness	Mean Importance	Rank
Product quality	4.67	1
Product reliability	4.67	1
Short delivery time	4.00	2
Lower price	4.00	2
Product design	3.83	3
New product development	3.35	4

It is worth noting that quality and reliability are identified as equally important and price and delivery time are also seen as equally important. This ranking provides an opportunity for the technological service providers. They can help the autoparts manufacturers to improve quality, reliability, and reduce cost and delivery time. It also provides an opportunity to the firm to build their competitiveness by focusing attention on these factors.

While the respondents had more than average share in the domestic market, they did not have a significant presence in the international market. This shows that the companies in the autocomponent industry have yet to make a significant impact in the international market. 27 (93.1%) of the 29 respondents reported that they had a minor share in the international market. The relative shares can be seen from table 3.3.

It can be seen from the above table that even the companies having dominant market share in the domestic market have not been able to capture even moderate market share in the international market. Our international competitiveness is yet to be built.

Table 3,3

Market shares of mail survey respondents

Market share	Domestic market	International market
1 (minor)	3	27
2.	1	2
3. (average)	11	nil
4.	13	nil
5. (dominant)	7	nil
6. Missing	-	6

3.1.5 The future of competition

With the entry of new players the competition is going to be more intense.

3.2 Production Performance

3.2.1 Key capabilities of auto components industry

Over the four decades the component industry has developed the following capabilities:

- Understanding the design and specification of parts
- Developing manufacturing practices to productionise the design
- Responding to the feedback from the customer.
- To meet the varying volume requirements of the customer
- Unbundling and assimilating foreign technology.

We had asked the mail survey respondents to compare their technological level with those of the domestic and industry leaders. their responses show that while the respondents perceived their technological capability to be equal to the technology leaders on the domestic front, they viewed their technological capability to be at a considerably lower level than that of the world leader in the industry. All the respondents perceived that their technological capability was average or more than average, 20 out of 34 respondents felt that their technological capability was equal to that of the industry leader. Out of them only one company perceived its capability to be equal to that of the world leader. Table 3.4 provides the details.

Table 3.4

Comparative Technological Capabilities of mail survey respondents

Comparative technological capabilities	Domestic Technology leadership		Internal Technology leadership	
	No. of firms	Percentage	No. of firms	Percentage
1. Very low	-	-	2	5.71
2.	-	-	4	11.4
3. Average	5	14.3	18	51.4
4.	10	28.6	10	28.6
5. Same as leader	20	57.1	1	2.9

The strategies for bridging the gap need to be thought through.

Some companies within the industry have developed exceptional operational and logistic capabilities consider the following example.

In a global competitive bid, Sundaram Fasteners bought two radiator cap manufacturing plants of GM, located at U.K. It entered into an agreement to supply the caps at a competitive price on time. The plants were dismantled and relocated near Madras in December 1992. The samples were sent in January. The approval was received in February. The first container load of bulk supplies left on March 5, 1993. The company was the first in the country to obtain the ISO-9000 certification.

3.2.2 The growth of the vehicle industry

3.2.2.1 Trends

The growth of the autocomponents industry is linked to that of the vehicle industry. In this section we present the trends in the growth of the vehicle industry as a prelude to discussing the growth of the components industry.

Starting with the assembly of Completely Knocked Down (CKD) units imported from collaborators in Europe and U.S.A, the Indian vehicle industry has developed a base for manufacturing a wide range of vehicles. Initial technology came from the technical collaborators. The government had allowed technology collaboration for a limited period. When the technology transfer agreement ended the Government of India did not permit them to renew their agreement.

The growth in the number of various types of vehicles is given in tables 3.5 and 3.6. We can note that there has been a change in both the rate of growth and the composition of the industry.

In 1970 35,305 passenger cars were produced in India. This increased to 1,53,357 by 1992. The medium and heavy duty commercial vehicles produced increased from 34449 to 77947 during this period. The number of scooters increased from 58,242 to 6,82,474, and that of motor cycles increased

from 53,038 to 3,87,037 in the same period. Mopeds, which was 11,691 made a dramatic increase to 4,05,808 units. The mopeds were produced with indigenous and foreign technology.

Table 3.5

Changing Vehicle Mix

Year	Passenger Cars	Jeeps	LCVs	Heavy & Medium LCVS	Tractors
1970	35,305	9,344	6,785	34,449	19,475
1980	30,538	15,068	20,415	47,896	67,105
1985	102,456	26,876	35,122	66,106	78,258
1990	176,821	41,944	57,525	88,103	128,775
1991	176,995	30,417	56,755	80,397	149,743
1992	153,357	38,202	50,148	77,947	151,931

Source : Automotive industry of India : Facts & Figures - 1991-92.

Table 3.6

Growth of two and three wheelers

Year	Scooters	Motor Cycles	Mopeds	Three Wheelers
1970	58,442	43,038	11,691	4,229
1980	209,943	101,586	106,073	26,519
1985	422,307	248,001	455,298	49,267
1990	968,443	478,528	428,551	95,528
1991	778,567	425,107	397,434	79,429
1992	682,474	387,037	405,868	65,340

Source: Automotive Industry of India: Facts & Figures 1991-92.

Technological upgradation in the vehicle industry has been through limited technical collaboration varying from transfer of design and drawings to buying specific technology, as permitted by the Government of India, and indigenous R & D. In the two wheeler sector, an indigenous effort was made to develop a moped, a lower horse power vehicle. The upgradation in style and features was very slow and the gap between domestic and international vehicles widened.

After the oil crisis and the consequent increase in fuel prices, the demand for fuel efficient vehicles increased. The Indian consumers and policy makers developed a disgust for gas guzzling, poor quality

and costly vehicles produced by the Indian vehicle manufacturers.The technology and quality gap between the Indian and international manufacturers became glaring. They preferred have sleek, flexible, compact and fuel efficient vehicles made in Japan.

New Initiative from the Government of India: The Government of India took the initiative by promoting an automobile company in technical and financial collaboration with Suzuki Motor company. Signing Technological and financial collaboration with Suzuki, a Japanese car company heralded the entry of several Japanese companies along with their supplier companies. The policies regarding technical and financial collaboration were liberalized. The automotive industry was also delicenced. Initially, the vehicle industry was brought under broad banding policy. Under this the earlier distinction between cars, heavy and light duty commercial vehicles was abandoned for licensing purposes. They were clubbed under a licence for four wheeler. Similarly no distinction was made between scooters and motor cycles. The other companies that entered the industry in association with Indian partners were Toyota, Mitsubishi, Nissan, Isusu and Mazda in the four wheeler segment, and Honda, Suzuki and Kawasaki in the two wheeler segment. Yamaha had already entered in collaboration with Escorts.

Setting up new enterprises in the automobile industry in the eighties in collaboration with Japanese companies created opportunities for upgrading the technology and expanding the base of the component industry.

3.2.3 Production of components

The total value of production of auto components increased from Rs.178.4 million in 1961-62 to 25.679 million. The total production has jumped significantly in the eighties. Between 1971-72 and 1981-82, the total value of production increased from Rs.1,310.6 million to Rs.6,479.5 million, an increase by Rs. 5168.9 million. But between 1981-82 and 1991-92, the increase was from Rs.6479.5 million to Rs.25,679 million, an increase by Rs.19,199.5 million. The increase over the previous decade has been by 3.7 times. The changing composition can be seen from table 3.7.

Table 3.7

Changing Composition of Component Mix

Year	Engine Parts	Electrical Parts	Transmission steering Parts	Suspension & Braking	Equipment Parts	Other	Total
1961-62	80.8	6.6	9.4	36.8	8.2	36.0	178.4
1971-72	479.4	124.7	273.2	303.8	65.8	63.6	1310.6
1981-82	2530.0	597.0	1680.9	1150.5	231.0	2901.1	6479.5
1988-89	5847.4	1175.8	3535.8	2474.1	760.8	1633.6	15427.3
1989-90	7113.2	1336.6	4507.2	2758.3	811.9	1371.5	17898.7
1990-91	8527.4	1976.1	5434.6	3030.2	980.6	1607.7	21559.6
1991-92	10370.9	2212.2	6782.5	3421.0	1116.7	1775.7	25679.0

The increasing independence of the components industry from the domestic industry was noticed during the recent recession. It was found that the components industry continued to grow despite the domestic recession, thanks to the increasing export markets.

3.2.3 Export Performance

Export opportunities for Indian components manufacturers developed as the international vehicle manufacturers started looking for alternative sources of supply of components to reduce the overall cost of the vehicle and stay competitive.

Anxious Moments for auto component industry: The entry of Japanese vehicle manufacturers created anxious moments for the existing auto-components manufacturers who had primarily served the domestic OEM and replacement markets. Their low technology, and poor quality image had made their bargaining power vis-a-vis the new entrant lower, despite a long standing presence in India. It was apprehended that the Japanese manufacturers would bring in their own suppliers and deny the existing Indian manufacturers an opportunity to share the market for components that would be created by the Japanese vehicle manufacturers in India. The fear also arose from some negative remarks made by Japanese collaborators about the quality and technological levels of Indian auto component manufacturers. The Automobile Components Manufacturers' Association represented their case to Suzuki Motor company in Japan and other vehicle manufacturers. These companies assured them that they would provide opportunities to the Indian companies if they provided components according to the quality and delivery requirements of the Japanese vehicle manufacturers.

Building Competences: Exploiting the new opportunities called for competences to rejuvenate the organization as a whole. New opportunities demanded declared commitments to higher quality standards, training employees at all levels in concepts like Total Quality Management, time based delivery and competition. Since most of the Indian companies have had a history, high cost, out of tune technologies and quality, there was sufficient unlearning to be done to build the necessary quality and technology orientation. New companies established to supply to the new entrants in the Indian industry did not have this problem. They had screened their people right in the beginning.

The supporting competences that the Indian companies needed to provide were as follows:

* Ability to understand the specifications
* Create processes to achieve the specifications and maintain the adherence to the specifications
* Expand volume to meet the needs of economies of scale.
* Develop tools to conform to quality requirements
* Install and operationalize special purpose machines, CNC machines, or any other equipment needed to meet quality
* Control over cost and driving down cost to provide for cushion as the price was never within their control
* Strive for external certification of internal processes and systems to maintain quality like ISO-9000.

In addition to manufacturing and related competences, the exporting company was also required to develop competences in managing logistics and communication. A thorough knowledge of custom checking and other requirements within and outside India was called for. Since most of the importing companies were operating on building advantage on time, some kind of information technology network is required.

The nature of competence needed varied from product to product, the nature of help available from outside and the initial conditions of the companies. The help available from outside was of the following kind.

* Transfer of design and drawings only
* Technical and training help
* Technical, financial and overall monitoring

Institutional Initiatives for Encouraging Exports: The Auto-components Manufacturers Association (ACMA)has adopted the slogan 'export and grow'. It has been taking delegations to leading automobile manufacturers in Europe to present the case of Indian auto components manufacturers. It is proposing collaborations with built in buy back arrangements. It is trying to focus the attention of the manufacturers on specific products and customers rather than any product or any customer It has organized seminars and training programmes to enable its members to obtain quality assurance certification like ISO 9000.

Setting up of Inapex: ICICI, a development financial institution in India, has taken initiative of promoting Inapex Auto Products Exports Ltd. which has been formed with an equity capital of Rs.6 crore. With a view to boost exports of Autoparts. Rest of the equity would be allocated to a large number of auto components manufacturers.

Industry response: As the auto component manufacturers readied themselves to meet the challenge from the new vehicle manufacturers following options were identified for building competences.

* Putting efforts on their own to improve the technology and quality standards.
* Signing up collaboration agreements with Japanese components manufacturers or others to obtain the necessary know-how and know-why.
* Exploring export markets independently by signing agreements with OEM manufacturers in Europe and developing competences with the help of the demanding customers.
* Tieing up with the Japanese joint venture manufacturers in India and learning from feedback.

A combination of the above strategies was pursued by the early respondents to the opportunity.

Sundaram Fasteners a company belonging to the TVS group of companies set the trend. This was followed by many more companies. In another instance Sona Steering Systems Ltd, a Maruti Joint Venture, became one of the two suppliers of manual steering systems to Koyo Seiko, Japan, its collaborator. It has bagged a trial order for $.05 million. Many more new Maruti suppliers or the suppliers to other Japanese joint ventures followed suit.

It was heartening to note during our field visits that the companies had either exported or making product and process changes to begin exporting. In three cases the companies made a mention of the market development subsidy provided by the EXIM Bank of India. One of the companies claimed ignorance about the existence of such a facility. On learning about this from the researcher he expressed keen desire to contact the bank immediately.

In 1990-91 exports were Rs. 2500 million against an import of Rs. 1300 million. The estimated market for exports was more than Rs.20,000 million. Details of the growth of exports are given in tables

It was commented by one of the international buyers that in view of the lower overheads in India and reasonably developed infrastructure spread over 250 companies, aiming for a Rs.5000 million target

was respectable. This, however, needed that the Indian manufactures offered a 15 to 20% cost advantage[2] .

Tables 3.7 and 3.8 provide details of exports. From Table we can analyse the relationships between the imports and the exports. By 1977-78, the imports had declined considerably and the exports just paid for imports, at a rate of 1.09. With liberalization and entry of collaborators, the import content increased and the export-import ratio declined steadily to 0.18 in 1986-87. With the stabilization of imports and the increased emphasis on exports, the ratio changed in favour of exports again at 1.14. This has declined to 0.50 in 1990-91. The hope is that this would increase considerably and the exports would more than pay for the imports in the coming years. Increasingly the efforts are to the more demanding markets.

Table 3.8

Export by components Groups*

(Rs. in million)

Component Group	89-90	90-91	91-92
Engine parts	547	658	790
Drive transmission and Steering	179	157	212
Electrical Parts	58	53	37
Suspension and Braking	78	85	523
Equipments	30	62	73

Table 3.9

Relative Ratios

Ratio --> Year	Exports/ Imports	Exports/ Production	Imports/ Production
1977-78	1.09	0.20	0.19
1981-82	0.88	0.19	0.16
1984-85	0.50	0.08	0.16
1985-86	0.20	0.08	0.41
1986-87	0.18	0.08	0.42
1987-88	0.36	0.08	0.23
1988-89	1.14	0.10	0.08
1990-91	0.50	0.11	0.29

2 Times of India, May 21,1993

Export orientation of Sample Data: The export orientation of the field survey sample can be seen from the fact that only 2 companies did not have exports. Others had to sold to developing or developed countries. 6 companies (37.5%) had sold to industrialized countries and 4 (25%) sold to developing countries, and 4 companies have sold to both developed and developing countries.

The export performance of the mail survey respondents are in table 3.10.

Table 3.10

Export experience of mail survey companies

Export percentage	Frequency	Percentage
0-5	11	52.4
5-25	8	38.1
25-50	2	9.5
Missing	14	-
Total	35	100 (based on valid cases)

Ten companies out of 21 respondents had exported more than 5% of their sales. It is heartening however to note that there were 2 companies which had more than 25% of their sales as exports.

4. Effort in Technology Building

The sources of technology for auto ancillary units have been inhouse efforts, foreign collaboration, technical institutions, private consultants and OEM customers.

4.1 Inhouse Efforts

We did not come across cases where a company had a full fledged R & D department to design components and propose them to the OEM customers or trade. Those companies that had R & D department, the efforts were directed towards understanding the collaborators design and developing products based on it, indigenization of material, equipment or evaluation of vendors, reverse engineer a component for offering to the trade of OEMs.

Majority of the companies did not spend more than one per cent of their sales towards technical services. The absolute number of employees in the R & D department did not exceed 11 out of 16 companies representing 68.75% of the sample. There were two companies in the sample which did not have an R & D department. The distribution of R & D and Technical staff employed is given in table 4.1.

Foreign collaboration with the suppliers to the collaborators of the vehicle manufacturers has been one of the sources. With liberalization the number of collaborations increased three times from 108 during 1971 to 80 to 137 during 1981-91. Companies in Japan and Germany were the collaborators.

4.2 Collaboration for with Institution for Joint Efforts

In addition to the institutions mentioned in the section on the role of government, the component manufacturers can get support from the private and state government engineering colleges, and National Institutes of technology, located in various parts of the country. There are poly-technical institutes offering diploma in automobile engineering.

Table 4.1

Employment of R&D and technical staff by field survey respondents

No. of staff	Distribution	
	R & D	Technical
0	2	2
<10	11	3
10-25	3	5
25-50	0	3
50-100	0	2
100-250	0	1
>250	0	0

The supply of trained technical manpower is from the technical training institutes run by the state government and private organizations. There is dissatisfaction about the facilities and quality orientation of these institutes. The facilities are old and outdated. The world Bank has formulated a scheme to modernize these institutes. The Northern region chapter of the Confederation of Indian Industries (CII) has also initiated efforts to upgrade the quality of training of some of the institutes located in the North.

The role of TIs in organizing interfirm linkages was reported to be very small; only 3 out of 18 firms had used TIs for organizing linkages. 8 firms had linkages with other firms for bringing about major product changes and the contribution of these links was rated to be very high. For major process changes, only 6 firms had links with other firms. This shows that for bringing out product changes, the auto parts components manufacturers need the support of other firms while they do not need their support for process changes. The companies are capable of developing the process themselves.

Table 4.3

Nature of collaboration

Nature of Collaboration	1986-91	No. of countries
1 Design & Drawings	21	8
2 Technical	91	14
3 Technical & Financial	07	4
4 Financial	22	7

[Source : Foreign Collaborations in Autocomponents Industry ACMA 1992]

While giving assignments to technical institutions, the companies are concerned more with confidentiality (4.29), than with protection of new technologies (3.94).

The overall usage of collaborations with institutions was very small. Ten (55.5%) companies had not collaborated with any institution. Among those who had used the number of users of private consultants was more than those of R & D institutions. Technical colleges have more users than the

industry association. The industry association has started the services recently. Table gives the number of users of various institutions for collaborative effort.

Table 4.4

Trends in Foreign Collaboration

Country	1961-70	1971-80	1981-85	1986-91	1991
UK	34	33	50	20	5
Germany	18	21	63	25	3
USA	22	16	27	19	1
France	04	16	10	-	-
Japan	-	09	30	47	9
Italy	05	04	28	09	2
Others	05	09	-	-	-
Total :	88	108	229	141	20

Source: R.J. Shah, Status Report on Auto Components Industry

4.3.1 Role of ACMA Centre for Technology

The ACMA Centre for Technology (ACT) represents a new initiative by an industry association to provide technological assistance to its members. ACT was promoted in 1992 by the Automotive Components Manufacturers Association of India (ACMA) with the support of Government of India and the Ontario Ministry of Industry, Trade and Technology of Canada. The aim of ACT is to provide a range of services like total quality management, manufacturing technology, flexible manufacturing systems, automation and robotics, materials handling, production planning and control, and design engineering with the help of experts shared by ACT, panelists within the country identified by ACT and experts from outside who could provide technical services to the clients. The objective is to help the companies improve cost performance, production, quality, delivery and profit margins. ACT is being managed by a government body comprising members from the Autocomponents Industry. At the time of writing the draft, ACT had started its quality control programmes and had enlisted the support of around 20 members. The Centre proposes to have a technical data base containing information on technical standards, manufacturing systems and practices, future trends in technology, and inter-firm comparison of data. The centre derives its strength from a similar Association in Canada called Centre for Automotive Parts

Technology of Canada. The government of India has given financial aid to make the centre operative. The centre is expected to be self sufficient. The centre expects to obtain enthusiastic support from the members. Considering the new enthusiasm in the industry to upgrade technology and export ACT is likely to succeed in a big way.

4.4 Use of Private Consultants

Private consultants have been a source of support for a majority of the companies in the autocomponents industry.

Out of 18 firms in the field survey sample, 11 have used individual consultants and 7 have used private consulting firms. The contribution of individual consultants seems to be marginally higher than that of private consulting firms. The contribution, however, is more than average (3.57 for private consulting firms and 3.64 for individual consultants).

In our discussion we found that retired employees of large firms are retained as private consultants by middle and small companies. We came across a case where a small company had hired the services of a private consulting firm to help it modernize its production operations so that it could compete in the international markets on the basis of cost and quality.

The small company had found it beyond its capability to embark on the modernization programme all by itself though the founder had a technical background.

Customers provide technology to the components manufacturers in their effort to substitute imports or augment the base of suppliers. This aspect will be elaborated later.

5 Support for Product and Process Changes

An analysis of the source of support indicates that the firms in the auto parts companies rely mostly on inhouse effort for bringing in product and process changes. These inhouse efforts are supported by the customers. Foreign collaborator also plays a key role. The technical institutions have played a role in bringing about process changes and not product changes. The details are presented in the following paragraphs.

5.1 Support for significant product and processes changes

Table 5.1 provides information on the sources of support for significant product and process changes.

It can be seen that for bringing out significant product and process changes, the firms have relied on inhouse efforts and support from the collaborators. A study of seventeen significant changes reported by 13 companies. Major role is not played by TIs in introducing significant product changes. But TIs have played a role, though small, in bringing about significant process changes. Our discussion with the executives showed that these inhouse efforts are invariably supported by an interaction with or feedback from the OEM customer.

The inhouse efforts of an entrepreneur in developing an international quality horns is worth noting.

An automobile graduate running a garage, was fascinated by the high quality horns produced by a world leader in the industry. He decided to develop one like that and supply it to the Indian consumers. Reverse engineering the horn turned out to be a difficult exercise. He approached several agencies in India and abroad to understand the composition of materials used in making the horn. He did not receive any support from these agencies. He set up his own lab in the garage and experimented with alternate composition. Having broken the code he made few horns supplied to customers who wanted to but could not import the horns. Based on their feedback, he improved the design and functioning of the horns and approached the established car manufacturers in India. He passed their quality test and became an OEM supplier. Today he is modernizing his operations to get orders from an OEM buyers in the west.

The involvement of the customer can be seen in the case of an shell casting company,

A shell castings company decided to meet the stringent quality requirement of a new OEM customer it sought his help in improving the methods of production and quality management. The customer gave feedback on the performance of the product and technical hints. The overall plan of product and process upgradation was developed by the company.

The component suppliers to Maruti Udyog talked eloquently about the help provided by the vender development cell of the company.

In the new joint ventures with Japanese companies we saw the active role played by the collaborator in not only developing the product but also making improvements in the process of production.

An automotive battery manufacturer learnt a lot from his collaborator. The choice of equipments, the approach to quality inspection and the insistence on zero defect every time were new to the otherwise well established battery manufacturer. He is using this knowledge to bring about changes in his industrial battery business.

The role of TIs in bringing about process changes is greater than in product changes. In the context of the need to improve quality the autocomponent manufacturers have sought the help of TIs. The relatively less significant roles of the TIs in product changes is due the nature of industry it self. The industry makes components to meet the needs of the vehicle manufacturer. It has little strategic freedom to propose changes. It needs to work closely with the vehicle manufacturer.

Table 5.1

Sources of support for significant product and process changes

Source of Support Process	Significant Product changes(%)	Significant process changes(%)
Inhouse efforts	41	40
Foreign collaborator	29	32
TIs	3.5	28
Both TI & foreign collaborator	5.88	-
Total no. of changes	(13) 17	(15) 25

(Figures in parenthesis indicate the number of respondents)

5.2 Incremental changes in product and process changes

The sources of support for incremental changes can be seen from table 5.2.

Table 5.2

Sources of Support for incremental product and process changes

Sources of Support	Product changes (%)	Process changes (%)
Inhouse efforts	76	78
Foreign collaborator	11	5.5
TI	27.77	16.66
Total no. of changes	(14) 18	(16) 18

(Figures in parenthesis represent the number of respondents)

The foreign collaborators effort is not important in introducing incremental changes in products or processes. Nor is there an appreciable role for the TIs. The changes are brought about through inhouse efforts.

6. Usage of Technical Services and Sources

6.1 Usage of services and their importance

Table 6. 1 provides information on the usage of technical services by the field sample companies.

Table 6.1

Importance and Usage of Technical Services

Service	Importance	No. of firms
1.Collaborative R & D	4.85	7
2.Standards & Testing	4.05	24
3.Technical Networks	4.00	12
4.Information services	3.95	20
5.Problem solving/Trouble shooting	3.95	19
6. Education & Training	3.6	22
7. Contract R & D	3.6	5
8. Commercial Advice	3.0	7

The frequency of usage of technical services was also quite low. Information services, standards and testing, and education and training are the more frequently used services than other. Top three needed services are information supply, standards and testing and , education and training. This goes well with the finding that the companies rely more on inhouse efforts than outsiders for bringing product and process changes. Hence the technology building related services are not in demand so much.

It can be seen from the table that the services which are considered to be more than useful are standards and testing, collaborative R & D, exchanging views with technical personnel, followed by information services and problem solving. While collaborative Rand D is perceived by its users as the most important, the overall usage or the service itself is loss. Only 7 out of 35 respondents had used the service. The most used services are standards and testing, education and training and information services.

The ranking of services based on the frequency of usage response of field survey sample is presented in table 6.2.

Table 6.2

Ranking of services - (Field survey sample)

Services	Rank	Mean frequency usage score
Information service	*1*	*1.67*
Standards and testing	2	1.56
Education and training	3	1.5
Engineering services	4	1.28
Problem solving and trouble shooting	5	1.22
Applied R & D	6	1.11
Strategic R & D	7	1.06
Manufacturing products	8	1.00
Commercial advice	8	1.00

The sources have differed with respect to the importance attached to them. The discussions with customers emerges as a good source while industry associations held in information, and education and training. For standards and testing, laboratories--both private and public--are used. For problem solving, however, the companies have depended upon their own laboratories.

Given the nature of the industry, reliance on the customer or foreign investor is understandable.

6.2 Sources of Technical services and their importance

One can also look at the importance of the various sources and the problems and benefits conferred by these sources. Ranking of the sources on the basis of mean importance is given in the table 6.3.

It can be seen that the users of a given source have obtained more than average benefit from the source. However, the number of users of the services perceived to be more important, is not uniform. A majority of the firms (19 out of 35) look at customers with long term relationship as the most used source of support for quick solutions, new product development and shared facilities rate it as being more than average. The highest importance is given to the inhouse labs for obtaining benefits like quick solutions to problems, cost reduction and quality improvements. 17 out of 35 respondents have used this. Private contract laboratories have been rated low an important but the extent of use is next to that of inhouse labs.

Table 6.3

Ranking of Sources on mean importance

Source	Rank	Mean import ance	No. of firms using	Major Benefits	Major Problems
1. Departmental Labs	1	4.75	17	Quick solutions to problems (8) Reduction of cost, quality Improvement	Inadequate facilities
2. Foreign investors and Licences	2	4.23	13	Quick solutions to problems, new product development, quality improvement, solution to specific problems	
3. Long-term customers	3	4.11	19	Solution to specific problems, quick solutions, new product development shared facilities	
4. National Technical Institutions	4	3.83	13	Solutions, quality improvement and new product development	High fees
5. Consulting firms	5	3.82	11	Quick solutions, source of new ideas, quality improvement	High fees, too far
6. Private contract labs	6	3.56	16	New product development, quick solutions, solutions to important problems shared facilities	High fees, timeliness, inadequate facilities
7. Long term suppliers	7	3.36	14	Quick solutions, solutions to specific problems, new product development	
8. Regional Institutions	8	3.27	12	Solutions to specific problems, shared facilities	High fees, technical inability
9. Universities	9	3.13	9	Quick solutions, solutions to specific problems	Technical inability, Timeliness
10.Industry Association	10	3.07	16	Shared facilities, contacts, new ideas & quick solutions to problems	Timeliness and Confidentiality
11.Research Associations	11	3.00	03		
12.Academic Associations	12	2.67	03		

Table 6.4
Services and their sources

Service	1. Private contract laboratories	2. Customers with long-term relationships	3. Suppliers with long-term relationships	4. Departments/ Labs within your firm	5. Foreign investors and licensors	6. National technical institutions	7. Local/regional technical institutions	8. Consulting firms	9. Universities and Technical Colleges	10. Industrial Associations	11. Academic Associations	12. Research Associations	13. Other (specify)
(i) Information Services	-	8	3	-	5	2	1	2	1	11	2	3	
(ii) Problem Solving/Trouble Shooting	4	5	3	7	5	5	1	6	1	4	-	-	
(iii) Standards/Testing etc.	12	4	1	7	7	7	8	2	-	1	-	-	
(iv) Education/Training	-	1	3	3	4	3	6	8	4	10	2	2	
(v) Contract R & D	-	1	-	1	1	3	1	-	-	-	-	-	
(vi) Collaborative R & D	-	2	1	1	1	6	-	-	-	-	-	-	
(vii) Commercial/Managerial Advice	-	3	-	2	-	-	-	2	-	2	1	-	
(viii)Meeting and exchanging views with technical personnel from other companies (Facilitating Formation of Technical Networks)	-	4	1	-	-	-	1	1	-	3	1	1	
(ix) Other (specify)													

6.3 Matching services and sources

Table 6.4 presents cross tabulation of services vis a vis the sources. It can be seen that the most used source for information services is industry association. This is followed by customers with long term relationships. Given the dependence of the component manufacturers on the vehicle manufacturers they have to learn from the customers. They have yet to reach the stage of influencing the vehicle manufacturers discretely.

No particular source emerges as the dominant source for problem solving and trouble shooting. However the reliance is more on companies own efforts in their departmental laboratories and Consulting firms than customers, foreign investors, and national and technical institutions. The least used source is the local technical institution. These institutions get preference in testing according to standards. Private contract laboratories are the most used source for standards and testing.

Education and training: The most used sources are industry associations and consulting firms. The reliance is also on the local institutions. The respondents have not used the customers as much as the field survey firms. Only one respondent has used the customers education and training purposes.

Contract R&D is the least used service. Here the reliance is on the national institutions. So is the case with collaborative R&D.

For exchanging views the two sources relied on are the customers and industry associations. No source is uniformly used for all the services. If one were to attempt a crude matching of the service vis a vis source on the most used basis then the matching would be as in table 6.5.

Table 6.5

Matching of Services and Their Sources

Service	Source
Information services	Industry association
Problem solving	Departmental lab
Standards -Testing	Private Contract Laboratories
Education and Trng.	Industry association
Contract R&D	National technical institutions
Collaborative R&D	National Technical Institutions
Networks	Customers

This shows that there is scope for developing expertise in few devices and not offering an umbrella of services.

6.3 Sources and problems

Table 6.6 gives an idea of the problems faced by the respondents with respect to the various sources. Though there is reliance on the private contract laboratories for certain key services like testing there fee is considered to be too high and they are located far away from the companies.
The departmental labs are characterized by inadequate facilities.

Table 6.6

Sources of services and their problems

Sources / Benefits	Quick and Easy Access to Information & Technology	Reduced Production and Operating Costs	Solutions of Specific Problems	Shares Facilities	Stimulating Ideas	Help New Product Development /Design	Improved Quality and Reliability	Enhanced Technical/ Business Contacts	Other (specify)
1. Private contract laboratories	4	3	9	5	-	5	4	1	
2. Customers with long-term relationships	6	3	9	7	3	8	5	4	
3. Suppliers with long-term relationships	5	3	8	3	3	9	3	1	
4. Departments/Labs within your firm	8	8	13	2	1	4	6	-	
5. Foreign investors and licensors	5	3	4	2	2	8	4	2	
6. National technical institutions	2	-	6	1	3	5	6	-	
7. Local/regional technical institutions	2	-	5	4	1	3	2	1	
8. Consulting firms	6	1	7	1	5	-	4	2	
9. Universities and Technical Colleges	4	1	4	2	1	2	-	1	
10. Industrial Associations	8	-	3	8	5	-	3	6	
11. Academic Associations	1	-	2	2	-	1	1	-	
12. Research Associations	1	-	1	-	1	2	2	-	
13. Other (specify)									

Fee is the problem with consulting firms. No problem has emerged as significant for other sources. Table 6.6 provides an idea of the benefits received from the various sources. Obtaining solutions to specific problems is the major benefit received from various sources. Departmental labs provide quick solutions and help in reducing costs.

6.4 Usage and firm characteristics

An attempt to see the usages of different services according to various firm characteristics was made. Tables 6.7 to 6.15 provide the data on the usages across the firm characteristics. Chi square tests along many dimensions cannot taken seriously owing lower expected frequencies. This is a preliminary statistical analysis. Some limitations have been observed at the time of interpretations.

Table 6.7
Usage of Technology Services by Size

TSI	Large	Medium	Small	Chi Sq	Sig
Information Service	8 40.0 80.0	9 45.0 56.3	3 15.0 50.0	1.97	.37
Problem Solving/Trouble shooting	6 31.6 60.0	9 47.4 56.3	4 21.1 66.7	.20	.91
Standards/Testing	9 37.5 90.0	11 45.8 68.8	4 16.7 66.7	1.76	.42
Education &/Training	7 31.8 70.0	11 50.0 68.8	4 18.2 66.7	.02	.99
Contract R & D	1 20.0 10.0	4 80.0 25.0	0 0.0 0.0	2.42	.30
Collaborative R&D	5 71.4 50.0	2 28.6 12.5	0 0.0 0.0	7.13	.03
Commercial & Managerial advice	1 14.3 10.0	4 57.1 25.0	2 28.6 33.3	1.38	.50
Technical Networks	5 41.7 50.0	5 41.7 31.3	2 16.7 33.3	.98	.61
Total	10	16	6		

Table 6.8

Usage of Services by Ownership Categories

TSI	PDC	PFC	MGO	COOP	OTH	Chi Sq	Sig
IS	14 73.7 60.9	5 26.3 62.5	0	0	0	.01	.94
PS/TS	14 77.8 60.9	4 22.2 50.0	0	0	0	.29	.59
S/T	16 69.6 69.6	7 30.4 87.5	0	0	0	1.00	.32
E/T	16 76.2 69.6	5 23.8 62.5	0	0	0	.14	.71
Con RD	4 100.0 17.4	0 0.0 0.0	0	0	0	1.60	.21
Col RD	4 66.7 17.4	2 33.3 25.0	0	0	0	.22	.64
C/MA	6 100.0 26.1	0 0.0 0.0	0	0	0	2.59	.11
TN	10 90.9 43.5	1 9.1 12.5	0	0	0	2.49	.11
Total	23	8	0	0	0		

Table 6.9

Usage of Services by Background of CEO

TSI	SW	ENT	E/S	M/F	OTH	Chi Sq	Sig
IS	0	4 20.0 50.0	8 40.0 53.3	2 10.0 100.0	6 30.0 85.7	3.88	.27
PS/TS	0	7 36.8 87.5	6 31.6 40.0	1 5.3 50.0	5 26.3 71.4	5.45	.14
S/T	0	6 25.0 75.0	10 41.7 66.7	2 8.3 100.0	6 25.0 85.7	1.65	.65
E/T	0	5 22.7 62.5	10 45.5 66.7	2 9.1 100.0	5 22.7 71.4	1.11	.78
Con RD	0	2 40.0 25.0	1 20.0 6.7	0 0.0 0.0	2 40.0 28.6	2.71	.44
Col RD	0	1 14.3 12.5	4 57.1 26.7	0 0.0 0.0	2 28.6 28.6	1.36	.72
C/MA	0	3 42.9 37.5	3 42.9 20.0	0 0.0 0.0	1 14.3 14.3	1.97	.58
TN	0	1 8.3 12.5	7 58.3 46.7	2 16.7 28.6	2 16.7 28.6	6.24	.10
Total	0	0	15	2	7		

Table 6.10

Usage of Technical services by Industry Accumulation

TSI	Local	Non-Local	Chi Sq	Sig
IS	11 55.0 61.1	9 45.0 64.3	.03	.85
PS/TS	9 47.4 50.0	10 52.6 71.4	1.50	.22
S/T	13 54.2 72.2	11 45.8 78.6	.17	.68
E/T	11 50.0 61.1	11 50.0 78.6	1.12	.29
Con RD	4 80.0 22.2	1 20.0 7.1	1.36	.24
Col RD	5 71.4 27.8	2 28.6 14.3	.84	.36
C/MA	4 57.1 22.2	3 42.9 21.4	.003	.96
TN	5 41.7 27.8	7 58.3 50.0	1.66	.20
Total	18	14		

Table 6.11

Usage of Technical Services by the rate of Research and and Development Expenditure

TSI	LOW-1	2-5	11-HIGH	Chi Sq	Sig
IS	5 41.7 83.3	6 50.0 54.5	1 8.3 100.0	1.98	.37
PS/TS	4 40.0 66.7	6 60.0 54.5	0 0.0 0.0	1.55	.46
S/T	5 38.5 83.3	8 61.5 72.7	0 0.0 0.0	2.98	.23
E/T	3 27.3 50.0	7 63.6 63.6	1 9.1 100.0	.98	.61
Con RD	0 0.0 0.0	1 50.0 9.1	1 50.0 100.0	8.80	.01
Col RD	0 0.0 0.0	1 100.0 9.1	0 0.0 0.0	.67	.71
C/MA	1 25.0 16.7	3 75.0 27.3	0 0.0 0.0	.56	.76
TN	1 20.0 16.7	4 80.0 36.4	0 0.0 0.0	1.16	.56
Total	6	11	1		

Table 6.12

Usage of Technical Services by the rate of Expenditure on Technical Services

TSI	LOW-1	2-5	6-10	11-HIGH	Chi Sq	Sig
IS	4 66.7 66.7	2 33.3 40.0	0	0	.78	.38
PS/TS	3 50.0 50.0	3 50.0 60.0	0	0	.11	.74
S/T	5 55.6 83.3	4 44.4 80.0	0	0	.02	.89
E/T	2 33.3 33.3	4 66.7 80.0	0	0	2.40	.12
Con RD	2 100.0 33.3	0 0.0 0.0	0	0	2.04	.15
Col RD	6 54.5 100.0	5 45.5 100.0	0	0	0	0
C/MA	1 50.0 16.7	1 50.0 20.0	0	0	.02	.89
TN	2 66.7 33.3	1 33.3 20.0	0	0	.24	.62
Total	6	5	0	0		

Table 6.13

Usage of Technical Services by the Strength of Engineers and Technicians

TSI	Low-10	11-25	26-50	51-100	101-250	251-high	Chi Sq	Sig
IS	4 21.1 50.0	5 26.3 71.4	4 21.1 57.1	2 10.5 50.0	2 10.5 100.0	2 10.5 66.7	2.30	.81
PS/TS	5 26.3 62.5	5 26.3 71.4	4 21.1 57.1	2 10.5 50.0	0 0.0 0.0	3 15.8 100.0	5.64	.34
S/T	4 17.4 50.0	6 26.1 85.7	6 26.1 85.7	2 8.7 50.0	2 8.7 100.0	3 13.0 100.0	6.38	.27
E/T	6 27.3 75.0	5 22.7 71.4	5 22.7 71.4	1 4.5 25.0	2 9.1 100.0	3 13.6 100.0	6.21	.29
Con RD	1 20.0 12.5	1 20.0 14.3	2 40.0 28.6	0 0.0 0.0	0 0.0 0.0	1 20.0 33.3	2.71	.75
Col RD	0 0.0 0.0	0 0.0 0.0	2 33.3 28.6	1 16.7 25.0	0 0.0 0.0	3 50.0 100.0	17.04	.004
C/MA	3 42.9 37.5	1 14.3 14.3	2 28.6 28.6	0 0.0 0.0	1 14.3 50.0	0 0.0 0.0	4.34	.50
TN	2 16.7 25.0	2 16.7 28.6	2 16.7 28.6	2 16.7 50.0	2 16.7 100.0	2 16.7 66.7	5.61	.35
Total	8	7	7	4	2	2		

Table 6.14

Usage of Technology Services vis-a-vis Technology gap in the domestic context

TSI	VL	LOW	AVG	HIGH	SAL	Chi Sq	Sig
IS	0	0	3 15.0 60.0	4 20.0 57.1	13 65.0 65.0	.15	.93
PS/TS	0	0	3 15.8 60.0	5 26.3 71.4	11 57.9 55.0	.58	.75
S/T	0	0	3 12.5 60.0	5 20.8 71.4	16 66.7 80.0	.91	.63
E/T	0	0	3 13.6 60.0	3 13.6 42.9	16 72.7 80.0	3.54	.17
Con RD	0	0	2 40.0 40.0	1 20.0 14.3	2 40.0 10.0	2.74	.25
Col RD	0	0	0 0.0 0.0	0 0.0 0.0	7 100.0 35.0	5.38	.07
C/MA	0	0	2 28.6 40.0	1 14.3 14.3	4 57.1 20.0	1.24	.54
TN	0	0	2 16.7 40.0	2 16.7 28.6	8 66.7 40.0	.30	.86
Total	0	0	5	7	20		

Table 6.15

Use of services vis-a-vis Technology Capability Gap in International context

TSI	VL	LOW	AVG	HIGH	SAL	Chi Sq	Sig
IS	2 10.0 100.0	2 10.0 50.0	10 50.0 58.8	5 25.0 62.5	1 5.0 100.0	2.16	.71
PS/TS	1 5.3 50.0	3 15.8 75.0	9 47.4 52.9	5 26.3 62.5	1 5.3 100.0	1.49	.83
S/T	1 4.2 50.0	2 8.3 50.0	14 58.3 82.4	7 29.2 87.5	0 0.0 0.0	6.16	.19
E/T	1 4.5 50.0	0 0.0 0.0	14 63.6 82.4	6 27.3 75.0	1 4.5 100.0	11.19	.02
Con RD	1 20.0 50.0	2 40.0 50.0	1 20.0 5.9	1 20.0 12.5	0 0.0 0.0	6.85	.14
Col RD	0 0.0 0.0	0 0.0 0.0	3 42.9 17.6	4 57.1 50.0	0 0.0 0.0	5.84	.21
C/MA	1 14.3 50.0	0 0.0 0.0	5 71.4 29.4	1 14.3 12.5	0 0.0 0.0	3.30	.51
TN	0 0.0 0.0	1 8.3 25.0	8 66.7 47.1	3 25.0 37.5	0 0.0 0.0	2.73	.60
Total	2	4	17	8	1		

The following hypotheses are possible.

The larger the firms the greater the use of information services, problem solving, standards and testing, and education and training services.

Commercial and managerial services are sought more by the small companies than the large companies.

Type of ownership does not matter in the case of the industry for the use of services.

Companies whose owners are from commerce back ground tend to use the information standards and testing services more than the others.

The consideration of the existence of cluster did not make a difference to the use of services.

Companies with higher percentage of R&D to sales and networks education and training more than others. The use of standards and problems is more by the firms with lower R&D expenditure.

The strengths of engineers and technicians makes a difference in the use of services.

Leadership dimension matters only in the use of education and training services.

6.5 Characteristics of firms and choice of sources

We did an analysis of the association between the choice of services and various firm characteristics. The chi-square results are given in Tables 6.17 to 6.25. The following observations can be made.

The choice of source is independent of the size of the firm, nor has it influenced by the ownership of the firms. However, sources like relationship with customers is associated with private domestic companies. The background of the chief executive does not matter in the choice of sources of technical services. Clustering of industries around location influenced the choice of national technical institutions, local research and technical institutions and university and technical colleges. The cell frequencies in these cases are less than 5 for the non-local category. Hence the results are to be seen with lot of caution. The rate of R & D expenditure has made a difference in the choice of consulting firms. Here again, the cell frequencies are not high. Rate of technical expenditure does not influence the choice of sources. The technology orientation of the firm as reflected in the size of the engineers and technicians employed by the firm influences the choice of suppliers, departmental laboratories within the firm and local research and technical institutions. Gap in technology capability vis-a-vis industry leader in the international context influences the choice of foreign investors and licensors. In other words, no significant factor can be associated with the influence of choice of sources. Further analysis needs to be made to see and identify the influences.

Table 6.17
Usage of TSI by Size of Firms

	Large	Medium	Small	Chi Sq.	Sig.
PCL	5	8	3	0.81	0.67
	31.3	50.0	18.8		
	55.6	50.0	75.0		
CWLTR	7	10	2	1.09	0.58
	36.8	52.6	10.5		
	77.8	62.5	50.0		
SWLTR	5	7	2	0.33	0.85
	35.7	50.0	14.3		
	55.6	43.8	50.0		
DLWF	6	10	1	2.20	0.33
	35.3	58.8	5.9		
	66.7	62.5	25.0		
FIL	3	8	2	0.70	0.71
	23.1	61.5	15.4		
	33.3	50.0	50.0		
NTI	3	8	2	0.70	0.71
	23.1	61.5	15.4		
	33.3	50.0	50.0		
LRTI	3	8	1	1.17	0.56
	25.0	66.7	8.3		
	33.3	50.0	25.0		
CF	4	6	1	0.45	0.80
	36.4	54.5	9.1		
	44.4	37.5	25.0		
UATC	3	4	2	0.97	0.62
	33.3	44.4	22.2		
	33.3	25.0	50.0		
IA	4	10	2	0.81	0.67
	25.0	62.5	12.5		
	44.4	62.5	50.0		
AA	1	2	0	0.52	0.77
	33.3	66.7	0.0		
	11.1	11.8	0.0		
RA	2	1	0	2.26	0.32
	66.7	33.3	0.0		
	22.2	5.9	0.0		
Total	9	16	4		

Table 6.18
Usage of TSI by Ownership of Firms

	Pvt	PWFC	MGO	Coop	Oth	Chi Sq.	Sig.
PCL	12	3	0	0	0	1.16	0.28
	80.0	20.0	0.0	0.0	0.0		
	60.0	37.5	0.0	0.0	0.0		
CWLTR	15	3	0	0	0	3.50	0.06
	83.3	16.7	0.0	0.0	0.0		
	75.0	37.5	0.0	0.0	0.0		
SWLTR	8	5	0	0	0	1.16	0.28
	61.5	38.5	0.0	0.0	0.0		
	40.0	62.5	0.0	0.0	0.0		
DLWF	12	4	0	0	0	0.23	0.63
	75.0	25.0	0.0	0.0	0.0		
	60.0	50.0	0.0	0.0	0.0		
FIL	7	5	0	0	0	1.76	0.18
	58.3	41.7	0.0	0.0	0.0		
	35.0	62.5	0.0	0.0	0.0		
NTI	7	5	0	0	0	1.76	0.18
	58.3	41.7	0.0	0.0	0.0		
	35.0	62.5	0.0	0.0	0.0		
LRTI	7	4	0	0	0	0.54	0.46
	63.6	36.4	0.0	0.0	0.0		
	35.0	50.0	0.0	0.0	0.0		
CF	8	2	0	0	0	0.56	0.45
	80.0	20.0	0.0	0.0	0.0		
	40.0	25.0	0.0	0.0	0.0		
UATC	5	3	0	0	0	0.44	0.51
	62.5	37.5	0.0	0.0	0.0		
	25.0	37.5	0.0	0.0	0.0		
IA	11	4	0	0	0	0.06	0.81
	73.3	26.7	0.0	0.0	0.0		
	55.0	50.0	0.0	0.0	0.0		
AA	3	0	0	0	0	1.27	0.26
	100.0	0.0	0.0	0.0	0.0		
	14.3	0.0	0.0	0.0	0.0		
RA	0	3	0	0	0	0.78	0.003
	0.0	100.0	0.0	0.0	0.0		
	0.0	37.5	0.0	0.0	0.0		
Total	20	8	0	0	0		

Table 6.19
Usage of TSI by Background of Chief Executive

	SW	Ent	E/S	M/F	Oth	Chi Sq.	Sig.
PCL	0	6	6	1	3	1.85	0.60
	0.0	37.5	37.5	6.3	18.8		
	0.0	75.0	50.0	50.0	42.9		
CWLTR	0	7	6	1	5	3.31	0.35
	0.0	36.8	31.6	5.3	26.3		
	0.0	87.5	50.0	50.0	71.4		
SWLTR	0	4	7	1	2	1.59	0.66
	0.0	28.6	50.0	7.1	14.3		
	0.0	50.0	58.3	50.0	28.6		
DLWF	0	5	7	2	3	2.18	0.54
	0.0	29.4	41.2	11.8	17.6		
	0.0	62.5	58.3	100.0	42.9		
FIL	0	3	6	2	2	3.51	0.32
	0.0	23.1	46.2	15.4	15.4		
	0.0	37.5	50.0	100.0	28.6		
NTI	0	3	5	1	4	0.67	0.88
	0.0	23.1	38.5	7.7	30.8		
	0.0	37.5	41.7	50.0	57.1		
LRTI	0	4	5	0	3	1.66	0.65
	0.0	33.3	41.7	0.0	25.0		
	0.0	50.0	41.7	0.0	42.9		
CF	0	5	4	0	2	3.64	0.30
	0.0	45.5	36.4	0.0	18.2		
	0.0	62.5	33.3	0.0	28.6		
UATC	0	2	4	0	3	1.52	0.68
	0.0	22.2	44.4	0.0	33.3		
	0.0	25.0	33.3	0.0	42.9		
IA	0	6	4	1	5	4.36	0.23
	0.0	37.5	25.0	6.3	31.3		
	0.0	75.0	33.3	50.0	71.4		
AA	0	2	1	0	0	3.15	0.37
	0.0	66.7	33.3	0.0	0.0		
	0.0	25.0	8.3	0.0	0.0		
RA	0	0	1	0	2	3.94	0.27
	0.0	0.0	33.3	0.0	66.7		
	0.0	0.0	8.3	0.0	28.6		
Total	0	8	12	2	7		

Table 6.20
Usage of TSI by Local Industry Accumulation

	Local	Non-Local	Chi Sq.	Sig.
PCL	8	8	0.39	0.53
	50.0	50.0		
	50.0	61.5		
CWLTR	11	8	0.17	0.68
	57.9	42.1		
	68.8	61.5		
SWLTR	7	7	0.29	0.59
	50.0	50.0		
	43.8	53.8		
DLWF	10	7	0.22	0.64
	58.8	41.2		
	62.5	53.8		
FIL	8	5	0.39	0.53
	61.5	38.5		
	50.0	38.5		
NTI	11	2	8.26	0.004
	84.6	15.4		
	68.8	15.4		
LRTI	9	3	3.25	0.07
	75.0	25.0		
	56.3	23.1		
CF	8	3	2.21	0.14
	72.7	27.3		
	50.0	23.1		
UATC	8	1	6.00	0.01
	88.9	11.1		
	50.0	7.7		
IA	8	8	0.39	0.53
	50.0	50.0		
	50.0	61.5		
AA	2	1	0.14	0.71
	66.7	33.3		
	11.8	7.7		
RA	3	0	2.55	0.11
	51.9	0.0		
	82.4	0.0		
Total	16	13		

Table 6.21
Usage of TSI by Rate of R&D expenditure

	Low - 1	2 - 5	6 - 10	11 - High	Chi Sq.	Sig.
PCL	4	5	0	0	1.20	0.55
	44.4	55.6	0.0	0.0		
	57.1	55.6	0.0	0.0		
CWLTR	6	5	0	1	2.17	0.34
	50.0	41.7	0.0	8.3		
	85.7	55.6	0.0	100.0		
SWLTR	3	2	0	0	1.25	0.54
	60.0	40.0	0.0	0.0		
	42.9	22.2	0.0	0.0		
DLWF	3	4	0	0	0.75	0.69
	42.9	57.1	0.0	0.0		
	42.9	44.4	0.0	0.0		
FIL	2	4	0	0	1.01	0.60
	33.3	66.7	0.0	0.0		
	28.6	44.4	0.0	0.0		
NTI	3	7	0	0	3.50	0.17
	30.0	70.0	0.0	0.0		
	42.9	77.8	0.0	0.0		
LRTI	5	3	0	0	3.24	0.20
	62.5	37.5	0.0	0.0		
	71.4	33.3	0.0	0.0		
CF	4	1	0	0	4.46	0.11
	80.0	20.0	0.0	0.0		
	57.1	11.1	0.0	0.0		
UATC	2	2	0	1	2.63	0.27
	40.0	40.0	0.0	20.0		
	28.6	22.2	0.0	100.0		
IA	4	5	0	1	0.75	0.69
	40.0	50.0	0.0	10.0		
	57.1	55.6	0.0	100.0		
AA	3	0	0	0	4.50	0.11
	100.0	0.0	0.0	0.0		
	37.5	0.0	0.0	0.0		
RA	2	1	0	0	0.80	0.67
	66.7	33.3	0.0	0.0		
	25.0	11.1	0.0	0.0		
Total	7	9	0	1		

Table 6.22

Usage of TSI by rate of expenditure on technical training

	Low - 1	2 - 5	6 - 10	11 - High	Chi Sq.	Sig.
PCL	3	3	0	0	1.06	0.30
	50.0	50.0	0.0	0.0		
	42.9	75.0	0.0	0.0		
CWLTR	5	2	0	0	0.51	0.48
	71.4	28.6	0.0	0.0		
	71.4	50.0	0.0	0.0		
SWLTR	3	2	0	0	0.05	0.82
	60.0	40.0	0.0	0.0		
	42.9	50.0	0.0	0.0		
DLWF	4	2	0	0	0.05	0.82
	66.7	33.3	0.0	0.0		
	57.1	50.0	0.0	0.0		
FIL	3	3	0	0	1.06	0.30
	50.0	50.0	0.0	0.0		
	42.9	75.0	0.0	0.0		
NTI	6	2	0	0	1.64	0.20
	75.0	25.0	0.0	0.0		
	85.7	50.0	0.0	0.0		
LRTI	3	2	0	0	0.05	0.82
	60.0	40.0	0.0	0.0		
	42.9	50.0	0.0	0.0		
CF	0	1	0	0	1.93	0.17
	0.0	100.0	0.0	0.0		
	0.0	25.0	0.0	0.0		
UATC	0	3	0	0	7.22	0.007
	0.0	100.0	0.0	0.0		
	0.0	75.0	0.0	0.0		
IA	2	3	0	0	2.21	0.14
	40.0	60.0	0.0	0.0		
	28.6	75.0	0.0	0.0		
AA	0	0	0	0	-	-
	0.0	0.0	0.0	0.0		
	0.0	0.0	0.0	0.0		
RA	1	0	0	0	0.55	0.46
	100.0	0.0	0.0	0.0		
	12.5	0.0	0.0	0.0		
Total	7	4	0	0		

Table 6.23
Usage of TSI by No. of Engineers & Technicians in Firm

	Low-10	11-25	26-50	51-100	101-250	251-High	Chi Sq.	Sig.
PCL	3	6	3	1	1	2	3.89	0.57
	18.8	37.5	18.8	6.3	6.3	12.5		
	42.9	85.7	50.0	50.0	33.3	66.7		
CWLTR	5	3	4	2	2	3	4.42	0.49
	26.3	15.8	21.1	10.5	10.5	15.8		
	71.4	42.9	66.7	100.0	66.7	100.0		
SWLTR	1	5	2	2	1	3	10.86	0.05
	7.1	35.7	14.3	14.3	7.1	21.4		
	14.3	71.4	33.3	100.0	33.3	100.0		
DLWF	1	5	5	2	1	3	12.13	0.03
	5.9	29.4	29.4	11.8	5.9	17.6		
	14.3	71.4	83.3	100.0	33.3	100.0		
FIL	2	3	4	0	1	3	7.32	0.20
	15.4	23.1	30.8	0.0	7.1	23.1		
	28.6	42.9	66.7	0.0	33.3	100.0		
NTI	3	2	5	1	1	0	7.00	0.22
	25.0	16.7	41.7	8.3	8.3	0.0		
	42.9	28.6	83.3	50.0	33.3	0.0		
LRTI	1	4	4	0	3	0	12.06	0.03
	8.3	33.3	33.3	0.0	25.0	0.0		
	14.3	57.1	66.7	0.0	100.0	0.0		
CF	1	4	3	0	2	1	5.34	0.38
	9.1	36.4	27.3	0.0	18.2	9.1		
	14.3	57.1	50.0	0.0	66.7	33.3		
UATC	2	2	2	1	1	1	0.38	1.00
	22.2	22.2	22.2	11.1	11.1	11.1		
	28.6	28.6	33.3	50.0	33.3	33.3		
IA	5	4	3	0	1	3	6.32	0.28
	31.3	25.0	18.8	0.0	6.3	18.8		
	71.4	57.1	50.0	0.0	33.3	100.0		
AA	1	1	0	0	1	0	3.11	0.68
	33.3	33.3	0.0	0.0	33.3	0.0		
	14.3	14.3	0.0	0.0	33.3	0.0		
RA	0	0	1	0	1	0	5.38	0.37
	0.0	0.0	50.0	0.0	50.0	0.0		
	0.0	0.0	16.7	0.0	16.7	0.0		
Total	7	7	6	2	3	3		

Table 6.24
Usage of TSI by technology level in the domestic context

	VL	Low	Avg	AAvg	Oth	Chi Sq.	Sig.
PCL	0	0	2	3	11	0.73	0.69
	0.0	0.0	12.5	18.8	68.8		
	0.0	0.0	50.0	42.9	61.1		
CWLTR	0	0	4	3	12	3.71	0.16
	0.0	0.0	21.1	15.8	63.2		
	0.0	0.0	100.0	42.9	66.7		
SWLTR	0	0	1	2	11	3.14	0.21
	0.0	0.0	7.1	14.3	78.6		
	0.0	0.0	25.0	28.6	61.1		
DLWF	0	0	1	3	13	3.95	0.14
	0.0	0.0	5.9	17.6	76.5		
	0.0	0.0	25.0	42.9	72.2		
FIL	0	0	1	2	10	2.22	0.33
	0.0	0.0	7.7	15.4	76.9		
	0.0	0.0	25.0	28.6	55.6		
NTI	0	0	2	3	8	0.06	0.97
	0.0	0.0	15.4	23.1	61.5		
	0.0	0.0	50.0	42.9	44.4		
LRTI	0	0	1	4	7	1.21	0.55
	0.0	0.0	8.3	33.3	58.3		
	0.0	0.0	25.0	57.1	38.9		
CF	0	0	0	2	9	3.82	0.15
	0.0	0.0	0.0	18.2	81.8		
	0.0	0.0	0.0	28.6	50.0		
UATC	0	0	1	0	8	4.73	0.09
	0.0	0.0	11.1	0.0	88.9		
	0.0	0.0	25.0	0.0	44.4		
IA	0	0	3	4	9	0.84	0.66
	0.0	0.0	18.8	25.0	56.3		
	0.0	0.0	75.0	57.1	50.0		
AA	0	0	1	1	1	1.45	0.48
	0.0	0.0	33.3	33.3	33.3		
	0.0	0.0	25.0	12.5	5.6		
RA	0	0	0	1	2	0.52	0.77
	0.0	0.0	0.0	33.3	66.7		
	0.0	0.0	0.0	12.5	11.1		
Total	0	0	4	7	18		

Table 6.25

Usage of TSI by technology level in the international context

	VL	Low	Avg	AAvg	Oth	Chi Sq.	Sig.
PCL	1	1	9	4	1	2.86	0.58
	6.3	6.3	56.3	25.0	6.3		
	50.0	25.0	64.3	50.0	100.0		
CWLTR	2	2	9	5	1	2.05	0.73
	10.5	10.5	47.4	26.3	5.3		
	100.0	50.0	64.3	62.5	100.0		
SWLTR	0	1	6	6	1	6.26	0.18
	0.0	7.1	42.9	42.9	7.1		
	0.0	25.0	42.9	75.0	100.0		
DLWF	1	2	7	6	1	2.20	0.69
	5.9	11.8	41.2	35.3	5.9		
	50.0	50.0	50.0	75.0	100.0		
FIL	0	0	6	7	0	11.60	0.02
	0.0	0.0	46.2	53.8	0.0		
	0.0	0.0	42.9	87.5	0.0		
NTI	0	3	5	5	0	5.39	0.25
	0.0	23.1	38.5	38.5	0.0		
	0.0	75.0	35.7	62.5	0.0		
LRTI	1	2	5	4	0	1.32	0.86
	8.0	16.7	41.7	33.3	0.0		
	50.0	50.0	35.7	50.0	0.0		
CF	1	0	6	3	1	4.35	0.36
	9.1	0.0	54.5	27.3	9.1		
	50.0	0.0	42.9	37.5	100.0		
UATC	1	0	4	4	0	3.97	0.41
	11.1	0.0	44.4	44.4	0.0		
	50.0	0.0	28.6	50.0	0.0		
IA	2	2	5	6	1	5.90	0.21
	12.5	12.5	31.3	37.5	6.3		
	100.0	50.0	35.7	75.0	100.0		
AA	1	1	1	0	0	5.74	0.22
	33.3	33.3	33.3	0.0	0.0		
	50.0	25.0	6.7	0.0	0.0		
RA	0	0	1	2	0	2.96	0.56
	0.0	0.0	33.3	66.7	0.0		
	0.0	0.0	6.7	25.0	0.0		

6.6 Training Support for the autocomponents industry

The auto components industry has not been spending on external training significantly.Not more than 5 companies have used institutions for training. The companies have preferred to have their own on-the-job training. The emphasis so far has been on "learning by doing" and "learning on the job". The frequency of firms using the various sources and the ranking of sources on the basis of contribution can be seen from table 6.26.

Table 6.26

Sources of External Support for Training and their contribution

Source of training	Rank	Mean Contribution	No. of users
Joint venture partner	1	5.00	5
Vocational Institutions	2	4.67	4
Industry Associations	3	4.25	5
Buyers	3	4.25	5
Universities	4	3.75	5
Suppliers	5	3.67	4

The contribution of joint venture partners is seen to be the highest as can be seen from the highest score of 5 given by those using joint venture partners for training purposes. This is followed by the contributions of vocational institutions, industry associations, and buyers. Universities and suppliers do not seem to be contributing as much.

The concept of providing training to develop employees did not exist in the industry during the days of stability in the environment. This has changed with the change in the business environment. The new environment calls for changes in the technology and the attitude to business. The trend therefore would in favour of spending more on training in the years to come.

A leading manufacturer and exporter of head lamps has come up on his own efforts. He has not signed a single collaboration agreement so far. He has learnt from visiting exhibitions and continuous interaction with the suppliers.

A Steering Gear Manufacturing Company which has a joint venture partnership with his customer and a Japanese company. It sends not only its executives, but also its workers for training at the joint venture partners place. The company finds this arrangement to be very helpful.

7. Some Thoughts for Industry, TIs and Government

The autocomponents industry emerges from the study as an industry which has just opened out to the new developments in the world. It was closed and complacent for a long time given the less dynamic nature of the automobile industry in the country. The liberalization of the automobile industry and the entry of vehicle manufactures with a higher dynamism enabled the autocomponents companies to see new light. It not only enabled the new entrants to come into the industry but also energized the existing manufacturers.

New purchase strategies of international automatic companies created opportunities for export. The industry association is playing an active role in developing new markets for the members and upgrading the manufacturing methods and quality standards to exploit the new opportunities. TIs seemed to be out of the game. Given the emerging importance of the sector Tis need to associate themselves with the game but the private consulting companies are helping the industry in a commendable way..

From the survey and interviews with the TIs and the industry it appears that the usage of services provided by these institutions is not very high. The manufacturers prefer to rely on support from collaborators, in-house R & D and the foreign collaborator. They approach the Institutes only when certain mandatory certificates for tests and standards are to be obtained.

The autoparts manufacturers have not identified themselves with any TI. In our discussion with the industry executives it appears to us that the question of interaction with the technical institutions or the use of different types of services was a new question for them. 'We have done it our way' was the kind of response. Only recently with the arrival Japanese companies there is awareness of the need to be different. Hence they have looked around for support. The Confederation of Engineering Industries (CII) and the Automobile Components Manufacturers Association is taking the initiative to communicate the message of quality, cost and delivery. They are also helping the companies to upgrade the manufacturing methods. The ISO 9000 is felt lot more in the automobile sector than in other sectors.

Till recently they depended on TIs for mandatory testing and calibrations only. If a collaboration was available they would go to the collaborator.

There are certain reasons for the low usage of the services of TIs. A majority of the auto components companies do not feel the need as their problems are taken care of either by the collaborator or the customers. Some have mentioned lack of marketing orientation on the part of TIs, where the institutes reach out to identify and satisfy the needs of the producers as one of the reasons. The other reason mentioned is the lack of practical orientation to understand the problems of the producers. According to the respondents, the institutions have tended to be too 58academic. Yet another reason is the slow response of the institutes. It is felt that the institutions take considerable time to work on the problems given by the industry.

There is a feeling in the industry that institutes can benefit a lot if they go to the industry as learners. Industry according to them is ahead of the institutions in respect of practical orientation and knowledge of technological advances. It appears that the institutes are shy of benefitting from such opportunities either because the internal rewards and recognition systems do not support this or they are pre occupied with theoretical or Government or international agency sponsored research.

Consider the following comment by a TI.

We gave a problem to a TI. The TI preferred to work from its academic environment. The project did not progress satisfactorily as the institutional team refused to visit the shop floor and study the problem as it occurred during the operations. We have to withdraw the project politely.

The institutes on the other hand feel that it is an attitude problem. Industry prefers to go out for support rather than do indigenous work and take risks. Liberal foreign collaboration policy favours external orientation and obtaining what is proven. By going through the collaboration route the industry avoids the design, development and manufacturing risks.

A comment by one of the TI executives was as follows: About six collaborations have into the country. We do not know what is happening. The industry does not share information with us.

Once away, they tend to move further away.

A TI executive summed up the situation as follows: "Several collaborations have come into the country. We are not involved in any stage of technology management in these companies.

However there are instances where individuals in the institutes have made their independent impact and established linkages on their own. i.e. the industry asks for the help of Mr.x all the time. He is too involved in the industry while others focus on other projects. Institutes have not developed mechanisms to build around these individuals and institutionalize the linkages with the industry.

In this context some of the questions that can be raised for the industry, TIs and government are: How can we sustain the momentum of growth and exports?

What could be the process where the TIs also upgrade their process and participate in the game rather than being spectators or side players? Is it possible to diffuse the experience of CII, Auto sector in the North and ITIs. Can the higher level educational institutions like the IITs and the regional engineering colleges be involved in such exercises?

What could be an appropriate communication package for spreading the experiences of the early entrants in the growing export sector?

What is an appropriate learning forum for those who want to participate in the game now?

How can we identify the spin off benefits from programmes like ISO 9000 certification in which several auto components manufacturers are engaged?

While the export incentives have been seen as useful not many have used it. How can we communicate the government policy incentives to several others?

How can we enhance the capabilities of the firms so that they participate in the new vehicle design processes right from the start?

The future looks bright.

8. Conclusion

This report made an attempt to provide an overview of the autocomponents industry. The industry has attracted entrants from varying backgrounds. The industry's growth was constrained by the restrictive policies governing the growth of the vehicle industry. Liberalization policies created opportunities not only for the vehicle industry but also for the component manufacture. Currently the components industry is learning to export and grow.

The field and mail survey findings indicates that the component manufacturers were not large users of technical services. the most used services were standards and testing, education and training and information services. These services were obtained from collaborators, consulting firms and industry associations. Size, industry cluster and technical orientation of the firms influenced the usage of services and their sources. The most used government policies were fiscal and export incentives.

From the study it appeared that the technical institutions did not play a significant role in the new word of the old autocomponent industry. In future, there is scope for bringing the two together. They can learn and grow together.

Appendix 1

Abbreviations and Acronyms Used

Services

IS- Information Services

PS/TS- Problem solving/Trouble shooting

S/T- Standard Testing

E/T- Education Training

ConRD- Contract R&D

ColRdc- CColloborative R&D

MA-Ccommerial /Managerial Advice

FFTN- Facilitating Formation Of Technical Networks

Source

PCL-Private Contract Laboratories

CWLTR- Customer with Long term relationship

SWLTR- Suppliers with long teram relationship

DLWF- Departments/labs within youre firms

FIL- Foreign Investors and licensors

NTI- National technical institutions

LRTI-Local/Regional technical Inst

CF- Consulting Firms

UATC-University and technical Colleges

IA- Industreial Associations

AA- Academic Associations

RA- research Associations

FATH- Fees are too high

TUSP-Technically Unable to serve Purpose

NRTM- Not Reespnsible in Timely Manner

TMFA- Too Many Forms and aapprovals

LPC- Lack Of personal continuity

IPC Inadequate Protection Of Confidentiality

IF- Inadequate Facilities

IRORR- Inadequate Rules of Ownwership Of research facilities

TFAFF- Too far away from firm

Benefits

QUAIT- Quick and easy access to information and technology

RPAOC- Reduced production and operating costs

SSP- Solutions to specific problems

SF- Shared facilities

SI_ Stimulating Ideas

HNPD- Help new product development/design

IQAR- Improved quality and reliability

ET/BC- Enhanced technical and Business Contacts

Exhibit 1

Classification of Auto components

An automobile has a power unit to provide energy to the vehicle, a transmission system to keep the vehicle running on the road, a brake mechanism to reduce the speed or stop the vehicle when needed, a suspension system to take shocks from the road and smoothen the running of the vehicle. In addition, there is a lighting system to make the automobile usable all the time. Then there is the automobile body to cover all the parts. Based on this, automobile components can be classified as below:

i) Engine parts- pistons, valves, gaskets, carburetors, fuel pumps, filters and radiators
ii) Auto electrical parts- starting motors, ignition system and spark plug
iii) Drive and transmission system parts- clutch assembly, tie rod ends, steering gears, propeller shafts and wheels.
iv) Suspension and breaking parts- leaf springs, shock absorbers, brake linings
v) Automobile body/ equipment parts- horns, head lamps and tail lamps

Exhibit 2

Exports of auto components

(Rs. million)

Year	Total	Africa	Eastern Europe	Western Europe	South East Asia	West Asia	Others
1974-75	262	41	10	18	63	56	13
1975-76	314	51	18	87	65	73	21
1976-77	415	81	22	116	69	78	47
1977-78	606	139	34	134	105	120	73
1978-79	582	125	23	126	125	94	88
1979-80	585	131	21	99	127	110	97
1980-81	754	189	28	97	162	198	80
1981-82	920	215	43	107	148	300	106
1982-83	626	165	65	70	94	222	60
1983-84	648	146	59	84	108	167	84
1984-85	668	167	74	114	95	92	126
1985-86	789	150	169	128	92	114	136
1986-87	731	160	54	148	119	80	170
1987-88	966	234	81	202	164	88	197
1988-89	1539	302	203	294	277	157	306
1989-90	NA	NA	NA	NA	NA	NA	NA
1990-91	2341	369	221	523	440	283	506

Source: Automotive Industry of India
Automotive and ancillary industry - 1993 - facts and figures

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