Small Sector in India: Role & Performance

NPC Research Division

Four and a half decades of developmental efforts through a mixture of protective measures and incentives helped the SSI sector in India to emerge as a significant contributor to domestic output, employment and exports. In spite of its advantages due to the small size and ambitious government policies, the failure rate in the small scale sector continues to be high. This study examines the structure and growth of the village and small scale sector at both the industry level as well as the state level and identify the roles served by the sector.

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In spite of long drawn planning efforts, the strategy for industrialisation adopted in most of the developing countries could not realise the major objectives such as providing gainful employment to surplus labour, alleviation of poverty, egalitarian distribution of income and wealth etc. Most of the policy instruments were biased in favour of heavy industries in many developing countries including India. In this paper an attempt has been made to examine the structure and growth of village and small scale industries (VSI) at both the industry level as well as at the state level with a view to identifying the role served by this sector in the overall economic development of the country.

A peculiar advantage of the VSI sector against the large scale sector is its limited requirement of capital and indigenous technology and hence its suitability in rural interiors with limited techno-economic infrastructure[1]. It was therefore considered that this sector could provide immediate employment opportunities and incomes to the growing manpower in the country side which could not be absorbed in gainful opportunities in the agricultural sector. Apart from the transitional role as a shock-absorber of the economy when it moves away from a predominantly agrarian set-up to high-tech industrialisation, the small-scale sector can become flexible enough to contribute substantially to the modern sector of the economy as well. Besides, specialised crafts such as handicrafts, handlooms and cottage industries having an exclusive clientele at the national and international markets, it can also play a major complementary role in enhancing competitiveness of the large scale sector. Smallness in size

1. The term capital requirement used here is in terms of the volume of capital per enterprise and should be distinguished from capital intensity. The evidence in terms of reduced capital intensity of small scale sector, especially from the modern segment, has been a highly debatable issue (Subrahmanian, 1994).

facilitates firms to adapt to the production processes leading to lower production cost and controlled product quality (NPC Research Division, 1995). The economies of scale does not always operate at the whole product level but mostly at the level of processes, components or sub-systems. In the quest for competitive cost reduction, large scale producers generally resort to the practice of sub-contracting to small scale industries in recent years. This sort of small but independent and efficient small industries have always been the role model of small industrial development in many countries particularly in the successful South East Asian nations.

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In spite of its advantages due to the small size and highly ambitious government policy measures, the high failure rate of VSIs is an issue of grave concern. Some of the factors responsible for the high mortality rate among VSIs have been identified as the lack of managerial, marketing and technological capabilities at the entrepreneurial level; and the lack of infrastructure facilities at the local level (DCSSI, 1992; Khanka, 1994). The high rate of mortality in this sector has generated widespread concern on the efficacy of continuing with the present policy package (Ghosh, 1991). Major area of disagreement is that the quantitative growth of VSIs has not been accompanied by efficiency, innovation and social justice (Kashyap, 1988); the social cost of promoting VSI is not commensurate with the resultant benefits and so on. Sustained efforts have been made by the government in terms of monetary and fiscal instruments, integrated infrastructure development, technological support, industrial estate and clustering to encourage and assist the development of healthy and dynamic small industries (Sarma & Diwan, 1994).

Major Policy Initiatives in the Small Scale Sector

The emphasis on village and small-scale industries has always been an integral part of the Indian industrial strategy, more so after the Second Five Year Plan. It was envisaged that household industries would play an important role as producers of consumer goods and absorbers of surplus labour so that the heavy industry biased development strategy could be persued without undue inflationary pressures in the economy, besides addressing to the problems of poverty and unemployment. Other advantages of small industries are that they ensure a more equitable distribution of national income and facilitate mobilisation of local resources and skills which might otherwise have remained unutilised. This sector could also mitigate the problems associated with unplanned urbanization (Industrial Policy Resolution, 1956). In addition, this sector was also envisaged to act as the basis for transforming the economy from the one using traditional and outmoded techniques into one based on modern and efficient technologies.

It was recognised from the first Industrial Policy Resolution (1948) onwards that the small scale sector requires protection against the competition from their large scale counterparts; support has to be extended for the provision of raw materials, cheap power, technical advice and organised marketing of their produce (Industrial Policy Resolution, 1948). It was also envisaged that the small scale enterprises should play an active and lasting role in the overall developmental process rather than a mere transitional role. Later on the Industrial Policy Statement, 1977, reiterated that the main thrust should be on the effective promotion and development of cottage and small industries widely dispersed in rural areas and small towns. This is clear when the industrial Policy Statement further clarified that whatever could be produced by small and cottage industries must be so produced. In order to resolve the artificial divisions between small and large scale industries created by the earlier policy resolutions, the Industrial Policy Resolution, 1980, focussed on integrated industrial development. The Policy suggested the setting up of a few nucleus plants in districts which are identified as industrially backward. These nucleus plants could generate a spread-out network of small scale units or strengthen the existing network of small scale units. Such a two-way traffic would create an ancillarisation effect in terms of larger employment, more equitable distribution of the benefits in terms of higher per capita income for the larger number of people in the area. Further. It could also promote a resource based and need based industrialisation in the country which can generate economic viability in the villages viz., through handlooms, handicrafts, khadi and village industries etc. However, the reckless attempts to create and foster a large number of ancillary units with their heavy dependency on the large units, especially from the public sector, was later recognised for its disastrous consequences. This unfortunately, has a hangover effect on both the parent units and the contractors in later years; mutual distrust prevents them

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In the "New Policy Measures for Small, Tiny & Village Enterprises" the government of India in 1991, opted for promoting and strengthening small, tiny and village enterprises with the primary objective of imparting vitality and growth impetus to the sector in terms of output, employment and exports. The new policy includes setting up of a monitoring centre to assess the genuineness of the credit requirements of this sector and to ensure that they are fully met; review of all statutory regulations and procedures and their modifications to ensure that their operation does not militate against the interest of small and village enterprises; encourage industry associations to establish quality counselling and common testing facilities, development of sub-contracting exchanges and expansion of entrepreneurship development programme; further liberalisation of the scheme of National Equity Fund and single window loans etc. (Eight Five Year Plan, 1992-97).

Institutional Support Mechanisms

In order to fulfill the objective of a balanced and sustained small industry development programme, as enunciated in the industrial policy resolutions and successive five year plans, a wide network of supporting agencies/institutions has been developed at central and state levels. At the central level Small Industrial Development Organisation (SIDO) has been set up under the Ministry of Industry which functions as an apex body and is a nodal agency for formulating, coordinating and monitoring the policies and programmes for promotion and development of small scale industries in the country. It maintains close liaison with the central ministries, Planning Commission, state governments, financial institutions and other organisations concerned with the development of small scale industries. The activities of SIDO relate to the modern small scale industries excluding those which fall within the purview of six specialised boards/agencies viz.

(i) Khadi and Village Industries Board (KVIB);

(ii) All India Handloom Board;

(iii) All India Handicrafts Board;

(iv) Textile Commissioner for Powerlooms;

(v) Coir Board;

(vi) Central Silk Board.

SIDO also provides a comprehensive range of facilities and services in the areas such as consultancy in techno-economic and managerial aspects, training, common facility services, common processing and testing facilities, tooling facilities etc., to small scale units through a network of Small Industries Service Institutes (SISIs), Tool Rooms Process-cum-Product Development Centres, Regional Testing Centres, Field Testing Stations and specialised institutions. Furthermore, it has various allied institutions, like National Small Industries Corporation (NSIC), Central Institute of Tool Design (CITD), Tool Room and Training Centre, Institute for Design of Electrical Measuring Instruments (IDEMI), Small Industry Extension and Training Institute (SIETI) and National Institute for Enterpreneurship and Small Business Development (NIESBUD).

The state governments hold the primary responsibility for executing the assistance programmes with regard to the development of small industries. The broad network of state institutions includes, Directorate of Industries at the state level for planning, formulating and coordinating the activities; State Industrial Development Corporation (SIDC) in the area of supply of scarce raw materials, marketing of products and infrastructure development, State Financial Corporation (SFC) in finance and District Industries Centres (DICs) as focal point for SSI development at the grass-root level.

Direct Intermediation

Various protective and promotional measures have been introduced by the government for achieving the assigned objectives in the small scale industrial development. The protective measures which are specific to products or to the scale of production or to area of production have been formulated with a view to protect the small units against the competitive threats from the large scale units, where as the promotional measures have been undertaken to improve the efficiency and viability of the small industries.

Protective Measures

Among the protective measures, the demarcation on the scale of production has been used as a major instrument for preferential treatment. However, the cut-off point for preferential treatment has been revised from time to time (Table 1). Similarly, a sub-group of 'tiny units' has also been simultaneously made with periodical revisions in its investment in plant and machinery from Rs. 1 lakh in 1975 to Rs. 2 lakhs in 1980 and further to Rs. 5 lakhs in 1991. The periodic revision of SSI investment limits is primarily aimed at compensating for inflation, encouragement of technological development and greater export thrust (Industrial Policy Resolution, 1991). Furthermore, a list of items to be exclusively produced under the small scale sector has been identified. The production capacity of large scale enterprises producing the reserved products is frozen to the extent of their installed capacity obtaining at the time of the announcement of the reservation of product in the small scale sector. As an outcome of the common production programme of the First Plan, the product reservation policy started with a list of 47 items.

Table 1: Definition of Small Scale Industries over the years

Year	Investment criterion		Employment Criterion
	SSI unit	Ancillary unit	
Upto 1958	Fixed capital investment upto Rs. 5 lakhs	Same as SSI unit	Employment upto 50 workers if using power or upto 100 if not using power.
1959	The value of machine was taken as the original price paid irrespective of new or old machinery	-do-	-do-
1960	Gross value of Fixed Asset upto Rs. 5 Lakhs	Gross value fixed asset upto Rs. 10 lakhs.	Employment criterion dropped
1966#	Rs. 7.5 lakhs	Rs. 10 lakhs	-do-
1975	Rs. 10 lakhs	Rs. 15 lakhs	-do-
1980	Rs. 20 lakhs	Rs. 25 lakhs	-do-
1985	Rs. 35 lakhs	Rs. 45 lakhs	-do-
1991 till date	Rs. 60 lakhs*	Rs. 75 lakhs	-do-

Note: # Since 1966 investment limit applicable only to plant and machinery.

* The Exports units are those who exports at least 30 percent of the annual production. The the ceiling of investment shall be Rs. 75 lakhs for it.

Source: Kashyap (1988) up to the year 1980. VII and VIII Five Year plan Documents, for years 1985 and 1991.

As per the periodical review by an advisory committee, the list has been altered from time to time. A substantial enhancement of the number of items reserved for SSIs was made during late seventies from about 200 to over 800. As on today, it stands at 836 items in the reserved list. Besides this, 409 items have been reserved for exclusive purchase by the government from the small scale sector. For the rest of the items SSIs are also given a price preference of up to 15 percent over their counterparts from the large scale sector. The aggregate value of subsidies form a substantial component of the ex-factory value of output. Sandesara (1985) shows that the aggregate value of assistance from selected programmes in case of some industries could be as high as 70% of the ex-factory value of output.

The protectionist policy adopted by the government towards the SSIs sector has been subjected to severe criticism in terms of efficiency in resource allocation and impact on consumer welfare (higher price, substandard quality etc.). However, an objective evaluation of the governmental policy towards SSI sector becomes difficult due to the paucity of published data as well as definitional changes of the SSIs over the years.

Promotional Measures

A host of promotional measures has been introduced by the government for promoting the small scale sector in India. These measures can be broadly classified into a) fiscal and monetary; b) infrastructural; c) marketing; and d) techno-managerial. While the small scale industries (other than tiny enterprises) would be mainly entitled to one time benefits (like preference in land allocation/power connection, access to facilities for skill/technology upgradation etc.), the 'tiny enterprises' would be eligible for additional support on a continuous basis, including easier access to institutional finance, priority in government purchase programmes and relaxation from certain provisions of labour laws.

Impact of the Assistance Programme

While the cumulative effect of these programmes has been quite positive on the promotion and growth of the small scale sector over the years, occasional studies/reviews of these measures and the concerned delivery agencies show that many of them failed in their objectives to evolve a healthy and viable small scale sector. Protective policies are designed to provide a cover to small enterprises against competition from larger or more modern enterprises. In the case of handloom

industry, this policy package has proved to be unproductive. In fact, these policies have made small industries more complacent, inefficient and largely indifferent to further growth (NPC Research Division, 1994a). The primary aim of such development policies has been to build up economically viable and competent small enterprises which can withstand competition and contribute to the national economy without the perpetual support of the Government. But these goals still remain unachieved. The current approach, therefore, is aimed at moving away from a mere development to a policy of building technologically sound and efficient enterprises, which can be encouraged to move into new products and then to grow into medium and large scale enterprises subsequently. This would call for re-orientation of the current assistance package. Since numerous assistance measures for this sector are already in existence, it will be necessary to identify which one has failed in order to reach their objectives so that these can be replaced, rehashed or modified to match the policy objectives. It has been an accepted fact that the development and promotional programmes need to be geared to the available resources in the country and it could be enriched with the experiences from other countries in this field which in the long-run could prove useful in formulating a reasonably sound approach towards this sector.

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Relative Performance of VSI in India

A broad based policy support has been provided to this sector through the comprehensive network of implementing agencies/institutions expecting a substantial return in terms of employment, efficiency in capital use, output and regional balance on a sustainable basis. The village and small scale industries are divided into two segments viz. traditional and modern. The traditional segment is further divided into industries such as Khadi, Village industries, Handloom, Sericulture, Handicraft and Coir. The traditional segment is widely dispersed in rural areas and small towns with high dependency on agricultural products as raw material and inherited skill as state of the art. And the modern segment consists of modern small scale industries (SSI) and power loom industries, this sector mostly concentrates on the areas with proximity to road, to urban centres and markets (Papola & Misra, 1980).

To review the impact of development programmes related to the modern SSI sector two censuses have been conducted by the government pertaining to the years 1972-73 and 1987-88. Other sources of information on SSIs are the Census of Population, plan documents, Annual Survey of Industries, National Accounts Statistics and other related sources. Unfortunately, the data from different sources does not provide a comprehensive time series for the whole VSI sector to analyse its performance with respect to each of the promotional policies of the Government. However, a broad picture of this sector's performance could be made for different points of time.

As per the estimated achievements of the VSI sector in terms of output, employment and exports (table 2), it has registered considerable progress during the period 1973-74 to 1991-92. The contribution of the VSI sector to the industrial production, export and employment has significantly increased over the years. The compound growth rates of the VSI sector in these three areas have also registered significantly higher values than that of the economy as a whole. Its contribution to the national economy in 1991-92 is estimated to be 52.2 percent to exports and 15.4 percent to absorption of the economically active population in the country.

A detailed analysis reveals that the traditional segment has performed lower than the national average in terms of production. The production share of this segment to the total VSI production has been continuously declining during 1973-74 to 1990-91. Khadi, Handloom and Coir industries have been identified as declining industries. Handicrafts, Sericulture and Village industries have registered higher growth in output than that of GDP. Declining domestic demand has been a major constraint for the survival of the traditional sectors in the later period. As a result many of the crafts, cottage and village industries are being phased out with the increasing availability of products mostly from the modern small scale industries. For example, earthern potteries, handloom cloth, wooden furniture and fixtures are increasingly substituted by steel or metal based utensils, powerloom/mill cloth and metal furniture respectively. Due to the deterioration in local demand and with the easy availability of products from the modern sectors facilitated by better transportation facilities, the traditional industries are unable to find expanding markets elsewhere. When the local markets are being integrated with the national

Table 2: Relative Performance of Traditional & Modern Industries of the VSI sector in India (percentage to the total VSI Sector)

Sector	1973-74	1979-80	1984-85	1989-90	1990-91	1991-92*	CAGR
Production Performance							
Traditional Sector							
Khadi	0.24	0.27	0.26	0.18	0.15	0.14	9.91
Village Industries	0.90	1.04	1.15	0.96	1.07	1.10	15.66
Handloom	6.18	5.19	4.38	2.95	1.95	2.08	6.33
Sericulture	0.46	0.39	0.48	0.43	0.47	0.51	17.07
Handicraft	7.83	6.11	5.32	6.18	6.09	6.79	15.31
Coir	0.44	0.26	0.15	0.11	0.09	0.09	5.36
Total	16.05	13.26	11.75	10.82	9.82	10.71	12.50
Modern Sector							
SSI	52.94	64.51	76.86	80.55	83.54	81.93	17.85
Powerloom	14.56	9.69	9.47	8.63	6.63	7.36	11.76
Total	67.50	74.20	86.33	89.18	90.18	89.29	17.23
Others	16.45	12.54	1.61	—	—	—	—
VSI Total	100.00	100.00	100.00	100.00	100.00	100.00	15.34
Export Performance							
Traditional Sector							
Khadi	—	—	0.08	—	—	—	—
Village Industries	—	—	—	—	0.02	0.03	
Handloom	10.50	12.73	—	—	—	—	—
Sericulture	1.64	2.15	—	—	—	—	—
Handicraft	22.87	37.45	37.30	43.22	44.86	40.08	20.62
Coir	1.88	1.63	—	—	—	—	—
Total	36.89	53.96	—	—	—	—	—
Modern Sector							
SSI	63.11	46.04	51.56	51.50	50.40	55.06	19.72
Powerloom	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Others	—	—	—	—	—	—	—
VSI Total	100.00	100.00	100.00	100.00	100.00	100.00	18.82
VSI Export as % to Economy's total export	38.8	35.5	38.8	53.5	55.5	52.2	14.49
Employment Performance							
Traditional Sector							
Khadi	5.01	4.79	4.63	3.67	3.23	3.30	1.97
Village Industries	5.26	6.90	7.11	8.36	7.86	7.99	6.52
Handloom	29.54	26.31	23.70	19.77	25.19	23.92	4.99
Sericulture	6.80	6.85	6.35	13.00	11.88	12.30	10.32
Handicraft	8.51	8.69	8.70	10.96	10.01	10.89	6.63
Coir	—	—	—	1.43	1.25	1.23	—
Total	57.96	55.93	52.37	57.19	59.42	59.61	5.90
Modern Sector	28.15	33.37	38.79	42.81	42.86	40.39	7.59
SSI	22.48	28.67	28.57	31.10	28.39	28.43	5.28
Powerloom	5.67	4.71	10.22	11.70	14.47	11.96	15.71
Total	—	—	—	—	—	—	—
Other	13.89	10.70	8.84	—	—	—	—
VST	100.00	100.00	100.00	100.00	100.00	100.00	5.37
VSI Employment as % to Economy's Total Working Population[$]	8.9	9.6	12.6	14.0	15.6	15.4	3.81

* Anticipated achievement

$ Total working population of the non-census years are based on interpolation/projections assuming compound rates of growth between the Population Censuses 1971, 1981 and 1991. For details refer NPC Research Division (1994b).

CAGR = Compound Annual Growth rate for the period 1979-80 to 1990-91, at current prices.

Source: VI to VIII Five Year Plan Document, National Accounts Statistics, 1994, Economic Survey, 1994-95 and Census of India, 1981 and 1991.

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and international markets as it would happen in the course of ongoing economic reforms, characteristics such as low cost, higher quality and durability of the products become the deciding factors for the survival and growth of industries. However, there are ample scope for survival of the traditional products whose specialisation lie at the individual worker or at the household level. The specialised products if properly directed to the needy consumer segments (like elite domestic consumers and foreigners), they could command premium prices. The increasing dominance of handicraft is an outcome of a similar orientation to exports (table 3) and segmented domestic market. The success of the handicrafts industry is a learning case for other industries to grow.

Labour absorption of the traditional sector has been found to be very high. Share of VSI sector production to total production has been around 10% in the 1990s, it's share in total employment being nearly 60 percent of that in total VSI sector. The labour productivity ratios could be used as a pointer to assess the survival of many of the industries of the traditional segment (table 4). The engagement of labour is so high that the annual value of production per employee in most of the traditional industries could not ensure even a basic livelihood to its occupants which was considered to be an objective behind all governmental support services.

The major contributor to exports from the VSI sector are Handicrafts and Handloom industries. Handicrafts exports accounted for more than 40 percent of exports from the VSI sector during the 1990s.

In the modern segment, the SSI is dominant in growth in output where as powerloom in labour absorption. The export share of SSI in the total VSI exports has been declining over the years.

Table 3: Export Orientation of Village & Small Industries (Export as percentage to Production)

Year	Traditional Industries							Modern Industries			Others	VSI Total
	Khadi	Village Inds.	Hand-loom	Seri-culture	Handi-craft	Coir	Total	SSI	Power-loom	Total		
1973-74	—	—	10.65	22.22	18.31	26.67	14.41	7.47	—	—	—	6.27
1979-80	—	—	16.69	37.40	41.66	43.27	27.67	4.85	—	—	—	6.80
1984-85	2.15	—	—	—	48.57	—	—	4.65	—	—	—	6.93
1989-90	—	—	—	—	90.56	—	—	8.28	—	—	—	12.95
1990-91	—	0.18	—	—	71.52	—	—	5.86	—	—	—	9.71
1991-92*	—	0.29	—	—	69.49	—	—	7.91	—	—	—	11.77
ACGR =	—	—	—	—	4.61	—	—	1.58	—	—	—	3.01

Note: * Estimated
AGCR = Annual Compound Growth Rate for the period 1979-80 to 1990-91.
Source: Same as in table 2.

Table 4: Labour Productivity in Traditional and Modern Industries (Value of Production in Rs.'000 Per Person Engaged at current prices)

Year	Traditional Industries							Modern Industries			Others	VSI Total
	Khadi	Village Inds.	Hand-loom	Sericul-ture	Hand-icraft	Coir	Total	SSI	Power-loom	Total		
1973-74	0.37	1.32	1.61	0.53	7.10	—	2.14	18.16	19.80	18.49	9.13	7.71
1979-80	0.82	2.16	2.83	0.82	10.10	—	3.40	32.29	29.55	31.90	16.82	14.35
1984-85	1.17	3.39	3.86	1.58	12.77	—	4.68	56.13	19.33	46.44	3.81	20.87
1989-90	1.44	3.43	4.44	0.99	16.77	2.23	5.62	76.99	21.92	61.93	—	29.73
1990-91	2.02	5.79	3.29	1.67	25.83	2.95	7.02	124.97	19.47	89.35	—	42.47
1991-92*	1.90	6.07	3.83	1.83	27.48	3.08	7.92	126.98	27.13	97.42	—	44.06
ACGR=	7.79	8.58	1.28	6.12	8.14	—	6.23	11.94	–3.42	8.96	—	9.46

Note: * Estimated
AGCR = Annual Compound Growth Rate for the period 1979-80 to 1990-91.
Source: Same as in Table 2.

The engagement of labour is so high that the annual value of production per employee in most of the traditional industries could not ensure even a basic livelihood to its occupants.

Registered SSIs in India (SIDO Units)

Modern Small Scale Sector (SIDO units) emerged as a dominant segment of the VSI sector in terms of employment, output and exports. Second Census of Small Industries provides detailed data on the small scale industries (registered under the SIDO) for the year 1987-88. However, a similar data base has not been available for the traditional and unregistered segments of the VSI. In the following pages we concentrate on the development of SIDO registered Small Scale Industries with a view to identifying the growth of this sector according to the type of industries and the spread in various states and Union Territories.

Size Distribution of Small Scale Industries

The small scale industries have been distinguished in terms of the size of investment in plant and machinery. Wide variations could be observed in terms of the investment in plant and machinery and the number of people employed in Small Scale Industries. The Second Census of SSIs for the year 1987-88 reveals that more than 82 percent of the units belong to the category of investment in plant and machinery less than Rs. One lakh (table 5). Contribution of this smallest category of units in employment generation is more than 53 percent of the total employment in the sector. This segment of units constitute only about 28 percent of the total production in SSI sector. It may be also seen that more than 95 percent of the SSI units have been identified in the category of those where the investment in plant and machinery are less than 5 lakhs. They together employ about 79 per cent of workers and produce more than 58 per cent of the total production. A striking feature of the inter-sectoral comparison is that the number of enterprises in the category of investment in plant and machinery above Rs. 10 lakhs is only around 2 percent of the total number of units whereas they employ 12.5 percent of workers and account for as high as 27 percent of fixed investment. They contribute more than 28 percent to total production in SSI sector. The contrasting figures from various categories of units suggest that the enterprises with higher investment in plant and machinery are more efficient in resource utilisation as compared to their lower size counterparts. But in the absence of working capital expenditure and net value added figures for different categories of units it becomes difficult to establish conclusively this point. Another comparison has been made on the number of persons employed in various units (table 6). Nearly 65 percent of the SIDO units employ less than 4 persons in their units. These units also account for about 22 percent of employment and fixed investment whereas contribute only 11.7 percent of total production. At the upper level we have the units employing more than 100 persons, but they are only a marginal segment of the SSI sector

Table 5: Distribution of SSIs (SIDO Units) in terms of investment in P&M

Investment in P&M (Rs. lakhs)	No. of units	Employment (nos.)	Fixed investment (Rs. lakhs)	Production (Rs. lakhs)
0-1	482452 (82.8)	1976227 (53.9)	308731 (33.2)	1207131 (28.1)
1-2	41694 (7.2)	423244 (11.6)	101020 (10.9)	534417 (12.4)
2-5	34362 (5.9)	511340 (13.9)	154487 (16.6)	770865 (17.9)
5-10	12832 (2.2)	295365 (8.1)	112123 (12.1)	569843 (13.3)
10 & above	11028 (1.9)	459634 (12.5)	253242 (27.2)	1214949 (28.3)
Total	582365 (100.0)	3665810 (100.0)	929603 (100.0)	4297205 (100.0)

Note: Figures in parenthesis are percentages to total.
Source: Second Census of SSI for 1987-88, DCSSI.

Table 6: Distribution of SSIs (SIDO Units) in terms of Employment

Employment slabs (no.)	No. of units	Employment (nos.)	Fixed investment (Rs. lakhs)	Production (Rs. lakhs)
1-4	375828 (64.5)	822579 (22.4)	199800 (21.5)	501235 (11.7)
5-9	135577 (23.3)	880087 (24.0)	258073 (27.7)	992899 (23.1)
10-19	43282 (7.4)	567530 (15.5)	180701 (19.4)	845844 (19.7)
20-49	20832 (3.6)	617600 (16.9)	178978 (19.3)	1005496 (23.4)
50-99	4733 (0.8)	311707 (8.5)	68581 (7.4)	502297 (11.7)
100 & above	2116 (0.4)	466307 (12.7)	43470 (4.7)	449434 (10.4)
Total	582368 (100.0)	3665810 (100.0)	929603 (100.0)	4297205 (100.0)

Note: Figures in parenthesis are percentages to total.
Source: Second Census of SSI for 1987-88, DCSSI.

(0.4%). They employ about 13 percent employees and have 4.7 percent of fixed investment. These units contribute more than 10 percent of total production in the SSI sector. It may be seen from table 6 that less than 20 persons employed units are contributing to more than 50% to total production. This indicates that although firms with higher size are more efficient than the small size firms; their contribution to the aggregate production is limited.

Enterprises with higher investment in plant and machinery are more efficient in resource utilisation as compared to their lower size counterparts.

Industry-wise Performance

The major objective of promoting small scale industries has been to develop a wide-spread enterpreneurial base across various industries. Industry-wise contributions in terms of the number of units, employment creation, net-value added, export etc. have been analysed in table 7. The number of units can be a good indicator for assessing the enterpreneurial base in a particular industry. The prominent industry groups in this category are food products, repair services, metal products, wood products and machinery and parts (except electrical) as the top five in this respect with an aggregate share of 58 percent to the total.

In the case of employment it may be noted that the maximum has been generated in those industries which are widely dispersed. The major groups of industries which account for maximum employment are found to be food products, non-metallic mineral products, metal products, chemical & chemical products and machinery and parts (except electrical). These five industry groups together contribute to an aggregate share of 52 percent of the total employment generated in the SSI sector.

Table 7: Industry-wise Actual Performance of SSIs during 1987-88

Industry code	As % to All Inds.				Capacity Utilisation (%)	Closed Units as % to Working Units	Return on Investment (%)
	No. of Units	Employment	Net Value Added	Export			
20-21	16.51	13.14	11.30	21.37	48	35.71	43.92
22	0.63	2.00	1.70	0.41	60	56.34	115.76
23	0.25	0.67	0.43	0.53	68	62.37	36.04
24	0.20	0.34	0.89	0.14	74	58.12	120.51
25	0.04	0.07	0.08	0.10	37	105.48	30.50
26	6.83	5.41	5.21	29.04	69	63.34	57.84
27	9.44	6.25	5.58	1.48	48	42.89	63.78
28	5.72	5.44	5.14	0.88	60	39.86	41.59
29	4.13	2.23	3.57	18.02	79	55.41	105.48
30	4.43	5.15	5.67	1.42	58	77.90	37.75
31	4.45	8.57	15.36	7.99	53	88.93	77.21
32	5.42	12.17	5.31	1.85	49	64.34	33.93
33	2.56	5.52	8.27	3.57	43	63.96	50.13
34	11.31	10.17	10.70	5.13	43	63.35	52.93
35	7.01	7.62	6.77	2.59	62	49.02	34.90
36	2.11	3.74	5.81	1.07	42	61.69	46.52
37	1.94	2.74	2.45	0.73	60	51.86	32.62
38	1.52	1.78	2.78	2.39	46	65.12	70.16
97	13.81	5.24	0.87	0.48	62	35.90	1.61
99	0.11	0.07	0.06	0.00	63	34.91	15.66
Others	1.58	1.67	2.06	0.81	51	51.46	49.67
All Inds.	100.00	100.00	100.00	100.00	51	51.75	49.61

Note: Refer Annexure 1 for description of Industry code
Source: Second Census of SSIs for 1987-88, DCSSI, Min. of Industry.

Table 8: Industry-wise Relative Development Index of the Small Sector in India

Industry code	No of Units	Employment	Net Value Added	Value of Export	Capacity Utilisation	Closed Units as % to WU	Return on Investment	SSI Development Index
20-21	1.00	1.00	0.73	0.74	0.26	0.99	0.36	100.0
22	0.04	0.15	0.11	0.01	0.55	0.70	0.96	49.4
23	0.01	0.05	0.02	0.02	0.74	0.61	0.29	34.3
24	0.01	0.02	0.05	0.00	0.88	0.67	1.00	52.0
25	0.00	0.00	0.00	0.00	0.00	0.00	0.24	4.9
26	0.41	0.41	0.34	1.00	0.76	0.60	0.47	78.6
27	0.57	0.47	0.36	0.05	0.26	0.89	0.52	61.6
28	0.35	0.41	0.33	0.03	0.55	0.93	0.34	57.7
29	0.25	0.17	0.23	0.62	1.00	0.71	0.87	75.8
30	0.27	0.39	0.37	0.05	0.50	0.39	0.30	44.6
31	0.27	0.65	1.00	0.28	0.38	0.23	0.64	67.8
32	0.33	0.93	0.34	0.06	0.29	0.58	0.27	55.2
33	0.15	0.42	0.54	0.12	0.14	0.59	0.41	46.7
34	0.68	0.77	0.70	0.18	0.14	0.60	0.43	68.9
35	0.42	0.58	0.44	0.09	0.60	0.80	0.28	63.1
36	0.13	0.28	0.38	0.04	0.12	0.62	0.38	38.2
37	0.12	0.20	0.16	0.03	0.55	0.76	0.26	40.8
38	0.09	0.13	0.18	0.08	0.21	0.57	0.58	36.3
97	0.84	0.40	0.05	0.02	0.60	0.99	0.00	56.8
99	0.00	0.00	0.00	0.00	0.62	1.00	0.12	34.3
Others	0.09	0.12	0.13	0.03	0.33	0.77	0.40	37.0

Note: SSI Development Index has been estimated following the methodology explained in the text. The variable closed units as percentage to working units has been considered as a negative factor in the estimation scheme.
Refer Annexure 1 for description of Industry code.
Source: Second Census of SSIs for 1987-88, DCSSI, Min. of Industry.

The major contributors in terms of net value added have been identified as chemical and chemical products, food products, metal products, basic metal industries; and machinery and parts (except electrical) among all the industry groups. These five industry groups generate nearly 52 percent of the net value added in the SSI sector.

Another variable which has been considered for analysing the industry-wise performance is the export performance. It may be noted that only a few industry groups are export oriented; hosiery and garments (29%). food products (21%) and leather products (18%), together contributing nearly 68 percent of the exports from the SSI sector. Some other industries with notable shares are chemical and chemical products, metal products and basic metal industries.

Capacity utilization among many industry groups are found to be lees than 50 percent except in the case of 14 industries among a total of 20 industry groups. The maximum capacity utilization of 79 percent was found in the industry groups of 29 (leather products). Similarly the lowest capacity utilisation 37 percent was found in the industry groups 25 (Jute hemp and Mesta Textiles).

In order to determine the relative contribution of industries the methodology adopted by the UNDP in its Human Development Report (1990) is used here. For this purpose list of seven variables are identified which can broadly indicate the contributions of SSIs to the economy. These are:

(a) Number of units
(b) Level of employment
(c) Net value added
(d) Value of exports
(e) Capacity utilization
(f) Survival ratio i.e. closed units to working units and
(g) Return on investment (net value added less wage bill as percentage to the total capital deployed).

Table 9: State-wise Actual Performance of SSIs during 1987-88

State	As % to All India				Capacity Utilisation (%)	Closed Units as % to Working Units	Return on Investment (%)
	No. of Units	Employment	Net Value Added	Export			
Andra Pradesh	6.73	7.53	8.53	2.75	51.28	37.78	74.95
Assam	0.76	0.94	0.51	0.99	19.31	39.10	18.92
Bihar	5.98	4.96	2.33	0.86	37.47	42.54	31.96
Gujarat	5.92	7.56	5.16	4.24	44.84	55.08	20.34
Haryana	4.01	2.88	4.25	1.89	39.33	89.83	63.17
Himachal Pradesh	1.20	0.70	0.41	0.00	28.96	40.90	22.43
Jammu & Kashmir	1.56	1.11	0.79	3.44	48.29	44.39	35.23
Karnataka	6.96	6.66	9.28	4.22	52.64	36.10	84.40
Kerala	4.42	4.62	2.21	6.70	42.62	45.74	24.71
Madhya Pradesh	12.69	4.33	6.70	1.29	46.20	48.01	127.84
Maharashtra	5.13	9.71	24.22	12.24	74.60	36.59	71.63
Manipur	0.36	0.28	0.08	0.01	65.37	8.13	10.78
Meghalaya	0.10	0.10	0.07	0.00	55.25	23.17	23.35
Nagaland	0.03	0.08	0.85	0.00	46.29	45.36	623.80
Orissa	1.42	1.89	1.73	0.32	28.70	43.53	57.42
Punjab	7.79	5.63	5.31	2.53	63.06	47.86	42.61
Rajasthan	4.99	3.34	1.98	1.12	57.30	60.35	25.28
Tamil Nadu	9.82	14.63	9.44	19.87	72.69	43.39	38.57
Tripura	0.14	0.27	0.09	0.00	40.76	74.54	20.33
Uttar Pradesh	9.15	9.52	5.44	17.03	40.27	69.91	20.77
West Bengal	7.89	8.51	4.82	4.37	35.95	79.66	38.19
Sikkim	0.01	0.03	0.04	0.00	51.38	54.55	37.14
Andaman & Nicobar	0.06	0.05	0.02	0.02	50.11	27.24	14.40
Arunachal Pradesh	0.06	0.08	0.06	0.00	51.23	11.04	32.76
Chandigarh	0.22	0.29	0.36	0.10	32.25	48.85	41.58
Dadra & Nagar Haveli	0.03	0.06	0.09	0.02	36.73	22.15	34.22
Delhi	1.72	3.33	3.72	15.43	58.06	50.01	32.05
Goa	0.48	0.54	0.48	0.55	43.44	34.52	28.03
Mizoram	0.16	0.12	0.03	0.00	71.88	33.37	0.38
Pondichery	0.21	0.24	0.95	0.02	54.36	59.13	182.75
Daman & Diu	0.03	0.03	0.03	0.00	45.14	31.29	20.66
All India	100.00	100.00	100.00	100.00	50.60	51.75	48.42

Source: Second Census of SSIs for 1987-88, DCSSI, Min. of Industry.

For each of the seven variables, the relative contribution across various industry groups has been measured as:

$$RC_{ij} = (X_{ij} - Min_{ij})/(Max_{ij} - Min_{ij})$$

$$i = 1 \text{ to } 21 \text{ and } j = 1 \text{ to } 7$$

where,

RC_{ij} = Relative contribution of the ith industry group by jth variable

X = value of the variable

Min = minimum values of the ith industry for jth Variable

Max = Maximum values of the jth variable

This formula is for the variables which are considered to contribute positively. The formula is reversed for the variables which are considered to contribute negatively (Survival ratio, for instance)

The second step is to measure the aggregate relative contribution as:

$$RC_i = \Sigma RC_{ij}$$

and $i = 1$ to 21 and $j = 1$ to 7

Table 10: State-wise Small Scale Industry Relative Development Index

State	No of Units	Employment	Net Value Added	Value of Export	Capacity Utilisation	Closed Units To WU	Return on Investment	SSI Dev. Index
Andra Pradesh	0.53	0.51	0.49	0.14	0.58	0.64	0.12	57.5
Assam	0.06	0.06	0.07	0.05	0.00	0.62	0.03	17.1
Bihar	0.47	0.34	0.26	0.04	0.33	0.58	0.05	39.5
Gujrat	0.47	0.52	0.70	0.22	0.46	0.43	0.03	53.8
Haryana	0.32	0.20	0.28	0.10	0.36	0.00	0.10	25.8
Himachal Pradesh	0.09	0.05	0.06	0.00	0.17	0.60	0.04	19.3
Jammu & Kashmir	0.12	0.07	0.09	0.17	0.52	0.56	0.06	30.4
Karnataka	0.55	0.45	0.52	0.21	0.60	0.66	0.13	59.8
Kerala	0.35	0.31	0.31	0.34	0.42	0.54	0.04	44.0
Madhya Pradesh	1.00	0.29	0.20	0.07	0.49	0.51	0.20	52.8
Maharastra	0.40	0.66	1.00	0.62	1.00	0.65	0.11	85.0
Manipur	0.03	0.02	0.01	0.00	0.83	1.00	0.02	36.4
Meghalaya	0.01	0.01	0.00	0.00	0.65	0.82	0.04	29.0
Nagaland	0.00	0.00	0.00	0.00	0.49	0.54	1.00	38.9
Orissa	0.11	0.13	0.12	0.02	0.17	0.57	0.09	23.0
Punjab	0.61	0.38	0.45	0.13	0.79	0.51	0.07	56.2
Rajasthan	0.39	0.23	0.29	0.06	0.69	0.36	0.04	39.1
Tamil Nadu	0.77	1.00	0.86	1.01	0.97	0.57	0.06	100.0
Tripura	0.01	0.02	0.01	0.00	0.39	0.19	0.03	12.3
Uttar Pradesh	0.72	0.65	0.78	0.87	0.38	0.24	0.03	70.0
West Bengal	0.62	0.58	0.34	0.22	0.30	0.12	0.06	42.9
Sikkim	0.00	0.00	0.00	0.00	0.58	0.43	0.06	20.5
Andaman & Nicobar	0.00	0.00	0.00	0.00	0.56	0.77	0.02	25.8
Arunachal Pradesh	0.00	0.00	0.00	0.00	0.58	0.96	0.05	30.6
Chandigarh	0.02	0.02	0.03	0.01	0.23	0.50	0.07	16.6
Dadra & Nagar Haveli	0.00	0.00	0.01	0.00	0.32	0.83	0.05	23.1
Delhi	0.14	0.23	0.32	0.78	0.70	0.49	0.05	51.5
Goa	0.04	0.04	0.06	0.03	0.44	0.68	0.04	25.1
Mizoram	0.01	0.01	0.01	0.00	0.95	0.69	0.00	31.8
Pondichery	0.02	0.01	0.03	0.00	0.63	0.38	0.29	25.9
Daman & Diu	0.00	0.00	0.00	0.00	0.47	0.72	0.03	23.3

Note: Same as in table 8.
Source: Second Census of SSIs for 1987-88, DCSSI, Min. of Industry.

The results obtained (table 8) show that food products are the major contributing industries in the SSI sector, followed by hosiery and garments, leather products, metal products, chemical and chemical products in that order.

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State-wise Performance of SSIs

The results of the state-wise Performance analysis carried out based on the Second Census of Small Scale Industries through the method shown above, are given in tables 9–10. Wide variations of contribution by states in the various criteria are noticed. Madhya Pradesh having the largest entrepreneurial base with 13 percent of the number of units shows lower performance in employment, net value added and exports. The striking feature of SSI development in India is their concentration in a few states. In terms of employment the major sates are Tamil Nadu, Maharashtra, Uttar Pradesh, West Bengal, Gujarat and Andhra Pradesh. In terms of Net Value Added

The striking feature of SSI development in India is their concentration in a few states.

Maharashtra heads the list with 24 percent followed by Tamil Nadu, Karnataka, Andhra Pradesh and so on. Concentration is pronounced in four states viz. Tamil Nadu, Uttar Pradesh, Delhi and Maharashtra with regard to exports, accounting for a total of 65 percent.

When we take into account all the seven factors together Tamil Nadu tops the list followed by Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh and so on.

Conclusion

Reliance on the village and small scale industries development for fulfillment of various socio-economic objectives has been clearly pronounced from the beginning of the planning process in India. The direction of support and incentives provided at the beginning stage was one of protective kind. However, this has been moving towards a self supporting regime in the latest policy measures. Most of the policy decisions and responsibility fixation are at the central level and expected to be followed up by the grass-root level agencies/organisations. During their journey from the central level to the grass-root levels, these measures lose much of their vigour and effectiveness. Small enterpreneurs being vulnerable to problems in project conceptualisation and its effective implementation are highly prone to failure without a technically sound and adaptive helping hand from the development agencies. But many of the implementing agencies at the grass-root level are poorly equipped to stop the drift of units towards inefficiency or to rescue a derailed unit. Probably this is the reason of the high failure rate of small industries set up by the new enterpreneurs to make use of the incentive package provided by the government. However, the accumulated success of some village and small scale industries in India has acquired a reasonable amount of credibility across the nation.

When we take into account all the seven factors together Tamil Nadu tops the list followed by Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh and son on.

The contrasting performance at the disaggregated level of this sector is an interesting case to explore in detail. Although the traditional segment of the VSI revealed to have performed lower than the modern segment, there are emerging industries within it viz, handicrafts and to a lesser extent sericulture and village industries. The core of their success includes production and marketing adaptiveness to the needy segment of market. The success of the traditional industries in improving labour productivity and gainful employment to its participants depends on its movement to specialised products oriented to the segmented national and international markets.

The core of their success includes production and marketing adaptiveness to the needy segment of market.

The modern small scale industries, because of their cost-effective substitutability and complementarity characteristics with other industrial sectors is emerging as a dominant player in small industry development. A disaggregated level of analysis shows a striking feature; enterprises with higher investment in plant and machinery found to be more efficient than smaller units in terms of resource utilisation (labour & capital) as compared to low size category units, even though the evidence are inconclusive in the absence relevant details.

An analysis of relative contribution of industries reveals the dominance of food products followed by hosiery and garments, leather products, metal products, chemical and chemical products in that order. State-wise performance analysis shows the dominance of Tamil Nadu, Maharashtra, Uttar Pradesh, West Bengal, and Gujarat. The main feature of SSI sector is its concentrated development in a few industries and a few states, especially in term of exports.

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Annexure 1: Two Digit Industrial Classification

Industry Code	Description
20-21	Food Products
22	Beverages, Tobacco & Tobacco Products
23	Cotton Textile
24	Wool, Silk & Synthetic Fibre Textiles
25	Jute, Hemp and Mesta Textiles
26	Hosiery and Garments
27	Wood Products
28	Paper Products & Printing
29	Leather Products
30	Rubber & Plastic Products
31	Chemical & Chemical Products
32	Non-Metallic Mineral Products
33	Basic Metal Industries
34	Metal Products
35	Machinery & Parts Except Electrical
36	Electrical Machinery & Parts
37	Transport Equipments & Parts
38	Miscellaneous Manufacturing Industries
97	Repair Services
99	Services not elsewhere classified

Source: DCSSI, 1992. □

To return to the root is repose; it is called going back to one's destiny. Going back to one's destiny is to find the Eternal Law.

Tao Teh Chin (The Way)
LAOTSE

Emerging Industrial Policy Reforms: Implications for Small Size Enterprises

S.P. Kashyap

Small size enterprises in India have been the subject of much discussion. Given the sector's inherent heterogeneity in terms of scale, space, products and technology, the topic merits detailed study. The author outlines the public policy framework for small enterprise development in India and discusses the role this policy could play in enhancing the competitiveness of the sector.

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The small-sized enterprise sector (SES) in India covers a wide spectrum of manufacturing activities, ranging from simple craft-based household units in rural areas to small and medium size manufacturing units in urban areas that compete with large-sized units in terms of products and technology. The major objective of Indian policy with regard to the promotion of small enterprises has been employment generation, besides several other equity objectives. It was presumed that these objectives would not be fulfilled by the promotion of large-scale enterprises alone, which primarily aimed to strengthen the capital base of the economy, particularly in the public sector.

Over time, SES sector has shown substantial expansion which may not merely be an outcome of policy initiatives because in a labour surplus situation especially in rural areas, due to land constraint. a large number of small enterprises sprout as workers seek non-agricultural employment as wage earners or as self-employed. Recent evidence also indicates that rural employment is undergoing a distinct structural change in favour of non-farm activities. Appreciation of recent policy changes, particularly for the SES, should ideally relate itself with the nature of the growth process in terms of quantitative and qualitative dimensions and also the constraints that SES faces in performing its assigned role in the economy.

Appreciation of recent policy changes for the SES, should ideally relate itself with the nature of the growth process in terms of quantitative and qualitative dimensions and also the constraints that SES faces.

Public Policy Framework for Small Enterprise Development

India had a strong craft tradition which was badly bruised, though not extinguished, by the onslaught of industrialisation during the colonial period (Gadgil, 1971). The policy frame in the post-colonial period aimed at the revitalisation of small and village enterprises so that these could play an important role in the overall process of development. Official pronouncements often assumed that the emergence of a strong small enterprise sector would help in the following ways: generating large-scale employment, wage goods and incomes in a fairly dispersed manner; mobilising dormant skills and resources, and enhancing the supply of entrepreneurship; energising village economies and aiding the process of backward area development; and playing an important role in the overall process of industrialisation without disturbing the ecological balance.

Small enterprise sector help in generating large-scale employment, wage goods and incomes in a fairly dispersed manner; mobilising dormant skills and resources enhancing entrepreneurship; energising village economies aiding the process of backward area development and playing an important role in the overall process of industrialisation.

However, not all the components of the SES, such as the village, cottage and modern enterprises, were able to move at the same pace towards the intended objectives. The reason for packing these diverse components of small firms into the same policy basket is rooted in the colonial period. The approach towards small-sized enterprises, almost as part of the struggle for independence, has been swayed by two divergent streams of thought. Gandhians have been keen on the protection and expansion of traditional, mainly rural, household enterprises. The other strand of thinking has been largely shaped by the report of the Ford Foundation Team (Government of India, 1954), which emphasised the role of modern small-scale units as an organic component of the emerging industrial structure.

The policy frame constituted an attempt to steer the highly diverse structure of the SES in the direction to meet the intended development goals. The package contains various promotional and protective devices which are handled by a comprehensive institutional structure. Separate boards exist for handloom weaving, handicrafts, and coir; there is a Khadi and Village Industries Commission to look after the khaddar and other village enterprises (hand pounding of rice, extraction of edible oil, gur and khandsari, palm gur, leather, soap, handmade paper, etc.); the Small Industries Development Organisation (SIDO) to help the growth of modern small-scale enterprises. District Industries Centres (DICs) have been set up to facilitate the growth of the small enterprise sector. Such an elaborate institutional framework has been responsible for several promotional measures such as an ambitious industrial estate programme, artisan and entrepreneurial training programmes, and various other enabling devices — concessional finance, help in procuring critical inputs, and technical and marketing help. The official programme hitherto has been one of the most comprehensive in the Third World and covers, at least on paper, almost every phase of entrepreneurial activity: choice of product and site, technical and financial help in the installation of machinery, provision of raw materials, help in marketing and so on.

The official programme hitherto has been one of the most comprehensive in the Third World.

The policy frame also recognised that, despite all the promotional measures, the small-scale units would not be able to withstand competition from large-sized enterprises. Several protective measures have therefore been introduced. First, the scale of production is demarcated for the purposes of official assistance. The cut-off point however, has changed from time to time (table 1). During the Janata regime (First Non-Congress Government after independence) in 1977, a new category designated as "tiny" enterprises, having an investment in plant and machinery upto Rs. 0.1 million located in towns with a population of less than 50,000, was created. In 1980, the investment limit for "tiny" enterprises was raised to Rs. 0.2 million. This limit has recently been raised to Rs. 0.5 million and the locational restriction removed. The product reservation for small and village enterprises is another important component of the policy. Initially (1967), 47 products were put on the reserved list, which was expanded to include 800 products during the Janata regime. Such an expansion, which was to some extent disaggregation of established product divisions, reflected

the official policy at that time which categorically stated: "It is the policy of the Government that whatever can be produced by small and village industries must only be so produced". Since 1977, depending upon the recommendations of an Advisory Committee, products are added and deleted from the reservation list. The updated list as at the end of March 1989 included 835 items. The other facets of protection include: exclusive purchase from small-sized units (about 400 products), general price preference (about 15 per cent) over large units; power subsidies; excise concessions (no excise for sales upon Rs. 2.00 million for small firms producing single item/ product or upto Rs. 1.5 million for other firms). In addition, small firms are generally not covered by the fairly stringent labour laws or could easily circumvent these laws due to the absence of an organised labour force and indifferent (deliberate or induced) implementation.

Table 1: Small-scale enterprises: Definitional changes

Changes over time	Investment criterion		Employment criterion
	Normal small-scale units	Ancillaries	
Up to 1958	Fixed capital investment up to Rs. 0.5 million	Same	Employment up to 50 workers if using power or up to 100 workers if not using power
1959	The value of machinery was taken as the original price paid, irrespective of new or old machinery	ditto	ditto
1960	Gross value of fixed assets up to Rs. 0.5 million	Gross value of fixed assets up to Rs. 1.0 million	Employment criterion dropped

Investment limit (applicable only to plant and machinery, Rs. million)				
	Normal	Ancillary	Export-oriented small units	Tiny units
1966	0.5	1.0		
1975	1.0	1.5		
1977	1.0	1.5		0.1
1980	2.0	2.5		0.2
1988	3.5	4.5		
1991	6.0	7.5	7.5	0.5

Source: Tyabji (1980) and Goyal et al. (1984) for details until 1980.

The new policy document for small enterprises titled "Policy Measures for strengthening small, Tiny and Village Enterprises" was tabled in Parliament on August 6, 1991. The following are some important features of the new policy:

For the first time the policy differentiates explicitly between 'small' and the 'tiny' enterprises. It is also noted that small-sized enterprises, other than 'tiny' enterprises, would be entitled to one time benefits (preference in land allocation/power connection, skill and technology upgrading facilities) whereas the 'tiny' enterprises would be sustained on a continuous basis in terms of easier access to institutional finance, priority in the government purchase programme and relaxation in the provisions of labour laws. The other definitional change relates to industry related services and business enterprises which irrespective of location and having investment ceiling corresponding to tiny enterprises (Rs. 5 lakhs), would not be treated as small-size industries.

Another important feature of the new policy relates to equity participation. The new policy provides for equity participation by other (presumably large) industrial units in the small units not exceeding 24 per cent of the shareholding. The measure is expected to boost ancillarization.

The other special feature is the introduction of a new legal form of organization of business, that is, restricted or limited partnership. In this form the liability of at least one partner is unlimited whereas other partners have their liability limited to invested capital. The measure is expected to attract equity capital in the SES, particularly from friends and relatives.

The new policy recognises that the small units require timely credit rather than cheap credit. The Government expects that by speeding up procedures, through an enlargement of the scope of the single window clearance to cover projects upto Rs. 2 million and working capital upto Rs. 1 million, investment in SES sector would be facilitated.

Small units require timely credit rather than cheap credit.

The new policy also envisages an important role for non-governmental agencies, such as, industry/trade associations.

The village industries, as in earlier policy documents are expected to promote rural industrialization and provide employment, particularly to weaker sections of the people. A number of measures — supply of raw materials, sale of products, upgradation of production methods and improvement in the quality of products,

strengthening the existing support organisations, expansion of training facilities and so on — are suggested to enable healthy growth of village industries. Sandesara (1991) feels that "... all the measures are of routine type, and are more empty than full in the sense they are just listed" without elaborations.

We have only listed some features of the new economic policy. The likely implications of the new policy can perhaps be clearly seen by juxtapositioning of policy changes and the performance of the SES. To this we turn in the following paras.

Quantitative Significance & Instability of Small Firms

The growth of small-sized enterprises in India is thus shaped by an elaborate package of promotional and protective devices. It is difficult to establish even a rough correspondence between the instruments of policy and their outcome. However, an essential step towards understanding the various facets of small firm growth would be to have an assessment of the relative importance of these enterprises as part of the industrial system. It may be noted that the data for small enterprises lacks precision and diverse data sources depicting size, class changes often lack mutual consistency. In addition, several studies point out that small enterprises tend to conceal income and employment (Kashyap, 1988).

Contribution to National Income

Given this caveat, the relative share of small-sized enterprises can be assessed in terms of its contribution to value added and employment. Available information indicates that the relative share of the secondary sector (manufacturing, construction and power generation) in terms of value added rose rapidly upto the mid-1960s from 14.5 per cent to about 22 per cent. Since then, its relative share has tended to stagnate. The primary sector (agriculture and allied, and mining), despite year-to-year fluctuations, continuously lost its relative share. The tertiary sector (trade, transport and public services) gained continuously and after the mid-1960s almost exclusively.

The stability in the share of the secondary sector reflects its stagnancy since the mid-1960s. There is, however, evidence of acceleration in the growth of manufacturing in the 1980s, particularly during the second half of the last decade (Government of India, 1991).

How did this growth experience affect the fortunes of small-sized enterprises? Table 2 gives the relative share of registered and unregistered factories in the manufacturing sector. Registered and unregistered factories owe their nomenclature to the Factories Act of 1948, where the former is defined as those units that employ 10 or more workers (using power) or 20 or more workers (without power). The rest of the units, covering household enterprises and small factory units, are classed as unregistered enterprises.

Table 2: Relative share of registered and unregistered enterprises in the value added by manufacturing sector (at 1970-71 prices)

Year	Percentage share	
	Registered	Unregistered
1954-55	53.17	46.83
1958-59	55.13	44.87
1962-63	59.38	40.62
1966-67	61.81	38.19
1970-71	62.22	37.78
1974-75	61.96	38.04
1978-79	63.05	36.95
1982-83	64.85	35.15
1984-85	65.84	34.16

Source: Derived from H.L. Chandhok and the Policy Group, India Data Base, The Economy, Annual Time Series Data, Vol. 1, 1990.

It is seen that the relative importance of unregistered enterprises declined rapidly upto the mid 1960s (47 per cent to 38 per cent). The following decade and a half — dubbed a period of industrial stagnation — witnessed unregistered enterprises holding their own. Since then there has been a further slow but perceptible decline, particularly during the 1980s. These overall tendencies are not very revealing. First, the small-sized enterprises, which constitute a residual category, are likely to contain dynamic segments, as are also the declining ones. Unfortunately, the national income statistics do not disaggregate these enterprises into categories such as rural and urban household units, small factory units in rural and urban areas, crafts sector and so on. As discussed later, employment data provides a hazy but more inclusive picture. Second, to treat all registered units of the factory sector as large-sized units is misleading. Fortunately, since the mid-1970s, some basic traits of the factory sector by size class are being covered by the Annual Survey of Industries. It is seen that during 1975-76 and 1985-86, medium and small factories have gained in relative importance at the cost of large factories (table 3). The gains have been relatively larger for the medium-sized firms. This process seems to have speeded up during the 1980s — the period of industrial acceleration. It appears that since the mid-1960s the small firms in the industrial economy have maintained their relative share in

the process of income generation and even the recent acceleration in the industrialisation process has not been biased in favour of largeness — rather it has tended to favour the small — and medium-sized units.

The gains have been relatively larger for the medium-sized firms.

Table 3: Factory sector: Relative contribution to value added by enterprise and by employment size

Year	Percentage contribution to value added by manufacturing enterprises by size				
	0-49	50-99	0-99	100-499	500+
1974-75	8.04	4.98	13.02	19.67	67.31
1975-76	8.20	5.01	13.21	19.31	67.48
1978-79	7.90	5.20	13.10	21.80	65.10
1979-80	8.90	5.40	14.30	19.70	66.00
1980-81	8.50	5.60	14.10	20.10	65.80
1981-82	8.10	4.80	12.90	17.70	69.40
1982-83	7.70	4.90	12.60	19.00	68.40
1983-84	8.80	5.80	14.60	19.70	65.70
1984-85	8.40	5.30	13.70	20.50	65.80
1985-86	10.00	6.20	16.20	25.00	58.80

Source: Government of India, various issues of Factory sector: Summary results, Annual Survey of Industries.

The faster growth of medium sized enterprises in factory sector should be treated as a welcome feature. This implies that top-heavy structure of the industrial system, as was the case upto mid-sixties is changing. Also, some recent studies show that if employment is taken as the size variable, it emerges that it is the medium size (around 200 workers), not the small, that is beautiful (Little, et al., 1988).

Employment Aspects

Important though it is to study the changes in the output composition of the Indian economy, it deserves underscoring that the employment structure, in terms of workforce distribution between the agricultural and non-agricultural sectors, remained almost frozen until 1971. The 1981 Census, despite problems posed by the changes in the definition of "worker" over the period 1971 to 1981, revealed for the first time change in the workforce distribution away from agriculture in rural areas. The process of acceleration in rural non-agricultural employment noted in the 1981 Census is supported by the recent rounds of the National Sample Survey (NSS). It is seen that major transformation occurred in rural areas over a period of less than two decades. The relative importance of male workers in agriculture and allied activities declined by 8.7 percentage points and the gains were almost equally shared by the secondary and tertiary sectors. The corresponding fall was not as steep for female workers but most of the decline in the female workforce in agriculture and allied sectors resulted in enhancing the weightage of the secondary sector. These changes are truly remarkable but are not adequately reflected in the national income accounts in terms of changes in sectoral shares.

How did the changes in the employment structure affect the process of industrialisation? We may note some broad tendencies emerging from the population census and the recent rounds of the National Sample Survey. Mohan's (1989) study based on the population censuses (1961, 1971, 1981) showed that:

- The importance of rural household industries declined overall and for most of the industrial divisions.
- The most significant changes between 1971 and 1981 was the large increase in employment in non-household manufacturing — recording the largest growth among all categories for both males and females.

The most significant change was the large increase in employment in non-household manufacturing.

- The share of manufacturing in total urban employment increased from 28.4 per cent in 1971 to 30.3 per cent in 1981 — thus providing some support to the idea that the accelerated urbanisation observed during the 1970s might well be related to increased industrial activity.
- Overall greater employment growth occurred in the non-household, non-large factory sector: both household and factory sectors showed negligible or slow growth.
- The differential record of urban growth (across states) seemed to be more directly related to manufacturing employment rather than value added. It appeared that much of the dispersal of manufacturing employment was of low productivity.

However, by the mid-1980s, some of these tendencies noted during the 1970s appeared to have altered (table 4). After a period of relative stagnation, the rural unorganised sector has forged ahead. In a period of about seven years, 14 million additional jobs were generated by small firms in rural areas. Most of these jobs owe their origin to units employing fewer than six workers (household + hired). It is possible that some of the employment generation is statistical (changes in definition, coverage, sampling errors, etc.) but such a job-generation process is consistent with the ongoing changes in rural employment structure. In urban areas also births of new firms and job additions in the unorganised sector have shown a marked acceleration in recent times (1978-79 to 1984-85).

Table 4: Estimates of number of enterprises and workers engaged in unorganised manufacture in NSS Rounds, All India (in lakhs).

	28th Round (1974-75) 1	33rd Round (1978-79) 2	40th Round (1984-85) 3
No. of enterprises			
Rural	64.9	63.7	146.4
Urban	23.2	21.0	50.8
No. of Workers			
Rural	115.6	125.0	262.6
Urban	42.9	57.1	106.7

Source: Kashyap (1992).

Analysis of such massive increases in enterprises and employment over a short time span is hampered by inadequate data. The most important data gaps relate to the intensity with which labour is used, wage rates, and whether production in these enterprises is continuous or intermittent. It is interesting to note that, along with enhanced job generation, the proportion of part-time workers in rural areas has significantly declined. Also, a comparison of rural and urban enterprises shows that, although by 1984-85 comparable enterprises in rural and urban areas did not vary significantly in terms of employment size, per enterprise output, investment and value-added were much higher in urban areas compared to rural areas (Kashyap, 1992).

The period of significantly enhanced job generation by the small enterprise sector in rural and urban areas has coincided with almost unchanging employment levels in the factory sector. During 1981-82 to 1986-87, the employment levels in the factory sector ranged between 7.7 to 8.0 million, which is close to half the additional jobs generated by the tiny rural enterprises.

We may now take an overall view of the changes in the employment size structure in manufacturing employment. As stated earlier, data gaps, particularly for the unorganised sector, complicate time series analysis. However, it is possible to arrange employment information for two points in time distanced by a decade (table 5). It is seen that manufacturing employment rose by 23 million in a decade but more than nine-tenths of the additional jobs were generated in the unorganised sector. This has happened despite the fact that the relative share of the unorganised sector in value added tended to decline over this period (table 2). The job generation process resulted in the enhancement of the relative importance of the unorganised sector (rural + urban) by ten percentage points. The factory (organised) sector lost relatively despite the addition of two million jobs. A major proportion of the additional jobs in the factory sector, however, was accounted for by public sector units (1.1 million) and small firms (0.6 million). Large firms in the private sector showed stagnancy, or even decline.

Manufacturing employment rose by 23 million in a decade but more than nine-tenth of the additional jobs were generated in the unorganised sector.

Table 5: Share of unorganised and organised sector in manufacturing employment, 1974-75 to 1984-85

Category of employment	1974-75		1984-85	
	No. Lakhs	Percentage to total	No. lakhs	Percentage to total
Unorganised sector	159	72.60	370	82.40
Rural	116	52.97	263	58.57
Urban	43	19.63	107	23.83
Organised (factory) sector	60	27.40	79	17.60
Employment size:				
0-99	13	5.94	19	4.23
100-499	13	5.94	16	3.57
500+	34	15.52	14	9.80
Out of which:				
Public sector	14	6.39	25	5.57
Private sector	20	9.13	19	4.23
Total	219	100.00	449	100.00

Source: Kashyap (1992).

Large firm manipulate scales of production or shift production to small firms to take advantage of unregulated labour markets, liberal tax regimes, and other concessions.

The Indian industrial economy shows some peculiar traits. In terms of value added, the relative share of the secondary sector, after a period of considerable gains upto the mid 1960s, showed constancy. In terms of employment, there has been slow but perceptible structural transformation towards non-agricultural employment during the 1970s and the 1980s. Even if allowance is made for the lack of purity in data, there is no doubt that small and tiny firms in rural and urban areas are playing a dominant role in the ongoing structural transformation, particularly in the industrial economy. Such a pattern appears to some extent an outcome of the stagnancy of large firms and also due to the fact that they manipulate scales of production or shift production to small firms to take advantage of unregulated labour markets, liberal tax regimes, and other concessions (power and investment subsidy) (Kashyap 1988; Goyal et al. 1984). However, to a very large extent, the proliferation of small enterprises noted from the mid-1970s onwards appears to be a derivative of the rural occupational diversification and development process. It is important to understand the nature of this ongoing change, as it may have important implications for small enterprise development and policy reforms.

Probing into the ongoing rural transformation definitely calls for carefully designed micro studies where the growth of non-agricultural employment is studied across different layers of agricultural development that vary in terms of population pressure, rural poverty, agricultural prosperity, socio-economic environmental, urban accessibility and so on. Such micro level studies are rare. Nevertheless, some recent works sponsored by the Agro-Climatic Regional Planning Unit (ARPU) of the Planning Commission, have looked into labour absorption under rural settings and also mapped rural/urban employment Linkages. These studies, though mapped over different agro-climatic conditions, unfortunately differ in scope and methodology and therefore require cautious interpretation. (See, Basu & Kashyap, 1992).

The micro-level studies showed that it was not the level of agricultural productivity alone but also the cropping mix, particularly in favour of cash crops, that led to the emergence of the "farmer-entrepreneur". Widespread distribution of cold-storage facilities in Farakhabad district, growth of processing units in Hoshangabad district and the emergence of agro-processing units such as sugar, champagne, raisin and tomato ketchup units in Nasik district supported this contention. However, it did not follow that the agro-processing units would necessarily be located in rural areas. Indeed, as the findings of micro-level studies in nine districts suggested, the growth of agro-based activities was more in small and medium towns than in villages.

Small and tiny firms in rural and urban areas are playing a dominant role in the ongoing structural transformation, particularly in the industrial economy.

The migration process and urban accessibility played a very important role in determining non-agricultural employment. This process unfortunately is not captured by the NSS and Census data because of the "residence" criterion. Micro-level studies demonstrated that temporary migration of the labour force from rural to urban areas, particularly of the commuting variety, accounted for a sizeable portion of the workforce in various economic activities of urban centres as well as forming a major share of off-season employment of agricultural labour and small farmers. The level of agricultural development, mainly determined by the irrigation level and cropping intensity, reduced dependence on such migration, but not substantially. The difference was mainly in the duration of the employment sought by the rural workforce in urban areas. Continuity of such jobs was preserved through contacts and, in some cases, both in terms of activities and location, labour contractors played an important role.

Notwithstanding the importance of rural/urban employment linkages, the rural non-agricultural enterprises, despite their proliferation (or perhaps because of it), occupy the lowest rung of the ladder in terms of capital intensity and labour productivity. It is possible that the stagnant or slow-growing market is becoming divided into ever-increasing rural enterprises. Papola (1987), however, finds some relationship between the performance of rural enterprises and the levels of agricultural productivity. In this process, direct linkages with the farm sector play a limited role, compared to the role played by widening of markets through income

It was not the level of agricultural productivity alone but also the cropping mix, particularly in favour of cash crops, that led to the emergence of the "farmer-entrepreneur".

augmentation and generation of investible resources. He also notes that "... in an agriculturally better developed area, use of hired labour at reasonably high wage rates is of a higher extent and increasing much faster than in less developed areas, thus signifying a greater entrenchment of economic calculus and emergence of a non-household, capitalist mode rather than the household subsistence mode of production." (Papola, 1987, p. 104).

Instability of Small Firms

A vast majority of rural enterprises, particularly in depressed regions, to the extent they share stagnant economic space, merely subsist and provide an unavoidable but unstable alternative to farm jobs. Unfortunately there is hardly any evidence that could provide clues to entry and exit from such jobs. Evidence, however, exists that helps in understanding mortality and sickness in the modern component of the SES. In this respect, Sandesara's (1992) analysis of the Second Census of modern small industrial units that related to 1987-88, is very helpful. It may be mentioned that the Census relates to small industrial units falling within the purview of the Small Scale Industries Board and excludes those looked after by specialized boards and agencies. The Census covered those units that had investment in plant and machinery (original value) upto Rs. 35 lakhs or Rs. 45 lakhs in the case of an ancilliary unit. We may take note of some of the findings, which are important:

During a period of 15 years, 1972 to 1987-88, the employment in modern small units doubled, but investment and value added increased three-fold and output four-fold. At the same time there were modest increases in value added and output (at constant prices) per enterprise, but employment size (per unit) was halved from 12 to 6. The other development was that within this set of small units, the contribution of relatively large size units (investment in plant and machinery, Rs. 3 lakh and above), that accounted for 2 per cent of the units and 21 per cent of output, rose to 7 per cent of units contributing more than half of the output (52 per cent). The trend is thus clearly in the direction of large size units, accompanied by capital-labour substitution and possibly deliberate intent towards employment shedding through capital-deepening and/or division of enterprises.

The tendency towards largeness may also be an outcome of the fact that new entrants (in all probability relatively small units) face greater instability. Sandesara (1992) notes: "The statistics on closure presented here (table 6) show an alarming picture. The numbers are large as such, as also in the context of working units (of over 3 lakhs). Nearly half of this large number of closed units (of over 3 lakhs) are found closed within five years after start of production. Other information on existing sick and weak units and their capacity utilization therein (not given in this paper) add to the gloom. Perhaps a go-slow, more discriminating state policy for promotion of small industry, especially in regard to the new units and sick and weak units, would be better for the health of this sector."

Table 6: Number of Closed Units within the year of Start of Production, 1987-88

Years	Number (thousand)	Percentage
1-2	41,442	14
3-5	1,07,486	36
6-10	87,494	29
Above 10	64,968	22
Total	3,01,390	100

Notes: 1. The total number of closed units expressed as a percentage of working units (5,82,368) is 52.
2. Figures may not add up due to rounding.
Source: Sandesara, (1992.)

The migration process and urban accessibility played a very important role in determining non-agricultural employment.

What causes closure? Sandesara's analysis (table 7) shows that about half (1,48 lakh) of the total units were not able to survive because of financial (35 per cent) and marketing problems (14 per cent). Labour problems account for merely 2 per cent of closures. Note must be taken of the fact that 36 per cent units close down during 2-5 years (table 6) of their existence and 35 per cent do so because of financial difficulties. This may but be merely coincidental. It appears that entry in SES sector is easy, survival difficult and constraints in raising enough funds for working capital needs play a major role in this phenomenon.

Sandesara also notes that contrary to expectations the product reservation policy for the small scale sector has not been conducive, vis a vis unreserved items, in either capacity utilization or output growth.

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Table 7: Closed Units by Reasons for Closure

Reasons	Number	Percentage
Labour problems	6,777	2
Dispute among owners	11,023	4
Raw material problems	17,010	6
Finance problems	1,04,668	35
Marketing problem	43,451	14
Natural calamity	10,255	4
More than one reasons	49,738	17
Other	58,468	19
Total	3,01,390	100

Source: Sandesara (1992).

Enhancing Competitiveness of SES: Role of Policy

There is no doubt that the SES in India, despite a bewildering variety in terms of size, technological orientation and capacity to meet the requirements of home and foreign markets, occupies an important, even dominant, place in the total industrial economy. There is also evidence to suggest that its domination is on the increase. An important issue is how could SES continue to play an important role in the wake of policy reforms that primarily aim at reducing/eliminating elements of subsidy and enhancing the role of the market. It is important to note that even prior to recent reforms, serious doubts persisted regarding the policy for this sector. Many perceptive observers felt that the government was aiming to do too much with too few resources, trying to achieve too many — at times conflicting-goals, without being clear about the needs or capacities of their clients, with the help of a generally inflexible administrative structure that found it difficult, if not impossible, to co-ordinate a multiplicity of services (Kashyap, 1988; Taub & Taub, 1989). The elaborate promotional and regulatory or protective paraphernalia was not found conducive to equity, efficiency or growth (Kashyap, 1988; Sandesara, 1980; 1985). It appeared that excessive keenness on the part of Government to protect and promote small firms encouraged the entry of opportunists or those lacking the capacity to run a successful enterprise, leading to widespread malaise in the small-scale sector (Kashyap & Shah, 1989, Sandesara, 1992).

It was also argued that ineffectiveness or the negative influence of government policy was due to the fact that interventions in favour of the small sector were practised in a policy environment which was generally hostile to small producers. For instance, (Mead 1991, p. 415), in reviewing the book by Little et al (1988) and other works in this area, notes:

> "India clearly has a maze of policies, programmes, and regulations that impinge on small producers. While macro policies (tariffs and exchange rates, investment incentives, credit policies, the promotion of public enterprises, etc.) have generally discriminated against small producers, a battery of direct assistance programmes have sought to overcome the negative effects of these broader policies... this is a costly and undesirable combination. If the policy environment is badly distorted, micro-interventions aimed at compensating for these distortions are unlikely to be effective, and in fact may well make things worse (by promoting wrong kinds of activities, by creating cumbersome bureaucratic procedures that discourage innovation, etc.)".

The recent policy reforms in India, such as devaluation of the rupee, preference for tariffs vis-a-vis quantity restrictions, liberalisation of foreign investment, delicensing and debureaucratisation of industrial economy, etc. have tried to remove some of the distortions in the policy environment. Since the process of reforms is still ongoing, it is difficult to evaluate or anticipate its outcome for the economy. The true test of the reform regime would lie in its capacity to create conditions whereby small units could be technologically progressive and innovative, unconstrained by limitations imposed by the small size.

It is worth examining the elements of the policy reforms that aim at overcoming the disadvantages faced by small units because of size. In this respect the categorization of small size units into 'tiny', small and village is clumsy. For instance Second All-India Census of Small Scale Industrial Units (1992) shows that of all the working units, 42 per cent were located in rural areas and 96 per cent were tiny units and only 7.5 per cent were registered under the Factories Act. Categorization of units in policy document reflects more attachment to

products (handloom) or technology (crafts) for historical reasons rather than considerations dictated by the size variable.

For village industries (handloom and crafts), the emphasis on quality, design and on area specific solutions for clusters of village in the new policy seems to be in the right direction. Survival of these units and possible globalization, in the ultimate analysis, is possible only on the basis of quality, taking advantage of the demand for custom-made goods. There are other elements of policy like intentions for strengthening and expansion of existing institutional set up that implicitly assume that the survival of handloom and handicraft would require continuous care.

The new policy reform also assures of continuous support to 'tiny' units. There are two issues involved: How could we do it? Why should we do it? We have seen that the so called modern component of the small scale sector is overwhelmingly constituted by 'tiny' units. Add to this the process of new enterprise formation as an outcome of rural occupational diversification, which is truly gigantic in dimension. How could any institutional umbrella envelop all these enterprises? Continuous support, in certain cases no doubt would help first generation entrepreneurs (with or without EDP training). It is however, unlikely to prevent large scale capital (as is indicated) by a number of studies) from taking advantage of the subsidies or support intended for tiny units. Continuous support, apart from distorting the scale structure by hampering the small firms in crossing the size barrier, would make these units depend on political and bureaucratic patronage which in turn might encourage and sustain widespread sickness and mortality in small firms. Village and tiny enterprises stand to gain much more from the acceleration of the growth process (particularly agricultural development), strengthening of rural-urban access and improvement in physical and social infrastructure, than any actual and intended elaborate official dependence.[1]

It is true that small firms, particularly those functioning in a competitive environment (internal and external) seek alliances to overcome the limitations imposed by size. This usually takes the form of commercial subcontracting or industrial subcontracting (usually relationship with large firm or firms) or inter-dependence within community of small firms (industrial districts of Italy, for instance, Pyke, 1992).

Village and tiny enterprises stand to gain more from the acceleration of the growth process (particularly agricultural development), strengthening of rural-urban access and improvement in physical and social infrastructure, than any elaborate official dependence.

The new policy document makes a special mention of industrial subcontracting and contains special measures to promote it through equity participation. Some people doubt the desirability of the new measure. It is argued that the new measures would legitimise the existing benami stake of large firms in the small scale sector and the unequal relationship would perpetuate the subordination of small firms.

We do not share this view. We believe that any policy that encourages open and honest transactions is a step in the right direction. There is no doubt that in the recent past concealed industrial subcontracting has risen substantially. The pronounced rise in the employment share but not in income share of the unorganised sector is an indicator of such a phenomenon. In the past, the official efforts at encouraging ancilliarization though inspired by the Japanese experience, did not serve the intended purpose because of fundamental constraints. First, effective sub-contracting in Japan was regarded as prerequisite to the growth and technical progress of large firms, whereas in India the promotion of small-scale sector was guided by a desire to curb largeness. Second, in Japan, the spirit of competition was kept alive by appropriate trade and industrial policies, e.g., keeping the door open to competition from abroad. In this process, cost-conscious specialization through inter-firm inter-dependence (famous "just in time" system) played a key role in giving Japan an edge over its competitors. The extent to which the reform regime in India is trying to create a competitive environment augurs well for healthy industrial subcontracting. The product reservation policy and continuous support to tiny enterprises, however, would continue to constrain this process or encourage lonely existence leading to instability and sickness.

Commercial subcontracting and interdependence between localized community of small firms around a spe-

1. World Development Report (1994, p. 3) notes: "An important ingredient in China's success with rural enterprise has been a minimum package of transport, telecommunication, and power at the village level. Rural enterprises in China now employ more than 100 million people (18 per cent of the labour force) and produce more than a third of national output". It is interesting to note that productivity growth has been more rapid in rural industries compared to urban industries (Islam and Hehni, 1994).

cialized industry are also important organizational forms, in India and elsewhere, that overcome the size limitation of small firms. The former is important in diamond polishing and garments industries in India. In both these industries that account for substantial employment and foreign exchange earnings, production is carried out in small firms or home-based putting-out systems (garments particularly), but most of the crucial functions, such as the supply of raw materials and reaching the final consumers, are handled by large organizations. It is thus possible to take advantage of flexibility in production. The system suits the small producers because, despite leading to dependence, it ensures existence. There are also a large number of spatial clusters of small firms engaged in specialized industries — woolen garments, bicycles and parts, sewing machines and parts in Ludhiana; sports goods in Jullunder; locks in Aligarh; leather goods in Agra and Kanpur; cotton hosiery in Calcutta and Delhi; powerlooms in Bhiwandi; roof tiles in Morvi; diesel engines in Rajok and Coimbatore, brass parts in Jamnagar and so on — which have or could have interdependencies based on equality.[2]

The new policy document does not address these organizational forms directly. Nevertheless trends towards globalization and emphasis on area specific solutions, which is the undercurrent of reform regime, are likely to induce technological change in small firms, irrespective of organizational pattern.

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2. A recent study on the impact of new economic policies on small size firms shows that the entrepreneurs operating within a cluster have much better resilience to policy changes than those operating in isolation (Krishna & Awasthi, 1994).

Technology Dimensions of Small Scale Industry

K.K. Subrahmanian

This article highlights the technology dimension of Indian small-scale industry. It comments upon the rationale, direction and form of interventionist policies on small scale industries (SSEs) in the light of their technological dynamism for raising productivity and growth. It takes the view that the acid test of any policy approach is the performance record of the small scale industry in achieving efficiency-based growth. The paper examines factor-use efficiency, productivity growth and technological progress in Indian small scale industry. The analysis has particular significance in the context of the ongoing economic reforms, which shift development emphasis away from the State intervention to the market-guided growth process based on industrial efficiency and export competitiveness.

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The development of the small scale sector has been receiving increasing attention as an element of industrial policy in many developing countries. Among them India has a special place at least on two counts. First, India is a pioneer in assigning a strategic role to small scale enterprises (SSEs) in its industrialization process and introducing public policies and targeted efforts for their development. Most other developing country governments did not give much attention to this sector atleast until the seventies (Little et al., 1987). Second, India is unique in both the extent and duration of its efforts to promote and protect small scale units. The rationale of the Indian approach rests on the advantage SSEs have relative to large firms in terms of some development criteria which include: employment generation, poverty alleviation, reduction of economic concentration, industrial dispersal and development of latent resources, especially entrepreneurship.

Generally, the consideration of above criteria is confined to their economics whereas, most of these and in particular, the core criterion of employment generation, have a technological dimension as well. In fact, more than the economics it is the technology dimension that gives SSEs a unique position in the dynamics of development. This aspect, however, has not been adequately appreciated in academic discussions and policy formulation in India.

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The Rationale of Small-scale

The central claim made for small scale enterprises (SSEs) in developing countries is on the ground that they are good for employment. As there is scope for appropriate choice and adoption of labour-using (capital-saving) technology, they produce a unit of output (value-added) with less capital but more labour than large enterprises. Here, it is not factor-intensity *per se,* but the factor-use efficiency, that matters. It is when the labour-intensive bias of technology results in higher productivity of capital, which is scarce in the developing country context, the small scale enterprise assumes significance. In a true sense, it is the nature of the technology that renders the use of scarce factors more efficiently than do other types, given their social cost. If the logic is taken to the extreme, SSEs ensure more employment as well as more output due to static efficiency relative to large firms and hence, qualify for special treatment. In the dynamic sense, SSEs have to undergo a process of technological transformation which renders them competitive and growth-dynamic in the context of the fast changing technological frontiers in the industrial world. In this regard, small scale industry is favourably placed to the extent that small firms are generally more innovative and their inventive performance per unit of R & D expenditure better, than large firms (Freeman, 1974). In the ultimate analysis, it is technological change that lies at the heart of development and hence, the defence of the discriminatory (special) treatment to small industry (SSEs) has to rest on the technological dynamism to ensure efficiency-based growth.

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Factor-intensity & Productivity

To begin with, a look at the evidence on factor intensity and productivity across size-classes is in order. Capital productivity of smaller firms is found to be lower when they use labour more intensively relative to larger firms, they must be using both labour and capital less efficiently, and the defence of discriminatory treatment in favour of small firms breaks down. The literature is flooded with studies on the subject. However, the evidence as to whether small firms in fact, are relatively more efficient in capital productivity or they are not in India, has long been controversial[1]. A look at selected economic ratios in respect of different size-classes (employment based) in the ASI factory sector for a recent period may be instructive.

A recent study on the subject based on the analysis of ASI data for 1983-84 has observed that while labour productivity increases with size throughout the range, capital productivity peaks in the size-class 50-99 workers and then declines for larger firms (Desai & Taneja 1993: 213). The relevant economic ratios computed from ASI broadly confirm the same pattern in 1990-91 (see table 1). This means, there is no clear evidence of general inefficiency of small scale production though within the small scale sector (factories with less than 100 persons) absolute efficiency is seen to increase with size. Thus, the case for special treatment to SSEs in India is broadly justified.

Table 1: Selected economic ratios by employment size classes ASI factory Sector-1990-91.

Size classes	Labour productivity Y/L (Rs. thousand)	Capital labour ratio K/L (Rs. thousand)	Capital productivity Y/K (Rs.)
	1990-91	1990-91	1990-91
0-49	30.63	42.35	0.72
50-99	37.14	48.53	0.77
100-199	48.21	76.44	0.63
200-499	66.16	106.99	0.62
500-999	86.24	182.17	0.47
1000-1999	86.37	204.52	0.42
2000-4999	86.00	120.29	0.71
5000 & >	78.18	468.73	0.17
Total	63.11	163.73	0.39

Growth Performance

There still remains the question of effectiveness of the policy in terms of growth performance. A detailed analysis of growth trends in Indian small scale industry is difficult due to non-availability of time-series data on relevant variables. There is also the difficult task of deciding upon the definition of "small" scale. If unregistered firms are treated as constituting the small scale sector (SSEs) an earlier study (Sandesara, 1988) has noted the relatively slow pace of growth: the share of small firms in NNP has been rising very slowly from 4.6

1. For a review of the early literature dealing with the controversy see, Subrahmanian (1975). For a review of the recent studies and a fresh analysis on the subject see Desai and Taneja (1993).

per cent in 1950-51 to 5 per cent in 1970-71 and to 5.3 per cent in 1983-84. Perhaps, a more meaningful approach lies in tracing the growth in the small scale sector over time. If we define the small scale sector as consisting of units (factory and non-factory) registered with Small Industry Development Organization (SIDO units) a rough idea of the growth trend can be formed by computing compound annual growth rates (CAGR) in relevant variables based on the data from All-India Census of Small Scale Industrial Units carried out for 1972 and 1987-88 (table 2).

Table 2: Growth of Small Scale Industry

Items	1972	1987-88	CAGR %	CAGR between 73-74 & 87-88 ASI factory
No. of Units	139557	593769	9.99	3.99
Fixed Investment (Rs)	79674	292639	9.06	7.59
Employment (No.)	1653178	3665810	5.45	2.45
Output (Rs)	260274	1352760	11.61	9.23
Net Value added (Rs)	84100	323012	9.39	6.87

Values in Rs. lakhs at constant 1972-73 price Annual Survey of Industries (ASI) for 1972-73 was not done
CAGR = compound annual growth rate.

It is seen that there is a mis-match between expansion in the number of units and employment (also income generation). This is not a welcome trend, as it indicates the increasing tendency of forming very small units and their clustering in the lower size class, where capital productivity is relatively low. Generally speaking, the growth performance of the small scale industry (SIDO) has not been in poor shade in an absolute sense. In the absence of strictly comparable data, no firm conclusion on the performance of the small-scale sector relative to large-scale can be drawn. To get a rough idea, however, annual compound growth rates between 1973-74 and 1987-88 in the ASI factory sector (this includes small firms registered under the Factories Act), which can be approximated as the large scale sector, can be looked at. Interestingly, the small scale sector has shown a better growth performance as compared to the large scale sector both in employment and output under the protective policy.

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Technological Progress

The defence of any policy approach to small scale industry, as stated earlier, rests on growth with efficiency. Here, the concern is with static efficiency or dynamic efficiency or both. Indeed, the evidence on size-efficiency correlate in Indian industry has remained a long-standing controversy. Yet, our finding that capital productivity peaked in the size-class with 50-99 persons and then declined with increasing size in the ASI factory sector commends the small scale sector on the count of static efficiency. Now we need to look into the dynamic efficiency, which includes a time dimension and deals with technological progress. Here again, a detailed analysis is constrained by the lack of time-series data. A rough idea, however, can be formed from the change in the value of efficiency ratios between the time points (1972 and 1987-88) of the two censuses of Small Scale Industrial units (table 3).

Table 3: Selected efficiency ratios

	NVA/Output (%)	Y/L (Rs. thousands)	K/L	Y/K Rs.
I. SIDO Sector (small scale)				
1972	32.31	5.09	0.05	1.06
1987-88	23.88	8.81	0.08	1.10
CAGR (%)	–2.00	3.73	3.42	0.30
II. ASI Factory (large scale)				
1973-74	23.92	5.71	0.15	0.30
1987-88	18.40	9.47	0.27	0.35
CAGR (%)	–2.16	4.31	5.01	–0.67

Values in Rs. at 1972-73 constant price

The available evidence is tempting to note the better (but marginal) dynamic efficiency of small scale sector relative to large scale though there are methodological hazards in comparing the performance of SIDO small scale sector with ASI Factory sector. An inference on the dynamic efficiency of SIDO small scale sector on the basis of the changes in selected economic ratios between the two time points is less objectionable. It is disturbing to note that the emerging picture in SIDO sector is disappointing. In particular, efficiency in terms of value addition (transformation efficiency) as it is reflected in the ratio of value-added to output, has declined. Also the rate of increase in capital productivity is marginal whereas the capital intensity has increased substantially. There is the suggestion that the overall efficiency represented by the total factor productivity growth (TFPG) is rather low. By implication, there has not been any significant technological progress in Indian small scale industry.

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To draw a firm conclusion, however, the estimation of total factor productivity growth is required. In literature there has not been any major attempt at it presumably for want of required time-series data. However, studies (For example, Page (1984), Goldar (1985) and Bhavani (1991) which examined the relationship between size and technical efficiency by analysing firm level cross-section data within the frontier production function framework, throw some light on total factor productivity growth in the small scale industry. Most studies have observed substantial intra-industry variations in relative technical efficiency and thereby, pointed out the scope for improvement in the total factor productivity of small firms. It has also been suggested that a shift in the production frontier (technological change) itself is crucial for growth in the small scale industry. It must be noted, however, that these suggestions are based on the analysis of the data which are outdated or related to sample surveys of limited geographical areas.

To supplement our understanding therefore, we ventured to identify sources of growth during 15 years between 1973-1988 by relying upon the data on small scale sector published by the CMIE [Centre for Monitoring Indian Economy, (1994)] and positing the estimable version of the Solow production function of the following type:

$$\ln y_t = \alpha + \beta_1 \ln k_t + \beta_3 t \qquad (1)$$

(where, y_t = output per labour and k_t = capital per labour)

The variable t is expected to capture the Solow concept of disembodied technical change (TFP). The equation (1) is constrained by the usual restrictive assumptions. We have attempted to relax the assumption of constant returns to scale by introducing the labour variable (L_t) in the equation (1). The resulting estimable equation is of the following type:

$$\ln y_1 = \alpha + \beta_1 \ln k_t + \beta_2 \ln L_t + \beta_3 t \qquad (2)$$

The co-efficient of labour, if it is significantly different from zero, implies the absence of constant returns to scale. In this way we also examine the scale economies.

The estimates of Solow production function are presented in table 4. It is seen from the estimated equation (1) that growth of labour productivity (y_t) is almost determined by capital intensity (k_t). The impact of total factor productivity growth (TFPG) is positive but marginal on the overall growth of the small scale sector. The estimated equation (2) reveals that the co-efficient of labour (Lt) is no significantly different from zero and suggests that there are no scale economies. Further, the relaxation of the constant returns to scale assumption has not altered the parametric values of the equation (i). Thus seen, total factor productivity growth (representing the Solow sense of disembodied technical progress) is positive in sign but the small magnitude of the value suggests that its bearing on the growth of small scale sector as a whole has been marginal. Clearly, results of the production function analysis indicated the inadequacy of technological change and its growth dynamism in Indian small scale industry.

Table 4: Estimated production functions

Equation (1) $\ln y_t = 0.392 + 0.964 \ln k_t + 0.061\, t$

(0.67) (7.57)* (15.00)*

Adjusted R^2 = 0.986 and DW = 2.01

Eqn. (2) $\ln y_t = 1.617 + 0.814 \ln k_t - 0.148 \ln L_t + 0.067\, t$

(0.87) (3.22)* (0.69) (6.95)*

Adjusted R^2 = 0.988 and DW = 2.01

It is instructive to note that the depressing picture depicted by the above macro analysis conforms broadly to the findings of a recent micro level survey (Desai & Taneja 1993) of small firms in Indian industry. To quote from the survey study, "52 per cent of the firms felt the need for more technology; thus many more acknowledged the worth of technology than, for instance, those who thought they needed managerial expertise; 19 per cent felt that lack of technology posed a problem; the rest could see the uses of more or better technology.... Thus the need for technology is widely acknowledged but (though) few firms consider it as a front-rank problem (Desai & Taneja 1993: 227–228).

Thus, the empirical evidence (though compiled from various sources) shows the slow technological progress of small scale industry (SSEs) in India. There is temptation to argue that small scale industry (SSEs) thriving under protection generally may have turned laggard in the search, acquisition, adaption, and upgradation of technologies and in making investment on inventions and

innovations for improving its technological frontier. It is also plausible that the policy formulation did not give adequate support to encourage technology-efforts of the small scale sector (SSEs). The growth performance of the small scale industry, though fairly impressive and higher than the large scale, is the result of the static allocative efficiency. On the count of dynamic efficiency, which implies technological progress, Indian small scale industry (SSEs) has faltered; rather failed.

In this context it is worth noting that South Korea, a country which initiated policies on SSEs (small scale industry) only in the late seventies could achieve a remarkable success. South Korean policies and efforts combined technology development and credit support remarkably well[2]. In contrast, India has not given comparable attention to technology (the move to set up venture capital fund in India is very recent) in its targeted efforts with the result that small firms are starved of credit as well as technology in India. Evidently, the difference in the direction of India's approach with that of South Korea explains the differences in the performance. The experience of the United States, the most industrialised country with a significant role of the small firms, also tells that an approach which takes in its fold the technology dimension as complementary to other aspects such as credit and inter-linkage with the large firms, is very effective to the growth of the small scale sector[3].

Conclusion

To conclude, the Indian approach of favoured treatment to small scale industry guided by the diction of "small is beautiful", stands justified on the touch-stone of static efficiency. However, the policy is found weak to stand the test of dynamic efficiency. It seems, a shift in the direction of policy and targeted efforts away from the present one saddled with product/price reservation, towards technology development is needed. The successful experience of some countries suggests that the efficiency-based growth of small scale industry (SSEs) is an outcome of the process of the interaction of small with large firms, capital market and technology-development structures, and that the State has to facilitate this process through legislative measures and targeted support measures. A reform in the direction of India's approach to small scale industry (SSEs) taking in its fold the technology dimension is, therefore, consistent with the ongoing economic reforms that stresses the market-related structures is urgent.

2. For example, in South Korea the Technology Development Fund established in 1976 advanced low-interest and long-term technology development loans. In 1980, the Technology Innovation Promotion Fund was established for technological improvement including funds for meeting royalty payments, training expenses of technical personnel and initial expenses of foreign engineers. Since 1978 a venture capital fund came into being for the commercialisation of new technologies and for which only the members of the association of small and medium firms were qualified to apply. For details of South Korean efforts see Jingo Lee, (1982).

3. In the United States the government has taken a number of legislative actions, which included the establishment of Small Business Administration (SBA), Economic Development Administration (EDA), venture capital support to new technology oriented/based firms (NTBF), amendment to Patent & Trade Mark Act in 1980 etc — all with the view to help technology development and growth of SSEs. For details see R. Hammond (1982) & R Lalkaka and Wu Mingyu (1984).

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Fiscal Policies & the Small Scale Sector: A Macro-economic Model

Avanindra N. Bhat

The small scale sector is focused from the view point of comparing alternative fiscal policies and their impact on the real national income of the country. Amongst the policy instruments, income tax subsidy, capital subsidy and subsidies on imported technologies have been compared and a condition is derived in terms of sectoral equilibrium labour demand elasticities that shows that capital subsidy yields the maximum welfare gain.

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Fiscal policies regarding the small scale sector vary greatly in terms of their impact on the real national income of the domestic country. Hence a study was undertaken with the objective of comparing specific fiscal policies. A model proposed by Batra and Lahiri (1987) together with Bhat (1995a, 1995b) was used as the analytical framework. A three sector framework consisting of the Agricultural Sector, the Small Scale Sector and the Manufacturing Sector was assumed. Three types of fiscal policies were considered viz., capital subsidy meant for domestic capital, a subsidy on imported technology and an Income Tax subsidy seen as an aggregation of the income tax concessions given under different clauses and categories.

Methodology

The microeconomic theory of the model is the same as in Bhat (1995a). The model of the labour markets is identical to the standard neoclassical markets in the manufacturing and small scale sectors, with the assumption that the demand curve is downward sloping and the supply curve, upward sloping. The agricultural sector comprises a Lewis (1954) type supply and a usual demand curve. Unemployment is assumed to prevail in the agricultural sector and in the other sectors, though market clearing conditions prevail. We assume a wage differential between the agricultural and the small scale sector, and the small scale sector and the manufacturing sector.

In the earlier paper by Bhat (1995a), the objective was to compare to impacts of the concessions in different sectors on real national income of the country. Here, the purpose is slightly different. Three different fiscal instruments in the small scale sector are compared to assess the impact on the real national income of the country. This in turn is expected to show which fiscal instrument is the

most powerful one in the developmental episode of the small scale sector. Policy makers, it is expected, will benefit from such an exercise. The model is also enlarged by the addition of an exports function and a total tax function in the small scale sector.

The Model

Standard production functions in all the three sectors are assumed as in Bhat (1995a). The productions are assumed to be functions of capital, labour and sector specific imported technology. The production functions are as follows:

For agriculture,

$$A = A(K_a, L_a, Z_a) = L_a\, a(k_a, z_a)$$

For small scale sector,

$$S = S(K_s, L_s, Z_s) = L_s\, s(k_s, z_s) \text{ and}$$

For manufacturing,

$$M = M(K_m, L_m, Z_m) = L_m\, m(k_m, z_m)$$

where K_i is the capital stock in the i^{th} sector, L_i is the amount of labour employed in equilibrium in the i^{th} sector and Z_i is the sector specific imported technology in the i^{th} sector; k_i and z_i are the capital/labour ratio and the technology/labour ratio, where, $i = a,\ s,\ m$. $a(.)$, $s(.)$ and $m(.)$ are the average labour productivities in agriculture, small scale and manufacturing sector respectively. Capital is assumed to be mobile among the sectors and migration of labour from agriculture to the other sectors is assumed in the model via the wage differentials.

Capital market equilibrium obtains when

$$a_k\ (k_a, z_a) = r_a \tag{1}$$

$$s_k\ (k_s, z_s) = r \tag{2}$$

$$m_k\ (k_m, z_m) = r \tag{3}$$

where r_a is the rental for capital services in the agricultural sector which is distinct from the rental r for capital services in the other two sectors. a_i, s_i and m_i are the marginal products in the agricultural sector, the small scale sector and the manufacturing sector respectively where $i = k, z$. Equation 2, 3 follow from the fact that capital is perfectly mobile between these two sectors and the capital in the agricultural sector is considered to be distinct and not a substitute in the other two sectors. That is, r_a is not equal to r. Without loss of generality, the constant relative price of M, S in terms of A is assumed to be unity, where M, S, A are the outputs in the three different sectors.

Equilibrium in the labour market is determined by the usual marginal productivity conditions given by

$$w_a = a - a_k\ k_a - z_a\, a_z \tag{4}$$

$$w_s = s - s_k\ k_s - z_s\, s_z \tag{5}$$

$$w_m = m - m_k\ k_m - z_m\, m_z \tag{6}$$

where w_i is the real wage in sector i and the expression on the right hand side is the intensive form of the production function.

Further, wage differentials are assumed to persist between the three sectors and without loss of generality, it is presumed that the manufacturing wage is higher than the small scale wage and the small scale wage is in turn higher than the agricultural wage:

$$w_m = w_s + \alpha,\ \alpha > 0, \tag{7}$$

$$w_s = w_a + \beta,\ \beta > 0. \tag{8}$$

α and β are endogenously determined in this model. This implies that there will be migration of labour from the agricultural sector to the small scale sector and from the small scale sector to the manufacturing sector. The imported technologies being sector specific are however immobile between the two sectors. Each sector tends to import technology upto the point where the marginal productivity equals the respective real royalty rate Γ_i.

$$a_z\ (k_a, z_a) = \Gamma_a, \tag{9}$$

$$s_z\ (k_s, z_s) = \Gamma_s, \tag{10}$$

$$m_z\ (k_m, z_m) = \Gamma_m. \tag{11}$$

Total unemployment in the economy is represented by U and we have

$$L_a + L_s + L_m + U = \bar{L} \tag{12}$$

and

$$K_a + K_s + K_m = L_a\, k_a + L_s\, k_s + L_m\, k_m = \bar{K}. \tag{13}$$

Unemployment in the economy is assumed to be a function of the wage differentials α and β. α plays the same role as e in the study by Batra and Lahiri (1987). The lower the U is, the higher α is, because the probability of a migrant finding a job is higher and vice versa. In addition, lowering of unemployment might be due to productivity increase in the manufacturing sector leading to a rightward shift in the labor demand schedule. This results in a higher wage (w_m) and a higher wage differen-

tial (α) assuming w_a is fixed. Similarly, we can reason the causality between U and β. Thus, we assume that

$$U = g_1 \ (\alpha, \beta). \tag{14}$$

We will also assumed that the employment in the small scale sector

$$L_s = g_2 (\beta) \tag{15}$$

because as β increases, over time, we expect L_s to increase also following the argument above. The rental for capital services r is modelled as a function of $\int_s$ and $\int_m$ given as

$$r = h (\int_s, \int_m). \tag{16}$$

Real national income of the South is given,

$$\begin{aligned} Y &= A + S + M + X(e, Y) - \int_a z_a \\ &\quad - \int_s z_s - \int_m z_m - T - T_1 \\ &= w_a L_a + w_s L_s + w_m L_m + r \bar{K}_1 \\ &\quad + r_a \bar{K}_2 + X(e, Y) - T - T_1. \end{aligned} \tag{17}$$

$X(e, Y)$ is the exports function viewed as a function of the exchange rate and real national income of the country. T is the total income tax function of the small scale sector. T_1 is the total income tax function of the remaining sectors.

This completes the model specification of the small open Southern economy in a static framework. Time is not being explicitly modelled to retain the simplicity of the analysis. Equations 1 to 16 are sixteen equations which determine the sixteen endogenous variables viz., w_a, w_s, w_m, k_a, k_s, k_m, z_a, z_s, z_m, L_a, L_s, L_m, U, α, β and r. The parameters of interest in the system are r_a, $\int_a$, $\int_m$, T, T_1, $\bar{L}$ and $\bar{K}$.

Fiscal Instruments in the Small Scale Sector and the Real National Income of the South

We will consider the impact of three fiscal policy instruments on the Real National Income of the South. Welfare considerations are captured by the Real National Income of the economy. Real National Income Y of the south can be written as,

$$\begin{aligned} Y &= w_a L_a + w_s L_s + w_m L_m + r \bar{K}_1 \\ &\quad + r_a \bar{K}_2 + X(e, Y) - T - T_1. \end{aligned}$$

Suppose, the government gives a concession on the import of small scale technology. The impact on welfare is obtained as follows:

$$\frac{dY}{d\int_s} = -w_a z_a \frac{dL_s}{dw_s} - L_s z_s - w_s z_s \frac{dL_m}{d\int_s} + \frac{dr}{d\int_s} \bar{K}_1 + \frac{dX}{dY} \frac{dY}{d\int_s},$$

that is, $(1 - m_y) \frac{dY}{d\int_s} = -z_s L_s (1 - \varepsilon_s) - Z_s \frac{Y_m}{Y_s} \varepsilon_{m,s} + h_s \bar{K}_1$

where $m_y = \frac{dX}{dY}$, $\varepsilon_s = -\frac{w_s}{L_s} \frac{dL_s}{dw_s}$,

$$Y_m = w_m L_m, \ Y_s = w_s L_s,$$

$$\varepsilon_{m,s} = \frac{w_s}{L_m} \frac{dL_m}{dw_s} \text{ and } h_s = \frac{dr}{d\int_s}.$$

Thus,

$$\frac{dY}{d\int_s} = -\frac{z_s L_s}{(1 - m_y)} (1 - \varepsilon_s) - \frac{z_s Y_m}{(1 - m_y)} \frac{e_{m,s}}{Y_s} + \frac{h_s}{(1 - m_y)} \bar{K}_1. \tag{18}$$

Here, $\frac{dY}{d\int_s} < 0$ assuming that the positive term is dominated by the negative terms and $0 < \varepsilon_s < 1$ and $\varepsilon_{m,s} > 0$.

The second fiscal instrument is the subsidy given on capital by the government. Let s be the subsidy given on domestic capital so that the real rental on capital is $(r - s)$ and $(r_a - s)$ in the three sectors. Thus,

$$\begin{aligned} Y &= w_a L_a + w_s L_s + w_m L_m + (r - s) \bar{K}_1 \\ &\quad + (r_a - s) \bar{K}_2 + X(e, Y) - T - T_1 \end{aligned}$$

Then,

$$\frac{dY}{ds} = w_a \frac{dL_a}{ds} + L_a \frac{dw_a}{ds} + w_s \frac{dL_s}{ds} + L_s \frac{dw_s}{ds} + L_m \frac{dw_m}{ds} + w_m \frac{dL_m}{ds} + \left(\frac{dr}{ds} - 1\right) \bar{K}_1 + \left(\frac{dr_a}{ds} - 1\right) \bar{K}_2 + \frac{dX}{dY} \frac{dY}{ds}.$$

Thus, $(1 - m_y) \frac{dY}{ds} = -k_a L_a m_s (1 - \varepsilon_a) - k_s L_s m_s (1 - \varepsilon_s) - k_m L_m m_s (1 - \varepsilon_m) + (m_s - 1) \bar{K}_1 - \bar{K}_2$

where $m_s = \frac{dr}{ds}$. This assumes that $\frac{dX}{de} = 0$ and $\frac{dr_a}{ds} = 0$.

Thus, $\frac{dY}{ds} = -\frac{m_s}{(1-m_y)}[k_a L_a (1-\varepsilon_a) + k_s L_s (1-\varepsilon_s)$

$+ k_m L_m (1-\varepsilon_m)] + \frac{(m_s-1)}{(1-m_y)}\bar{K}_1 - \frac{\bar{K}_2}{(1-m_y)}$. (19)

This result assumes that

$\frac{dw_a}{ds} = \frac{dw_a}{dr} - \frac{dr}{ds} = -k_a m_s$ by the result in Bhat (1995a).

Similarly, the other derivatives $\frac{dw_s}{ds}, \frac{dw_m}{ds}$.

From (17), $\frac{dY}{ds} < 0$ assuming that $m_s > 0$, $0 < \varepsilon_a < 1$, $0 < \varepsilon_m < 1$, $0 < \varepsilon_s < 1$ and that $(m_s - 1)\bar{K}_1$ is approximately equal to $\bar{K}_2$. Further, we will assume that m_y is insignificant although the analysis goes through for significant m_y as well.

The third fiscal instrument considered is the Income Tax subsidy where income tax concessions for the small scale sector aggregated over all sections and clauses of the Income Tax Act. Let the income distribution of the small scale sector be divided into income classes so that in the i^{th} income class, there are m small scale units.

Let y_1 be the total income accruing to all the small scale units in the i^{th} income class. Let t_1 be the income tax for small scale units in the income class assuming no tax concessions were to be given to this class. The total tax in the small scale sector is T where

$$T = \sum_{i=1}^{n} t_i y_i .$$

Real national income has already been defined before. Decreases in the tax rate t_1 will constitute a subsidy.

Thus $\frac{dY}{dt_1} = k_a L_a m_t (1-\varepsilon_a) - k_s L_s m_t (1-\varepsilon_s)$

$- k_m L_m m_t (1-\varepsilon_m) - y_i + m_t \bar{K}_1 + m_Y \frac{dY}{dt_1}$.

The derivation is as before and the notation is as earlier. We are assuming that $m_t = \frac{dr}{dt_i} < 0$.

We have $\frac{dY}{dt_1} = \frac{-m_t}{(1-m_Y)}[k_a L_a (1-\varepsilon_a) + k_s L_s (1-\varepsilon_s)$

$+ k_m L_m (1-\varepsilon_a)] + \frac{-y_i}{(1-m_y)} + \frac{m_t \bar{K}_1}{(1-m_Y)}$. (20)

Now $\frac{dY}{dt_1} > 0$ iff $\varepsilon_a, \varepsilon_s, \varepsilon_m$ are all > 1. Under these conditions, the income tax subsidy is not welfare improving.

The results can be summarised in the form of a theorem stated without proof, as follows:

Theorem:

If $0 < \varepsilon_a < 1$, $0 < \varepsilon_s < 1$, $0 < \varepsilon_m < 1$, then

(A) $\frac{dY}{d\hat{l}_s} < 0$, $\frac{dY}{ds} < 0$.

(B) $\frac{dY}{dt_i} > 0$ if m_t is large enough.

(C) $\left|\frac{dY}{ds}\right| > \left|\frac{dY}{d\hat{l}_s}\right|$ iff $Z_s \frac{Y_m}{Y_s} \varepsilon_{m,s}$
$< m_s [K_a (1-\varepsilon_a) + K_m (1-\varepsilon_m)]$
for large h_s and $k_s m_s > z_s$.

The elasticities and the parameters such as m_t in the theorem can be estimated econometrically using data. Then, we can ascertain whether $\frac{dY}{dt_1} > 0$ or < 0 and which impact among $\frac{dY}{ds}, \frac{dY}{d\hat{l}_s}$ is the greatest. The theorem implies that capital subsidy is the most effective amongst the three fiscal instruments under the conditions assumed. The theorem ranks the three fiscal instruments in terms of their effectiveness in improving the welfare of the domestic country. Capital subsidy is found to be the most effective provided all the equilibrium labour demand elasticities are between 0 and 1. The second best subsidy is the concessions on the imported technologies. Income tax subsidies may not always be welfare improving under the same set of assumptions. Policy makers should check the elasticities before advocating a specific subsidy.

Conclusion

Future reasearch could explore the role of the exchange rate via its effect on exports in explaining the impact of a specific subsidy. More general models could be chosen together with more general tax functions to see the effectiveness of these subsidies.

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Industrial Clustering in Developing Countries

Keshabananda Das

The unprecedented dynamism in the industrial clusters of Italy during the seventies turned out to be a major experiment with successful outcomes. The rather striking achievement of the small firms eventually projected the region widely known as the 'Third Italy', as the role model of a successful industrial district. The author examines the conceptual basis of successful industrial clustering in the West. Studying clusters in developing countries like India must be based on pragmatic research and not on the excitement generated by the "industrial district concept;" cautions the author.

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A remarkable resurgence of interest in the role and relevance of small and medium enterprises (SMEs) in the process of economic development has been a distinct phenomenon internationally, late seventies onwards. New policy approaches have been evolved favouring the potential of SMEs in controlling at least two disturbing trends in development-rising unemployment and regional imbalances. Efficient factor utilisation, innovative industrialisation and entrepreneurial advancement are also some of the important objectives the SMEs are expected to accomplish.

Controlling rising unemployment and regional imbalances, efficient factor utilisation, innovative industrialisation and entrepreneurial advancement are the important objectives the SMEs are expected to accomplish.

Especially, with the global economic restructuring underway, SMEs are being contrasted with their large counterparts in terms of the former's greater efficiency, flexibility and dynamism in business organisation. the 'stress' of adjustment, to a large extent, it has been observed, could be relieved by the growth of SMEs. The prolonged debate on firm size and efficiency, notably during the eighties, was marked by a plethora of literature postulating the decline of the large, vertically integrated corporation as the main component in western industrial growth. Unable to compete in a situation of ever fluctuating and unpredictable demands from both consumers and producers, growing international competition and the need for more flexible forms of work and inter-firm collaboration, the big firms would, it was presumed, collapse

under their own weight (IDS Bulletin, 1992). Growing disenchantment with the Fordist assembly line mass production system has come about with the declining employment and output in the large industrial establishments, particularly in the industrialised west, constrained by rigid systems of production organisation and allegedly poor innovative capability (Schmitz, 1990). Despite voluminosity, the scalar debate has essentially been elusive as cases and countercases exist on both sides. Consequently, blanket observations regarding the merits of the small firms could be as untenable as those made of large firms in earlier years.

However, in an attempt to explicate the vicissitudes of fortunes of enterprises in the developed world, during the past two decades of international economic crises, wherein the SMEs could sustain their activities and often attained higher levels of growth, distinct changes in business strategies in the small have been underscored by analysts. Much of the subsequent discussion has primarily converged on these strategies, the environs under which they seem to work and the institutions those buttress them. This different focus of enquiry, by implications, has rendered the concerns — whether the small has a role to play in the development process — redundant.

This welcome transformation in the perception was possible greatly due to the fact that the small could prove to be growing independently as opposed to the conventional appended-to-the-large status. Quite unlike the individualistic power of the Fordist giants, the SMEs, it has been held, derive their strength through a unique state of togetherness — the spatio-sectoral concentration of units or what are called the industrial clusters.

Industrial Clustering: The Concept

Clustering as a concept has no novelty. Instances of existence of industrial clusters in the history of western capitalistic development are too many. The evolution of clustering as a distinct pattern of industrial organisation is at least as old as the Industrial Revolution itself (Parker 1984). Later, Alfred Marshall's therorisation of the 'concentration of specialised industries in particular localities' or the well known industrial districts with special reference to the economies of agglomeration, made industrial clusters a formal subject of academic enquiry (Marshall, 1974). Eventually, the typical regional scientist, following the neo-classical framework, has been undertaking extensive studies in the field, but strictly viewing this as an 'economic' problem. This involved, inter alia, making assumptions known to be unrealistic (Holland, 1976). Conventional studies on industrial agglomeration, mostly empirical in nature, focused on scale economies and linkages in physical production. Evidently, such analyses fell short of explaining the complex nature of the evolving forms of industrial organisation. Unfortunately, the regional scientist considered the revival of interest in clusters in the eighties a phenomenon one was too familiar with.

In total contrast to the aforesaid restrictive 'economistic' vision, refreshing reinterpretations were proffessed by a number of social scientists, with a clear emphasis upon the inter-dsciplinary approach. Besides, the 'sectoral' approach to SMEs has been criticised on the ground of inadequate attention paid to the links with economic agents outside this 'sector' (Schmitz, 1982). The new approach focusses on the small enterprises' position in relation to the suppliers of inputs, distributors of outputs and large competitors.

Interestingly, the unprecedented dynamism in the industrial clusters of Italy, or to be precise, the Emilia-Romagna region in the north-estern and central regions, during the seventies, turned out to be the major imperative that inspired a series of studies on the phenomenon of clustering. The rather striking achievement of the small firms in clusters at least on two counts accelerating exports of such traditional commodities like footwear, garments, tiles, etc. and maintaining high standards of product quality without straining labour income or working conditions — eventually projected the region, also known widely as the 'Third Italy', as a role model of a 'successful' industrial district.

Inspired by such thriving reality, it was Becattini who effectively provided a broad based notion of the industrial district encompassing the inevitable extra-economic factors at work. He defined the industrial district as "a socio-territorial entity which is characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area. In the district, unlike in other environments, such as manufacturing towns, community and firms tend to merge" (Becattini, 1992). Obviously, this conceptualisation was both an extension as well as meaningful restatement of the Marshallian explanation with a broad outlook. This made a clear break from the conventional notions on activities in physical space.

Although wide variations have been noted in many other industrial districts, the Third Italy situation remained

the so called 'textbook', model. The most notable features on this form have been detailed as follows:

> " — clusters of mainly small and medium-sized enterprises spatially concentrated and sectorally specified
>
> — a set of forward and backward linkages, based both on market and non-market exchanges of goods, information and people
>
> — a common cultural and social background linking economic agents and creating behavioural code, sometimes explicit but often implicit
>
> — a network of public and private local institutions supporting the economic agents acting within the cluster" (Rabellotti, 1995).

It has been widely held that industrial clusters provide an active base for both business and social interactions. Economies of agglomeration ensue as a network of suppliers provides materials, equipment, new and second hand machinery, spare parts and other attendant services, including repairs. The development of a comprehensive support system, locally and spontaneously, has been greatly instrumental in providing competitiveness to the SMEs. In fact, this 'collective efficiency', as Schmitz (1990) calls it, remains the key of dynamism in clusters of small firms; for an individual unit, these gains would have been impossible to obtain.

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Flexibility: The Broader Concerns

The current deliberations on the strengths and weaknesses of collectivity of SMEs, especially in the European context, are inextricably linked to the broader debate on flexibility. Prominent in the debate is the concept 'flexible specialisation', introduced by Piore and Sabel (1984) in their engaging discussion on the industrial restructuring strategies in the industrialised nations. In its wide sense, this concept refers to a form of production organisation which is characterised by less rigid and more resilient structures, in clear contrast to the post-War Fordist pattern of industrial production. "Flexible specialisation is a strategy of permanent innovation: accommodation to ceaseless change, rather than an effort to control it. This strategy is based on flexible — multi use — equipment; skilled workers; and the creation, through policies, of an industrial community that restricts the forms of competition to those governing innovation" (Piore and Sable 1984: 17).

Understandably, responding to the discrete and changing demand driven market, flexible specialisation essentially involves " a radical shift in the relationship between technology and labour and, consequently, the manner in which the firm is managed" (Nadvi, 1992: 4). Notwithstanding the scale neutrality of flexibility, it is the small firm variant of flexible specialisation that is most relevant in the industrial district context. In a number of ways, the essential aspects of flexibility is best manifested in the 'ideal type' industrial districts.

Central to the notion of flexible specialisation lies innovativeness or technological dynamism which ensures the firm a niche in the market through timely adaptability. Achieving this flexibility for the small firm in particular, involves organisational changes both within and without. At the firm level, adoption of 'new' technologies, based essentially on microelectronics (e.g. CAD/CAM systems of CNC machine tools), has been seen as major facilitator in effecting positive and fast process transformation. Similarly, skilling the labour towards operating multifarious jobs is also essential for a firm to be flexible. Delimiting the boundaries of space and time of work, hence, promoting labour autonomy, forms part of it. "In the FS environment, maximising labour productivity is not the sole criteria for induction of new technology. Technologies have to be organic to the firm's intrinsic innovatory capabilities, to be of benefit. They have to aid the ability of skilled labour not only to produce more and better products but also augment its inventive capabilities" (Nodvi 1992: 5). Naturally, for the above process to be functional, unhindered flow of information between various 'departments' and a break with the typical hierarchical management structure — the very basis of vertically integrated plants — need to occur. As far as labour is concerned, this may confer numerical flexibility, i.e., 'enhancing the employers' ability to adjust their labour input', and wage flexibility, i.e. linking payment to performance and 'ensuring variable wage differentials between segments of employees' (Lauridsen, 1995: 185).

Innovations at the firm level could be technological and/or organisational. Often the latter precedes the former (James & Bhalla, 1995). the move towards systematic application of JMT (Japanese Management Techniques) in the firms across developing nations has been quite impressive and this has not necessarily taken

Flexible specialisation can be found in the small firms due mainly to their ability to adjust fast to market changes.

place with/after technological sophistication (Kaplinsky, 1995).

As mentioned earlier, the most expressive form of flexible specialisation can be found in the small firms due mainly to their ability to adjust fast to market changes. However, in order to sustain competitiveness, the firm cannot act in isolation. This is precisely where industrial clustering as a form of industrial organisation assumes importance. Small firms base their business on cooperation and mutual trust, realizing the possibility of obtaining economies of scale and scope only as a collective. In fact, the group of small firms performs the role of single large corporation that allows for proper networking between different branches. Development of this mutuality of interests, while helping to retain firm freedom, is said to have fostered innovative activities and demonstrated dynamism of functioning. "However, cooperation does not mean lack of competition, as there are always several firms capable of undertaking any particular task and individual firms are very conscious of this fact. Ease of entry and exit also ensures competition" (Alcorta, 1992: 33).

Undeniable, the nature and outcome of this delicate balance between cooperation and competition would depend upon the overall external environment of the cluster. As derived from the scenario prevailing in the successful industrial districts in the European context, at least three aspects are crucial — inter-firm production networking; community ties; and institutional, especially local, support system.

Inter-firm relationship in production activities, while recognising the expediency of capturing niche markets by individual firms, focuses upon inter-firm division of labour and encourages sharing of information and experiences in business. Such action by the collective, in fact, gives a fillip to product and process innovation on a continuous basis, at the local level. The emphasis on quality becomes obvious, as, together the firms face competition from the large and/or outside firms. Both horizontal and vertical phasing of production and process-specific functions ensure efficient utilisation of available resources; cost control; quality and variety of products; marketability on a competitive basis, both in the domestic as well as global contexts. Apart from effecting rational subcontracting between firms, SMEs are not humbled by the usual capital constraint.

In has been observed that industrial clusters thrive not just on pure business interests; in fact, strong community ties generate the much needed trust and understanding and encourage socio-cultural networking. Although difficult to gauge, the role of the so-called social milieu remains the inner strength of SMEs in a cluster. In develops "a non-confrontational social spirit which carries over to intra- and inter-firm relations thereby assisting local industrial relations and leading to productivity gains" (Nodvi & Schmitz 1994: 31). In a sense, an informal regulatory mechanism operates in the cluster guiding both social and business behaviour. Among notable benefits, such inter-connections among firms and between firms and the community facilitate 'interactive technical cooperation', harmonious industrial relations, and reciprocative assistance in business.

The role of local institutions, both governmental and otherwise, in providing 'real services' in the industrial clusters has been considered the driving force enhancing the life and vitality of the SMEs (Brusco, 1992). In the European context, formal as well as informal bodies of local industries help firms on a number of counts. These include; providing information of latest developments in products and processess; procuring inputs in bulk for a group of units; liaisoning with traders and exporters; organising trade fairs, group advertisement; intervening in legal problems; promoting local industrial training and research centres; and also taking steps to mobilise government resources in fostering the cluster through articulation of regional interests. A notable achievement of such institutional network has been both providing and managing credit at reasonable rates of interest to SMEs through local cooperatives. This has been particularly beneficial to the small and needy firms (Best, 1990). Further, there have been many instances of local governments promoting SMEs in the clusters through creation of physical infrastructure and providing a range of critical services, designed to cater to local area and/or industry

Industrial clusters thrive not just on pure business interests; in fact, strong community ties generate the much needed trust and understanding and encourage socio-cultural networking.

specific requirements. These are over and above the already existing long term macro development activities of the state.

Developing Country Context

Albeit there is no standard 'model' of industrial districts, the features of highly successful clusters in the Third Italy and elsewhere have attracted wide attention and also prompted many to search for those in the developing nations. In fact, wide variations in the characteristics of industrial districts both within and between European countries have been considered a constraint in 'importing' the model to the developing country scenario (Das, 1995). While small firms in advanced economies achieve their flexibility through investment in technology and skills, in developing counties SMEs function differently. Often trapped in low-profit/low-innovation competition, SMEs in developing economies are more likely to achieve flexibility through labour utilisation and of combinining several business activities, which can be frozen or expanded according to market exigencies. Although in the literature concerning the informal sector, passing references have been made to the ability of small firms to survive crises, very little could be useful toward understanding flexibility.

Given the mounting presence of surplus labour in developing countries, competing SMEs often opt for "squeezing labour more than innovation" resulting in technological stagnation and poor remuneration for labour (Schmitz, 1990). The survival and growth of SMEs, particularly in the informal sector, would be effected by obviating laws concerning labour and finance as also standards for technology use. The policy environment and the state's attitude towards SMEs also to a great extent influence the competitive capabilities of small firms. A mere incentive scheme has not been often helpful in making the units perform productively. This is a typical 'low road' syndrome as opposed to the 'high road' one generally referred to in the developed country context (Holmstrom, 1994).

The policy environment and the state's attitude toward SMEs influence the competitive capabilities of small firms.

Fortunately for the concerned researchers, critical reviews of the experiences of the industrial clusters in developing countries, as painstakingly gleaned through sporadic and very diverse study materials, have been presented in Nadvi (1994) and Nadvi and Schmitz(1994). Their careful work, inter alia, points to the spectrum of possibilities in different socio-economic and cultural environs. To quote them; "Their (developing nations) reality often cuts across this distinction (high road vs low road) in two ways: some clusters share aspects of both growth paths, notably innovation and cheap labour, often within the same firms; or they include some firms which have embarked on eh innovation/quality path and others which rely entirely on using the cheapest workers and materials. We found no example in the reviewed material of a cluster living up entirely to the 'high road' idea, but some fall squarely in the 'low road' category. Most seem to show some aspects of both. Thus, at best one can conceive of a continuum of growth paths between the high and the low road" (Nadvi & Schmitz, 1994: 44)

Concluding Remarks

By way of concluding, it needs to be underscored that studying clusters in developing counties like India must be based on pragmatic research and not on 'the "excitement" generated by the industrial district concept' (Nadvi, 1994: 199). It is one thing to say that clustering of SMEs in the developing nations holds tremendous possibilities for the future, but quite another to claim that the European experience is squarely replicable. Sans examination and in the hurry to 'establish' similarities, it will be mere innocent enthusiasm to hold that the industrial clusters, for instance, in Gujarat, are akin to those in the Third Italy. Any enquiry into the dynamics of SMEs in developing nations, where one has to learn from experiences of diverse situations, must be based on field observations and analyses. However tempting, caution needs to be exercised while generalising.

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MY GREAT GRANDMOTHER

Are Our SSI Units Receiving Adequate Institutional Credit?

S.R. Shinde & K.V. Patel

SSI units occupy an important place in our economy. Inspite of various guidelines issued by the RBI from time to time, these units face a number of problems in getting institutional credit. A study was recently undertaken by the National Institute of Bank Management, sponsored by SIDBI, to identify the credit related problems faced by the SSI units. The present paper reveals the important findings of the study and offers a number of useful suggestions.

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Small Scale Industrial (SSI) units are small in size but not in importance. The SSI sector comprises different types of units such as village industries, tiny sector units, export oriented units, ancillaries and others. They assume importance in the Indian economy due to many reasons, the prominent among which are: high employment potential; capital lightness: short gestation period; use of traditional skills; link between large industry and small entrepreneur; wider dispersal promoting balanced regional development; low cost per unit of employment; utilisation of local resources; suitability for production of consumer goods; mobilisation of small savings: provision of part-time working arrangements; and production of exportable commodities.

Small Scale Industrial units assure importance due to high employment potential, capital lightness, short gestation period, low cost per unit of employment, utilisationof local resources, mobilisation of small savings, and production of exportable commodities.

Credit Policy

The problems encountered by them, hence, deserve special consideration. In the recent past, the Nayak Committee, appointed by the Reserve Bank of India to examine the adequacy of industrial credit to the SSI sector and related aspects, noted the striking unanimity that exists between representatives of SSI units and banks that the guidelines issued by the RBI in respect of finance to the SSI units are wholesome (RBI, RPCD, 1992, p. 29). The Committee has observed: the SSI units would like nothing more than faithful adherence by the

banks to the guidelines. But there was a widespread belief among the industry that the banks do not always follow them and that was at the root of the travails of the SSI. The SSI associations alleged that the practice exists, in particular, of sanctioning inadequate working capital and/or releasing such working capital to the SSI units in driblets. The RBI has been, from time to time, issuing guidelines to the banks so as to ensure adequate flow of credit to the SSI units. Contrary to the recommendations of the Narasimham Committee (appointed by the Government of India) to reduce the directed credit from the present level of 40 percent of the lending portfolio of the banks to 10 percent, the RBI reiterated its commitment to continue the directed credit at the present level (GOI, 1991, p. 44). Finance to SSI units forms a significant portion of the directed credit. In case of urban cooperative banks, the credit limit is as high as 60 percent.

In a move to ensure increased flow of credit to the priority sector, foreign banks were advised to raise the minimum limits for lending to the priority sector from 15 percent to 32 percent of their net credit by March 1994. The priority sector for this purpose was expanded to include export finance by foreign banks. Within the overall limit of 32 percent, credit for exports and advances to SSI sector were fixed at 10 percent each. The shortfall in the amount, if any, in the achievement of these targets would have to be deposited with Small Industries Development Bank of India (SIDBI) at an interest rate of 10 percent per annum.

In the light of the revision in the definition of a SSI unit brought about by the Government of India in April 1991, the RBI clarified that advances granted to SSI units whose investments in plant and machinery did no exceed Rs. 60 lakhs (Rs. 75 lakhs in the case of ancillary units and export oriented units) might be classified under the priority sector. Further, with a view to avoiding the possibility of most of the bank credit to SSI segment being availed of by comparatively bigger units, the RBI stipulated a sub-target in respect of advances to smaller borrowers in the SSI segment. Accordingly, atleast 40 percent of the advances under the SSI segment within the priority sector should be granted to cottage industries, khadi and village industries, artisans and tiny industries (with investment in plant and machinery upto Rs. 5 lakhs) or other SSI units availing credit limits upto Rs. 5 lakhs.

In the credit policy announced by the RBI in April 1993, a special package of measures for financing of SSI units was included. The package was primarily based on the recommendations of Nayak Committee. This package consisted of measures for stepping up the flow of credit to the SSI sector by banks through an exercise of annual credit budget on bottom-up basis in consultation with borrowing SSI units; application of a simplified norm of 20 percent of annual turnover as minimum working capital finance by banks in respect of SSI units having fund-based requirements upto Rs. 50 lakhs; introduction of an institutional framework for redressal of grievances of SSI units at the level of individual banks and at RBI; assistance to marketing companies engaged in the marketing of SSI products by fully providing need-based working capital finance on the basis of 'First Method of Lending'; application of a revised definition of sick SSI unit to facilitate early rehabilitation of potentialially viable sick units in the SSI sector; Banks were also advised to give preference to village industries, tiny industries and other SSI Units in that order while meeting credit requirements of the small scale sector.

Inspite of the measures mentioned, SSI promoters and their association have been frequently complaining about non-availability, inadequacy and delays in getting institutional finance, besides the unhelpful attitude of the bankers. The process of liberalisation has ushered in new challenges for the SSI units. Their existence seems to be threatened in the light of the freedom of growth granted to the large and medium scale industrial units and entry of multinationals. On the positive side, the export market has been opened up to them provided they improve the quality of their products and reduce the cost of manufacturing by undertaking modernisation of their facilities. Ancillaries will have tremendous scope, supplying quality inputs to the large domestic and multinational concerns.

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About the Study

In view of these developments, a study was undertaken by the National Institute of Bank Management, which was sponsored by SIDBI. The objective was to identify the credit related problems faced by SSI units. A sample of 503 SSI units was drawn from 20 districts spread over 10 states. Districtwise coverage of the samples is in table 1. Within each state, two districts — one well developed and the other relatively underdeveloped — were chosen. Systematic sampling technique was used for selection of samples from each district. An elaborate questionnaire, covering various aspects such as background, operational details, credit facilities

availed and problems faced in availing the credit facilities, etc. was administered for the purpose. The field work was entrusted to four state level technical cosultancy/ entrepreneurship development institutes. An additional sample of 59 unsuccessful entrepreneurs was selected. These entrepreneurs could not get financial assistance from banks/financial institutions (FIs) and therefore could not set-up their projects. Data entry and analysis was done with the help of computers. Findings of the study were shared with senior bankers dealing with SSI finance, at two meetings held at Ahmedabad and Madras and their reactions and suggestions were sought.

Table 1: Districtwise Coverage of the Samples

District	No. of Units Covered	Percentage
Hyderabad	25	5.0
Nellore	25	5.0
Gaya	25	5.0
Patna	25	5.0
Ahmedabad	25	5.0
Bhavnagar	25	5.0
Ernakulam	25	5.0
Trichur	25	5.0
Durg	27	5.4
West Nimar	25	5.0
Dhulia	25	5.0
Nagpur	26	5.2
Cuttack	25	5.0
Mayurbhanj	25	5.0
Tanjavur	25	5.0
Salem	25	5.0
Kanpur	25	5.0
Muradabad	25	5.0
Birbhum	25	5.0
Howrah	25	5.0
Total	503	100.0

Profiles of the SSI Units

The status/designation of the respondents revealed that most of them were proprietors, partners or senior managers in their respective SSI units. The views expressed by them could thus, be taken as authentically representing the realities experienced by the sample units. While 73 percent of the total sample units were registered with DIC, one percent were not. The remaining 26 percent did not indicate the status regarding registration with DIC. While 25 percent of them belonged to the tiny sector, 3 percent were EOUs, 2 percent village industries, 1 percent ancillary units, while the remaining 69 percent belonged to the general category of SSI units (investment in plant and machinery ranging between Rs. 5 lakh and Rs. 60 lakhs). Fifty five percent of the sample units were located in backward areas. According to population group centres, the urban centres accounted for the largest number of units followed by rural, semi-urban and metropolitan centres in that order. Although urban and metropolitan centres accounted for 60 percent of the units, it was important to note that as many as 21 percent of the sample units were located at rural centres. the age profile of the sample units indicated that 2 out of every 3 had completed not more than 8 years of their existence.

Delay in commencement of commercial production, after completion of the project has a direct bearing on its long term viability. It is more so in respect of the SSI units. The sample data revealed that about 84 percent of the units could commence commercial production immediately on completion of the project, while the remaining 16 percent took some time in doing so. Effort was made to find out the extent of delays in the cases where commercial production could not start immediately on completion of the project. The data revealed that about 27 percent of the time-overrun cases had delay upto 3 months, another 24 percent had delay between 3 to 6 months. Remaining 49 percent had delays exceeding 6 months, out of which about 20 percent had delay exceeding 12 months. As regards the reasons for delay in the commencement of commercial production, it was found that non-availability of working capital, delay in disbursement of term loans, delay in obtaining power connection, non-availability of skilled labour, defective machinery, etc were the major factors. It may, thus be observed that some of the principal reasons for delay were related to the dealings between the promoters and the credit institutions. It was further examined whether there was any correlation between the location of the project according to the population group centre and delay in commencement of commercial production. It was hypothesized that incidence of delays would be more in the case of projects located in semi-urban and rural areas. While 21 percent of the projects in metropolitan areas had some delays, the percentage came down to 16 in respect of urban areas and further down to 9 in respect of semi urban areas. In rural areas, however, the percentage went up to 19. Decline in percentage cases suffering from delays in respect of urban an semi urban projects might be due to the relatively smaller size of the projects and less delays in getting various clearances, etc. In respect of rural projects, the percentage was higher possibly due to delays in obtaining essential inputs such as power connection, raw materials, bank finance, etc.

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During the course of the survey, it was found that all but 15 of the sample units were operational. Some of the operational units were under rehabilitation plans worked out by the banks/financial institutions. As far as the non-operational units were concerned, shortage of working capital funds or long term funds was one of the main reasons for closure. Besides, marketing and technical problems were also responsible for closure of some of the units.

As regards constitution of the sample units, about 85 percent of them were either proprietorship or partnership concerns. Another 13 percent were private limited companies. The remaining 2 percent were equally divided into public limited companies and other categories such as cooperatives etc. The data showed that because of the smaller size 'limited liability company' was not a very popular form of business organisation among the SSI units. Extremely few of them i.e. 1 percent had approached the public for raising equity capital. The distribution of the promoters according to their socio-technical background is given in table 2. It was gratifying to note that a large number of technically and professionally qualified persons were attracted towards setting up SSI units. However, social categories such as women and SCs/STs had a long way to go before they could have a noticeable presense in the industrial scenario of the economy.

Table 2: Socio-technical background of Promoters

Socio-Technical Background	No. of Promoters	Percentage
Woman entrepreneur	39	7.2
Scheduled Caste Scheduled Tribe	11	2.0
Ex-serviceman	3	0.6
Technocrat	132	24.4
Professional	90	16.7
Others	265	49.1
Total	540	100.0

Considering the ever increasing complexities of business, a certain minimum educational level on the part of the promoter has become necessary. Based on the information compiled in this regard, it was interesting to note that almost half the number i.e. 48 percent of the promoters had acquired either graduate or post graduate levels of education. Another 15 percent were technically qualified (either degree or diploma) and 6 percent had professional qualifications such as CA, ICWA, MBA etc. The data thus showed that the promoters, in general, were well qualified. It should however be noted that about 10 percent of the promoters were non-matriculates or illiterates.

It was examined whether the promoters had preference for particular categories of industry such as tiny, village industries, ancillaries, EOUs, etc. It was observed that women entrepreneurs had some preference for tiny units. ST/CT promoters also had preference towards tiny units, possibly due to various government sponsored schemes for such entrepreneurs. While ex-servicemen had some preference for EOUs, technocrats preferred ancillary units.

As to the profiles of the sample units, a little less than half i.e. 47 per cent of the sample units had project cost not exceeding 25 lakhs each. While another 15 per cent had project cost exceeding Rs. 25 lakhs each, the balance 38 per cent of the units had their project cost ranging from Rs. 5 lakhs to Rs 25 lakhs each. The data on this aspect showed that most of the sample units, were less capital intensive in nature. The distribution of sample units according to the debt to equity ratio based on the means of finance for the project, is given in table 3. It can be seen that the sample units were moderately geared. Only 7 per cent of the units had debt to equity ratio exceeding three. Seventy eight per cent of them had debt to equity ratio less than or equal to two. Whether it was a planned strategy by the promoters to keep the projects moderately geared or it was due to non-availability of funds from financial institutions/banks is a moot question.

As far as the employment aspect was concerned, 78 per cent of the units did not employ more than 20 persons each. On an average, one out of every four units was so small that its total staff did not exceed 5. As many as 55 per cent of the units had only one person in the supervisory cadre. Another 18 per cent had only two persons in that category. As far as salary/wage bill was concerned, it was less than or equal to Rs. 1 lakh per annum in respect of 55 per cent of the cases. The data revealed that about 37 per cent of the units had salary/wage cost

of less than 5 per cent of the value of production, while 61 per cent of them had the said cost at less than 10 per cent of the value of production.

Table 3: Debt-Equity Ratio

Debt-Equity Ratio	No. of Projects	Percentage	Cumulative Percentages
Less than or equal to 1	147	43.8	43.8
1 to 1.5	67	19.9	63.7
1.5 to 2.0	47	14.0	77.7
2.0 to 3.0	52	15.5	93.2
3.0 to 4.0	12	3.6	96.7
More than 4.0	11	3.3	100.0
No Response	167		
Total	503	100.0	

On an average, two out of every three units were engaged in manufacturing. Another 10 per cent had undertaken processing activities and 15 per cent were engaged in job work. Relatively a large number of firms were engaged in food products, metal products and rubber and plastic products. As far as capacity utilisation was concerned, the picture was fairly good. The average capacity utilisation of the sample units came to 60 per cent. Percentage distribution of sample units according to capacity utilisation and their location at population group-wise centres showed that the units in urban and semi urban areas had higher capacity utilisation, as compared to those in metropolitan areas. This might be due to smaller size of the plants in the former areas. In the case of rural areas, the capacity utilisation seemed to be on the lower side, possibly due to inadequate availability of essential inputs such as power, raw materials, etc.

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An effort was made to ascertain the reasons for varying level of capacity utilisation. The focus was laid on understanding the constraints on higher level of capacity utilisation, as perceived by the management. Distribution of sample units according to the ranking of the constraints in achieving higher capacity utilisation is in table 4. Paucity of funds is the major factor, followed by marketing problem. The problem of marketing seemed to be more acute in respect of units located in rural areas. As far as the business profile was concerned, one third of the units had net sales of less than or equal to Rs 5 lakhs. Another one third had net sales ranging from Rs 5 lakhs to Rs 25 lakhs and the remaining one third had net sales exceeding Rs 25 lakhs. Analysis of the sample units according to their profit margin on sales showed that their profitability was quite low. While 7 per cent reported losses, another 50 per cent had a profit margin of less than or equal to 10 per cent. To some extent, this might also be due to the normal tendency of the promoters to underquote the profit figure.

Credit Related Issues

The main focus of the study was to identify the credit related problems faced by the SSI units. In one of the questions the major problems generally faced by SSI units were listed out. They included : Paucity of funds, Shortage of utilities such as power, fuel, water, etc.: Non-availability of raw materials; Labour problems; Technological difficulties; Marketing; Management; Quality of finished goods; Any other problems;

The respondents were asked to indicate the frequency of occurrence of each of the problem, as faced by their units, by categorising it into 'Very frequently', 'Quite frequently', 'Frequently', 'Less frequently' and 'Not at all'. Based on the frequency analysis (table 5) paucity of funds was a major problem faced by them, followed by shortage of utilities such as power, fuel, water, etc. and marketing. Non-availability of raw materials, labour problems and technological difficulties came next. It was examined whether there was any significant relationship between the size of the projects and the extent of paucity

Table 4: Constraints in Achieving Higher Capacity Utilization

Type of Constraint	Rank					
	First	Second	Third	Fourth	Fifth	Not Indicated
Paucity of Funds	268	78	35	15	4	103
Technical Problems	30	39	80	70	17	267
Marketing Problems	91	159	59	26	8	160
Non-availability of Raw Materials	30	76	79	74	9	235
Other Problems	36	46	37	15	23	346

of funds faced by them (table 6). In short, the following hypothesis was tested. "Banks and financial institutions were more favourably inclined towards larger projects than the smaller ones". The problem seemed to be quite acute in respect of very small projects, costing less than or equal to Rs. 1 lakh. About 68 per cent of these projects rated paucity of funds as occurring 'very frequently' or 'quite frequently'. A similar analysis comparing the size of the projects with the extent of marketing problems showed that the smaller units faced these problems more frequently.

Term Loan Availability

Questions were asked in order to ascertain the sample units' experience while availing of term loan assistance from banks and financial institutions. In all, 201 out of the 503 sample units, i.e. 40 per cent, had applied for term loan after April 1990. A comparison between the size of the project and the type of financing institution showed that smaller projects preferred banks, while larger projects preferred to approach FIs. For instance, 81 per cent of the projects costing less than or equal to Rs. 1 lakh approached banks, while 73 per cent of the projects costing between Rs. 25 lakhs to Rs. 50 lakhs approached FIs for term loans. The above mentioned preference was further confirmed when we compared the amount of term loan applied for and the type of financing institution apporached (table 7). Banks were preferred in respect of smaller loans i.e. not exceeding Rs. 5 lakhs, while FIs were preferred in respect of larger loans, exceeding Rs. 5 lakhs. It showed a market segmentation between banks and FIs as far as term lending to SSI units was concerned. Analysis of the time taken for sanction of term loans is given in table 8. In 50 per cent of the cases, the time taken was less than or equal to three months. A disturbing feature was that in a sizeable number of cases (27 per cent) time taken was more than 6 months. In the remaining 23 per cent of the cases, the time taken ranged between 3 to 6 months. The position did not reflect a very happy situation, especially in view of the fact that a large number of applications i.e. 75 per cent were for loans not exceeding Rs. 10 lakhs.

Table 5: Percentage of Sample Units According to Extent of Problems Faced

Problem	Very Frequently	Quite Frequently	Frequently	Less Frequently	Not at all	Total
Paucity of Funds	37.6	18.8	20.6	14.1	9.0	100.0
Shortage of Utilities	21.3	14.7	17.8	25.2	21.1	100.0
Non-availability of Raw Materials	6.5	7.6	16.2	26.2	43.5	100.0
Labour Problems	4.7	4.2	15.6	22.7	52.9	100.0
Technical Difficulties	2.3	3.4	9.6	20.9	63.8	100.0
Marketing	12.3	14.1	15.6	18.0	40.0	100.0
Management	0.4	2.0	2.2	8.9	86.5	100.0
Quality of Finished Goods	1.6	1.4	3.9	15.5	77.7	100.0

Table 6: Percentage of Sample Units According to Size of Project and Extent of Paucity of Funds

Project Cost (Rs. in lakhs)	Paucity of Funds					
	Very Frequently	Quite Frequently	Frequently	Less Frequently	Not at all	Weighted Average
Less than or equal to 1	50.0	17.9	14.3	16 7	1.2	2.99
1 to 5	33.8	15.8	23.7	15.1	11.5	2.45
5 to 10	38.8	18.8	18.8	15.3	8.2	2.65
10 to 25	35.7	19.4	24.5	10.2	10.2	2.60
25 to 50	32.6	30.2	23.3	9.3	4.7	2.77
50 to 100	26.1	13.0	21.7	21.7	17.4	2.09
100 to 500	57.1	0.0	14.3	0.0	28.6	2.57

* Weights assigned :

Very frequently	4
Quite frequently	3
Frequently	2
Less frequently	1
Not at all	0

Table 7: Distribution of Term Loan Applications

Type of Financing Institution	Amount (Rs. in Lakhs)			
	Upto 5	5 to 25	More than 25	Total
Bank	72 (62.6)	17 (25.8)	4 (28.6)	93 (47.7)
Financial Institution	43 (37.4)	49 (74.2)	10 (71.4)	102 (52.3)
Total	115 (100.0)	66 (100.0)	14 (100.0)	195 (100.0)

Figures in brackets indicate percentages

Table 8: Distribution of sanctioned cases of Term Loans

Time Taken (No. of months)	For Sanction		For First Disbursement	
	No. of Applications	Percentage	No. of Applications	Percentage
Less than or equal to 3	87	49.7	126	74.6
3 to 6	40	22.9	27	16.0
6 to 12	33	18.9	13	7.7
More than 12	15	8.6	3	1.8
Not indicated	1	—	7	—
	176	100.0	176	100.0

In a large number of cases, to be more precise in 49 per cent cases, the amount of term loans sanctioned was less than the amount applied for. This partially explained the problem of paucity of funds faced by the SSI units. Delays in sanction of term loans were relatively more in respect of projects located in backward areas. Time taken in respect of disbursement of term loans also did not reflect a satisfactory picture. Distribution of the sanctioned cases of term loans according to time taken for first disbursement is in table 8. In 25 per cent of the cases, the time taken for the first disbursement was more than three month. Comparison between banks and FIs regarding the time taken for sanction and disbursement showed that, by and large, the latter took longer time for both. The FIs need to take immediate corrective steps so as to retain their market share in a competitive environment. Some of the common reasons for delay in sanctioning and disbursement of term loans were — lengthy procedural formalities, insistence upon certificates from local authorities such as village officers, electricity board, etc. some of the main reasons for sanctioned amount being less than the one applied for were: banker's insistence on higher amount of promoters' contribution, inadequate collateral security, etc.

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Security of Term Loans

In order to ascertain the relative importance given to the 'security aspect' by the bankers, questions were asked about the security offered for the term loan. The analysis of the sample units according to the percentage value of the primary security of the amount of term loan sanctioned is presented in table 9. In majority i.e. 75 per cent of the cases the value of primary security was more than the amount of the term loan sanctioned. In 35 per cent of the cases, the value of primary security was more than 150 per cent of the sanctioned amount. The median range was 125 per cent to 150 per cent. Out of the 176 units which were sanctioned term loan after April 1990, 51 per cent indicated that they had also offered collateral security, besides the primary security mentioned. Items such as land, building, residential property, etc were mostly offered as collateral. The position indicated that banks and FIs had obtained sufficient security while sanctioning the term loans. As far as repayment was concerned, if the feedback from the borrowers was to be believed, most of them were quite regular in payment of interest and instalments of term loans.

Table 9: Distribution of Sanctioned Cases of Term Loan According to Percentage of Value of Primary Security to Amount of Term Loan

Percentage of Value of Primary Security to Amount of TL	No. of Cases	Percentage	Cumulative Percentage
Less than or equal to 100	29	25.0	25.0
100 to 125	16	13.8	38.8
125 to 150	30	25.9	64.7
150 to 175	14	12.1	76.7
175 to 200	15	12.9	89.7
More than 200	12	10.3	100.0
Not Indicated	60		
Total	176	100.0	

Working Capital Facilities

In all, 404 out of the 503 i.e. 80 per cent of the sample units availed of cash credit facilities. As regards the type of financing institutions approached, a large majority i.e. 83 per cent of the borrowers approached public sector banks, 8 per cent approached private sector banks, 7 per

cent approached cooperative banks, while the remaining 2 per cent approached the state level FIs under the single window or composite loan schemes. Majority of the applications were for small amounts, for example 70 per cent were for amounts less than or equal to 5 lakhs. In majority i.e. 61 per cent of the cases, the sanctioned cash credit limit was less than that applied for. This is one more possible reason for paucity of funds faced by the SSI units. The reasons given for sanctioning lesser amounts were : inadequate collateral security, funds constraint in the banks, lack of confidence in the borrower and conservative approach of the bankers especially in respect of new units. Frequency analysis of the time taken for sanction/enhancement of working capital facilities is presented in table 10. In a large number of the cases, i.e. 71 per cent the time taken was more than one month. In 11 per cent of the cases, the time taken was more than three months. It certainly did not reflect a satisfactory position. Some of the common reasons for delays in sanctioning of working capital facilities were : procedural complexities, internal delays on the part of the banks, lack of interest on the part of the bankers in village industries and non-cooperative attitude of the bankers. The security aspect of the working capital finance revealed that in many cases, the banks stipulated high margins in respect of stocks and receivables. Such high margins might have come in the way of SSI units availing of working capital finance in the absence of adequate drawing power. Some of the common problems faced in availing fresh working capital limits or renewal of existing working capital limits were: bank's insistence on collateral security, procedural complexities and delays, stipulation of high margins, inadequacy of limits sanctioned, delays involved in producing required documents, bank asking for various papers and documents on different occasions thus causing avoidable delays, etc. Data regarding the nature of irregularities in the working capital accounts revealed that overdrawal in the account was the most common irregularity, followed by non-submission/delayed submission of stock statements and dishonouring of cheques/bills. About one third of the sample units resorted to borrowings from friends and relatives. Some of the common reasons for outside borrowings were to meet the working capital requirements and meeting capital expenditure.

Table 10: Time Taken for Sanction/Enhancement of Cash Credit Limit

Time Taken (No. of Months)	No. of Units	Percentage	Cumulative Percentage
Less than or equal to 1	59	29.1	29.1
1 to 2	89	43.8	72.9
2 to 3	32	15.8	88.7
3 to 6	3	1.5	90.1
6 to 9	12	5.9	96.1
9 to 12	8	3.9	100.0
Not Indicated	201		
Total	404	100.0	

A substantial percentage, of the borrowers rated the bankers attitude towards them as 'not so helpful' or 'unhelpful'.

Bankers' attitude

It was disturbing to note that a substantial percentage i.e. 33 per cent of the borrowers rated the bankers' attitude towards them as 'not so helpful' or 'unhelpful'. The matter should be of concern to the banks Fourty two per cent of the respondents rated the banker's response to their request for increase in working capital facilities as 'few times positive' or 'negative'. This further confirmed the 'not so helpful' attitude of the banker. Fifty seven per cent of the respondents said that the borrowing arrangement with the existing banker for working capital facilities was not satisfactory. The extent of dissatisfaction was more in respect of larger units. When asked about alternative arrangements, a large number of them indicated that they would like to approach a financing agency other than the banks, such as private financers. This response reveals the disillusionment of many of the borrowers with the banking system, which predominantly consists of the public sector banks. As regards the renewal of working capital facilities, only in respect of 20 percent of the cases, the renewal involved enhancement in the existing facilities. It, prima-facie, showed the conservative approach on the part of the bankers. As far as interest cost was concerned, in a substantial number of cases, (46 percent), it was more than 5 percent of the total cost of production. It was not surprising that many of the respondents had complained about the high burden of interest cost. A comparison between the project cost and the impact of increase in interest cost on profitability showed that the larger projects were more adversely affected.

Many respondents complained about the high burden of interest cost.

Bills Receivable

Information regarding the bills receivable by the sample units confirmed that they found it difficult to realise them on due dates, possible because of their weak bargaining power vis-a-vis the larger buyers. Fifty two percent of the respondents said that their bills were not realised on due dates. The data further indicated that just as the sample SSI units did not realise their bills in time, they in turn, were not in a position to pay their suppliers in time.

By and large, the sample SSI units provided longer period of credit to their buyers, as compared to the period of credit they were allowed by their suppliers. It was evident from the following data:

	Sundry Debtors	Sundry Creditiors
Less than or equal to 2 months sales/purchases	78	87
More than 3 months' sales/purchases	10	6

(Figures indicate percentage of sample SSI units)

The situation further explained the paucity of funds faced by the SSI units.

Common Credit Related Problems

As regards the common credit related problems faced by the SSI units. 'inadequacy of credit limits sanctioned' was reported to be the most important one, followed by increase in interest rate, bank's insistence on adequate security including collateral and delay in sanction/disbursement of credit facilities in that order. Some of the important suggestions regarding support expected from banks and FIs were as follows:

- Rate of interest on loans may be reduced
- Collateral security should not be insisted upon
- Strict time frame may be followed for sanction and disbursement of loans
- Procedural formalities may be reduced
- Technically qualified staff may be associated in project appraisal
- Applications for fresh facilities or enhancement of the existing facilities, from SSI units with good track record may be dealt with expeditiously under a separate fast track system
- In case of consortium/syndicate loans a single agency may sanction and disburse the loan amount
- Banks/FIs should have regular meetings with the SSI entrepreneurs in order to understand their problems and provide them counselling and guidance.

Applications for fresh facilities or enhancement of the existing facilities, from SSI units with good track record may be dealt with expeditiously under a separate fast track system.

As regards the role of SIDBI, it was suggested that it should give more publicity to its various schemes including the Single Window Scheme. It should open district level branches in all the states. As regards the government, it was suggested that DICs should closely monitor and help tiny units. They should be strengthened by employing professionals. The Government might protect the market for SSI units.

Ancillary Units & EOUs

In majority of the ancillary units, more than 50 percent of their output was lifted by the mother unit. The arrangement with the mother unit seemed to be satisfactory in most of the cases. As regards the EOUs, a majority of them export their goods directly without depending export houses/agents.

Study of Cases that Failed to Receive Bank Finance

As part of the study, a sub-sample of rejected cases was also considered. The rejected cases were those SSI units which approached a bank or a FI for term loan or working capital, but were not granted finance i.e. their applications were either rejected or kept pending for a considerably long time and as a result, the unit could not be set up. The reason for the 'rejected cases' sub-sample was essentially to cover those units which were not financed by the banks/FIs and therefore could not be a part of the main sample. The promoters of these rejected units belonged to a variety of categories as shown in table 11. The technocrats formed the largest group, i.e. 38 per cent, while professionals formed the second largest group, i.e. 16 per cent. A large number of technically or professionally qualified persons, both in the main sample and the sample of rejected cases, showed that these categories of promoters are coming forward in a big way to set up SSI projects. The educational profile of the

promoters of rejected cases indicated that 62 per cent of them were under-graduates. On the other hand, in the main sample of promoters who succeeded in getting finance from banks/FIs, 69 per cent were graduates/post-graduates, professionally qualified, etc. It could be thus inferred that promoters who had completed their graduation had a better chance of getting their loans sanctioned from banks and FIs. The data showed that location in terms of backwardness of the area was not a reason for non-sanction of bank finance. A majority of the units from the sample were proposed to be located in urban or semi-urban areas. The type of products proposed by them belonged to a wide variety including services, textiles, wood and wood products, electrical machinery, etc. Most of the rejected units were in low project cost category. Based on the proposed means of finance for the project, it was observed that in 59 per cent of the cases, the proposed debt to equity ratio was less than or equal to two, 18 per cent of them having the ratio ranging between two and three and the remaining 23 per cent with ratio exceeding three. It indicated that although high debt to equity ratio, implying inability of the promoters to bring in higher amount of contribution, might be one of the reasons for rejection of some of the cases, it did not appear to be the factor in many others. The analysis of the time taken to convey the decision in case of rejection showed that in 55 per cent of the cases, the time taken was more than three months, out of which in 13 per cent it exceeded 6 months. The position should be viewed as far from satisfactory. The reasons for rejection, as reported by the respondents, were: bank insisting on more collateral security, negative attitude of the banker, and the promoters' inability to raise the required amount of margin money. Some of the important suggestions from the respondents were: overemphasis on collateral security might be reduced, suitable timeframe should be followed for the processing of loan applications and decision of banks should be communicated to the promoters within two to three months.

Some of the important suggestions from the respondents were : overemphasis on collateral security might be reduced, suitable time frame should be followed for the processing of loan applications and decision of banks should be communicated to the promoters within two to three months.

Table 11: Socio-technical Background of Unsuccessful Promoters

Socio-technical Background	No. of Promoters	Percentage
Woman entrepreneur	5	7.9
Scheduled Caste/ Scheduled Tribe	1	1.6
Ex-serviceman	4	6.3
Technocrat	24	38.1
Professional	10	15.9
Others	19	30.2
Total	63	100.0

Bankers' Perception

The discussions so far, dealing with the credit related problems faced by SSI units are based on the response of the borrowers. Any study of this nature is incomplete and one sided, without including the response from the other side i.e. the executives from commercial banks and FIs. With this view in mind, two meetings were organised with senior executives dealing with SSI financing from banks and FIs. It was found that they largely agreed with the empirical findings of the study, such as delays in sanction and disbursement of loans, inadequacy of limits sanctioned, etc. They presented their side of the story for some of the unsatisfactory features highlighted in the study. As regards the paucity of funds faced by SSI units, it was agreed that banks and FIs had become more careful while sanctioning new loans and enhancing existing facilities, because of the stricter accounting norms recently introduced. It was felt that the banks might have a tendency to avoid financing smaller SSI units due to their high mortality rate and low overall recovery performance. Cost of servicing SSI units, especially those with project cost of less than Rs. 1 lakh was prohibitive. Non-availability of financial data in the format required by the banks was one more reason why the banders could not consider the applications for fresh loans or enhancement in existing loan facilities. It was felt that the formats in which the SSI units were required to furnish the financial data needed to be simplified further. Delays in release of Government subsidy was another factor causing paucity of funds. The problem of delayed payment by larger units, which were the buyers of the products manufactured by many of the SSI units, had persisted inspite of the various measures taken by the government and the RBI. Of late, the banks are flushed with funds. They would like to lend to good borrowers. Relatively larger SSI units with satisfactory past performance or new units set-up by promoters having good track record might not face paucity of funds in future, since banks and FIs are keen to finance them.

As far as delays in sanction of term loans were concerned, bankers were of the view that the situation had improved of late, mainly due to increased competition. As regards delays in disbursement of term loans, it was mainly because of the inability of the borrowers to fulfil the predisbursement conditions. Many times, there was delay on the part of the promoters to bring in the stipulated amount of contribution. Some of the banks had started maintaining time charts or registers to record the time taken for sanction and disbursement of loans, at various stages of processing. Some of the FIs and banks had introduced maximum time limits for processing of loan applications. Maintenance of time chart or register itself might create awareness and alertness amongst the concerned staff. One of the state level FIs had introduced 'gold card' scheme for existing entrepreneurs with good track record, which ensured speedy processing of their loan applications. Regarding the inadequacy of the term loan amounts the bankers felt that there was a tendency on the part of the promoters to inflate the project cost, so as to get higher amount of term loan sanctioned. In many cases, banks insisted upon higher amount of promoters' contribution to ensure that the latter had adequate stake in the project. Delays in renewal of working capital facilities were mainly due to non-submission/late-submission of the required data by the promoters.

As regards 'not so helpful' attitude of the bankers, the participants felt that the increasing competition itself would bring about the desired attitudinal changes amongst their staff. Some training inputs were also required for the staff working in the branches. Poor counter service might be one of the main reasons for the borrowers forming a negative impression about the bankers' attitude. Technological upgradation at the branches and introduction of computers might help the banks and FIs to improve the quality of service to their SSI clients. Closer and frequent interaction between the banker and the borrower might also bring about an improvement in the situation. In this context, it was mentioned that commercial banks had started opening 'SSI branches', to exclusively cater to their SSI clients.

Technological upgradation at the branches and introduction of computers might help the banks and FIs to improve the quality of service to their SSI clients.

As regards the working capital facilities, it was felt that Nayak Committee recommendations had started percolating down to the branch level. A view was expressed that some of the borrowers might not need the working capital facilities to the extent recommended by the Committee. It was observed that, by and large, there was a reluctance on the part of the SSI promoters to increase the equity capital. In many cases, they failed to retain adequate amount of the profits earned in the business. Some of the FIs and banks had recently introduced fast track system for their good clients. The credit rating system once stabilised, would help banks in taking early decisions regarding requests for additional credit facilities from borrowers with good rating. as far as bankers' insistence on sufficient security was concerned, it was agreed that the observation made in the study on this aspect was correct. the banks had become more particular about the security aspect especially in view of the high incidence of non-performing advances and the recent focus on profitability, etc. In order to avoid delays in the disbursement of the loans, one of the state level FIs had started requesting the borrowers to submit the title reports of the property to be charged to the former, right at the processing stage as the term loan application.

The bankers felt that cost and availability of power were important factors for proper growth of SSI units. Availability of other essential inputs such as raw materials, etc also needed to be ensured. If the 'recovery tribunals' recently set up by the Government functioned effectively, banks might have a more positive attitude while considering applications for new loans or enhancement of the existing facilities. One noteworthy feature of the interaction with the bankers was their readiness to listen to the realities prevailing at the grass root level and look at them in the overall perspective of their developmental role.

What is required at this crucial juncture, when the SSI units are standing at cross roads, is a proper understanding of the problems faced by them and initiation of appropriate measures by various agencies including banks, FIs the RBI and the government. It is hoped that the present study would help the concerned agencies to gain a better insight into the subject and accordingly initiate suitable action.

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Export Potential of Small Scale Industries

C.S. Prasad

The small scale sector has been contributing significantly to the improved export scenario emerging in India. The author analyses the export trends in the SSI sector with a specific focus on the constraints and potentials, and offers a few concrete suggestions

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Export promotion is one of the top agenda items of the current economic reforms in India. The key to its realisation lies to a great extent with the performance of the small scale industrial (SSI) sector. The SSI sector has emerged as a dynamic and vibrant sector of the Indian economy in recent years displaying phenomenal growth in the field of production, employment and dispersed development in general and exports in particular. There are about 24 lakhs small scale industrial units in the country. In 1993-94, it accounted for about 40 per cent of the gross value of the output in the manufacturing sector and about 35 per cent of the total export of the country. It provided employment to about 140 lakh persons, which is second only to agriculture. A sustained growth in all these fields since mid-seventies, is a remarkable feature of the SSI sector's performance. An idea of the overall growth of this sector since 1991-92 can be obtained from table 1.

Table 1: Overall Growth of SSI

Year	No.of units (lakh Nos.)	Production at current prices (Rs. in crores)	Production at constant prices (1990-91) (Rs. in crores)	Employment (Lakh Nos.)	Exports (Rs. in crores)
1991-92	20.82 (6.9)	178699 (15.04)	160000 (2.99)	125.80 (3.59)	13883.40 (43.66)
1992-93	22.75 (7.35)	209300 (17.12)	168960 (5.6)	134.06 (3.28)	17784.82 (28.10)
1993-94	23.84 (6.67)	241648 (15.46)	180956 (7.09)	139.38 (3.97)	24149.00(P) (35.78)

P = Provisional
(Figures in brackets give the annual increase over the previous year)
Source: Office of the Development Commissioner (SSI), Department of SSI & ARI, Ministry of Industry, New Delhi.

Export Performance of SSI

Export from the SSI sector has been growing at an annual rate of about 36 per cent per annum since 1991-92. If one traces the growth of exports since 1971-72, the

overall picture is really impressive. The growth performance of this sector from 1971-72 is presented in table 2.

Table 2: Exports from SSI

(Rs. in crores)

Year	Total Exports	Exports from SSI Sector*	Percentage Share
1971-72	1608	155	9.6
1976-77	5142	766	14.9
1981-82	7890	2071	26.5
1986-87	12567	3644	29.0
1991-92	44040	13883	31.5
1992-93	53688	17785	33.1
1993-94	69547	24149 (P)	34.5

P = Provisional

* *Source*: Office of Development Commissioner (SSI), Department of SSI & ARI, Ministry of Industry, New Delhi.

In a period of 2 decades, i.e. 1971-72 to 1993-94, the total exports of the country increased by 43.2 times, while that of the exports from the SSI sector increased by 155 times. It may, however be mentioned that the information in table 2 is with regard to direct exports only. SSI sector makes indirect exports also, which are estimated at around 10 per cent of the country's total exports. These take place through merchant exporters, trading houses and export houses. Sometimes, these are also in the form of export orders from large units or the production of parts and components for use in finished exportable goods. It is expected that the share of indirect exports will increase further after the results of the economic reforms start fructifying, particularly after the fruitful integration of the large and small scale sector which is at present in its infancy.

The unorganised sector of the Indian economy consisting of small scale industries, handicrafts, handlooms, powerlooms, sericulture and coir, dominates the export scene of the country.

It is the unorganised sector of the Indian economy consisting of small scale industries, handicrafts, handloom, powerlooms, sericulture and coir, which together dominates the export scene of the country and accounts for about 60 per cent of country's exports. After small scale industries, handicrafts play a very important role and make significant contribution to India's exports particularly through export of gems and jewellery and hand-knitted carpets. In 1992-93, in the total exports of manufactured goods, which was of the order of Rs. 40,514 crores, the contribution of village and small industries sector was Rs. 32,783 crores.

Though in the total exports on the country, this contribution made by the unorganised sector, particularly the SSI sector, may look impressive, one cannot ignore the fact that India's share in world's exports is very low, at about just 0.5 per cent. The total exports of the country was $22.18 billion in 1993-94 and is expected to exceed $25 billion by the end of 1994-95; but this is very small if we compare the same with world's exports which were $3730 billion in 1993-94 and expected to go up to $5500 billion by the end of 2000 A.D. India is now a member of the World Trade Organisation and it has to take measures to increase its exports significantly. Efforts will have to be made to double the volume of India's exports in the next five years if it wants to become a global player. The task becomes difficult as the country has been losing grounds in the export of primary products and traditional items and also because of the fact that the large scale industrial sector's attention has so far been focussed more toward the internal market than the international market. Competition is increasing day by day and the task has become all the more difficult because of the increasing manufacturing efficiencies of the developed and newly industrialised countries, higher emphasis on quality, higher investment on export promotion the world over and the emergence of fortified trade blocks. In such a situation. it is but natural that our attention is drawn to the SSI sector because of its past performance and future potential.

Item-wise Contribution

In order to have an idea of the potential, it is necessary to find item-wise performance of this sector (table 3). Small scale units produce a wide range of items, roughly about 7500. The items which play dominant role in terms of exports belong to the category of readymade garments, leather products, processed food and marine products, engineering goods, electrical and electronic goods, plastic goods, basic chemicals and pharmaceuticals. etc. In the export of certain items, its share is as high as 100 per cent.

The sector accounted for 100 per cent of the country's exports of sports goods, 90 per cent of readymade garments, 80 per cent of finished leather and leather products, 65 per cent processed food and 55 per cent of basic chemicals, pharmaceuticals and cosmetics. In the case of engineering goods and marine products,

the share was 30.2 per cent and 28.7 per cent respectively. However, within the sector, four items alone accounted for 83.1 per cent of total exports. These items are readymade garments (44.7 per cent), leather products (16.6 per cent), basic chemicals (10.9 per cent) and engineering goods (10.9 per cent). A deeper look into export performance of these items gives some additional information, some of which are not healthy ones.

Table 3: Export performance and the share of SSI (1992-93)

(Rs. in crores)

Product Group Non-Traditional Products	Total Exports	Share of SSI Sector	Percentage share of SSI sector
Engineering Goods including electrical and electronics	6450.00	1950.00	30.23
Basic Chemicals, Pharmaceuticals, Cosmetics	3623.20	1992.76	55.00
Chemicals & Allied Products	4299.44	118.98	2.81
Plastic products	389.55	175.40	45.02
Finished Leather & Leather Products	3692.48	2953.98	80.00
Marine Products	1767.43	506.81	28.67
Processed Foods	1293.00	840.45	65.00
Woollen Garments & Knitwear	594.65	208.12	35.00
Sports Goods	93.63	93.63	100.00
Readymade Garments	8840.75	7956.67	90.00
Rayon & Synthetic Products	N.A.	15.73	—
Processed Tobacco, Snuff & Bidi	507.74	240.14	47.30
	31481.87	17052.67	54.16
Traditional Products			
Cashew kernel and cashew nut shell liquid	749.23	642.46	85.75
Lac	52.63	51.49	97.85
Spices, Spice Oils, Oleoresins, 382.06	382.06	10.00	
	1183.92	732.15	61.82
	32665.79	17784.82	54.44

Source: Office of the Development Commissioner (SSI), Department of SSI & ARI, Ministry of Industry, New Delhi.

Some of the disturbing features of the performance could be listed as follows:

- There is lack of diversification since about 83 per cent of SSI exports are accounted by four broad groups of items. The share of some of the emerging areas such as electronics, engineering goods and plastics is very low. There are many other spheres which still remain to be tapped, particularly, glass and ceramics, marble and tiles, paper and wood products etc. Even within those items where the present contribution is significant, their share in total global exports is very low. Leather products which have very goods growth potential currently account for only 3-4 per cent of the global exports. Similarly, India's share in the total exports of fruits and vegetables and processed food, could be gauged form the fact that about 30 per cent of the fruits and vegetables produced in India are going waste and less that one per cent of the total production of these items is being processed.
- Most of our exports are going to recognised markets of developed countries, where not only is the competition tough but there also exist trade blocks. Enough scope exists for exploring the potentiality of the new markets of Asia and Africa. A visit made by a team from National Small Industries Corporation, New Delhi to South Africa recently has revealed that there is enormous potential for Indian engineering and machinery items in this country.

Present Scenario

There are about 24 lakhs registered and unregistered SSI units in the country but only a very small number of these units are engaged in exports. According to Second All India Census of registered SSI Units, out of 5.82 lakh working units in 1987-88, the number of exporting units was only 4554, which was only 0.7 per cent of the total. About 95 per cent of SSI units are tiny, with investment in plant and machinery below Rs. five lakhs, which produce mainly for the local market. It is only the larger among the SSI units which can afford to comply with the export formalities and procedures and can develop the necessary infrastructure for export promotion. Though technology is the crux of quality and competitiveness, many SSI units find it difficult to go for modernisation and technology upgradation because of the present definition of small scale industries, with a ceiling on investment in

Though technology is the crux of quality and competitiveness, many SSI units find it difficult to go for modernisation and technology upgradation because of the present definition of small scale industries.

plant and machinery at Rs. 60 lakhs in the case of general units and at Rs. 75 lakhs in the case of ancillaries and export oriented units.

In the total value of production within the SSI sector, the share of export is not significant. The total value of production in 1992-93 at current prices was Rs. 209,300 crores and the value of exports that year was Rs. 17,785 crores, which is about 8.5 per cent of the total production. This share is itself cannot be considered as high.

Challenges

The current economic reforms have ushered in some challenges before this sector. Some of the challenges are on account of its small size, some on account of the type of technology being used, some on account of location in rural and backward areas and some arise on account of their difficulty in obtaining adequate and timely credit. In brief, these challenges are:

- — Increased competition particularly in the consumer goods sector
- — Inadequate access to institutional credit and higher interest rates
- — Vulnerability in terms of success to technology information and advanced management practices
- — Inadquate standardisation of products, process, components, parts, sub-assemblies, etc. which discourage linkage between small and large units.

However, one need not jump to the conclusion that this sector suffers fro weaknesses and has no strong point which will help it to emerge as a global player. Small enterprises, with the layers of control so common to bigger businesses and their separation of ownership, are inherently flexible to react to market signals and changing tastes. This makes the small firms more innovative and open to new ideas. They also interact more closely with their customers to be in touch with changing preferences. In addition, SSI units have better access to cheap labour, and have lower overheads which help them to reduce the cost of production. Small firms generally specialise in a few products, in which their strength lies and where small scale production is technologically viable. After choosing and sometimes developing the product through R&D, the fixed costs are minimised by buying second-hand machneries and renovating them to adopt for small scale operations. large firms suffer from technological rigidities under capital intensive technologies. Small firms are in a better position to adopt new technologies and/or go for their diffusion. While opportunities exist for small scale units, they suffer from constraints arising out of lack of finance, lack of information and lack of support from large scale units and as a result are not able to make the best of the existing situation because of lack of integration between the large and small scale units.

Small enterprises, are inherently flexible to react to market signals and changing tastes. This makes the small firms more innovative and open to new ideas

While economic reforms have brought the small sector face to face with competition, they have at the same time presented certain opportunities in the form of impetus to quality, efficiency and better technology, increased availability of raw materials and components and opportunity to restructure and diversify with the dismantling of the control regime. The natural advantage of quick response, flexibility and innovativeness possessed by this sector, will help to convert the challenges into opportunities. However, to what extent it will be able to take advantage of the opportunities depends upon the solution to some of the major bottlenecks that this sector faces, e.g. inadequacy of finance, lack of infrastructure, high cost of production and poor quality and lack of information particularly on market conditions in India and abroad. In addition, there are problems arising out of cumbersome export formalities and procedures, which the units being mostly one-man show, find difficult

Credit Facilities

SSI units have to depend on State Financial Corporations and commercial banks for their long term and short term credit needs. According to Nayak Committee (constituted by Reserve Bank of India in 1990 to examine the adequacy of credit to SSI sector), the supply of credit was extremely inadequate from institutional sources. Commercial banks which meet the working capital requirements of these units provide only 8.1 per cent of their total output by way of working capital. Against the minimum norm of 20 per cent prescribed by the Nayak Committee, the actual availability of credit was very low. In the case of tiny units the supply of credit from the banks was not more than 2.7 percent of their output. Availability of credit plays a very important role in the successful working of any unit. Credit should be affordable, adequate and timely. The problems of credit become more serious because SSI units do not have access to other sources of finance

such as the capital market. The recent guidelines issued by RBI to banks to meet 20 per cent of the output as working capital, provision of both term loan and working capital through single window in 85 districts where SSI units are concentrated and setting up specialised bank branches, are some of the measures taken to augment the flow of credit. However, for export promotion, it is essential to have a comprehensive credit scheme targeted at SSI exporters. Specials lines of credit for SSI units need to be introduced and procedural bottlenecks need to be removed.

Infrastructure

Lack of adequate infrastructure, particularly in the field of power supply, communication network and telecommunication facilities affect production, its cost and delivery. Frequent disruption in power supply adversely affects productivity, particularly in continuous process industry and compromises quality in precision and high technology outputs. Demand for reliable power supply reflects the increasing awareness of small enterprises in maintaining their quality and competitive edge. Similarly, lack of adequate telecommunication facilities is proving disadvantageous to SSI units in the highly dynamic and hi-tech international market. The demand for better and improved telecommunication facilities reflects the growing appreciation by small units of its relevance. The use of hi-tech applications for establishing and nursing market contacts will also lead to cuts in the cost of going global.

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Technology Upgradation

Export promotion and technology upgradation are synonymous since it is the door to improving quality and reducing the cost of production. Though small units realise its importance, because of the prevailing local conditions arising out of inadequate infrastructure, they prefer to rely less on sophisticated technologies and more on simpler processing techniques. This inertia needs to be broken at the earliest. Some units find it difficult to go for better technology as these are costly and the present investment ceiling of SSI sector does not permit the same. The Government has been conscious of the need for technology upgradation and has set up several tool rooms, product-cum-process development centres, regional testing centres and workshops, but they need to be strengthened and multiplied, particularly at the regional level. Similarly, existing programmes meant for motivating the SSI units to enter the export market through training programmes on packaging for exports, export marketing management programmes or participation in the international trade fairs etc. need to be augmented. Launching of a new scheme of Integrated Infrastructure Development in rural and backward areas and the scheme of assistance for aquiring international quality certification (ISO-9000) are steps in the right direction. New programmes of creating industrial parks at the State level will definitely help SSI units to avail modern technology and thus produce quality goods acceptable in international market.

Linked with technology upgradation and exploration of market is the issue of information which is extremely inadequate at present. The issue has assumed greater significance as a result of the recent telecommunication revolution which is being used for hi-tech applications for market research and looking for business opportunities as a more cost effective substitute for exploratory personal visits abroad. Business queries between trading partners can be easily exchanged over the electronic networks and specifications, drawings and designs can easily be transmitted now. SSI units, however, have been depending heavily on conventional methods of market exploration through trial and error and private contracts, which is neither adequate nor meets the demand of time.

Potential of SSI

With a change in strategy from growth led export to export led growth, it has become necessary to arrange for better integration of small industries with large industries and to address to their basic problems relating to credit, infrastructure, technology and information. There exists a vast potential which becomes evident from a deeper look into some of the items which are being exported from the SSI sector.

Food Processing Industries

India produces a very wide variety of fruits and vegetables and is the second largest producer in the world, but less than one per cent of this production is commercially processed. India's share in the world trade of processed fruits and vegetables is also less than one

per cent. This figure of very low processing of fruits and vegetables in India is in sharp contrast to the figures of 30 per cent for Phillipines and 83 per cent for Malaysia. The present processing capacity in India is 1.10 million tonnes.

As per the Annual Survey of Industries, 1988-89, the number of units involved in the manufacturing of wide variety of processed foods was the largest, accounting for about 18 per cent of the total industrial units, 14.7 per cent of a gross value of output and 9.7 per cent of net value added. A large segment of this industry is located in small and cottage industries sector. At the end of 1992, the number of processing units registered under Fruit Products Order was 4057 and 87 per cent of these units belonged to small scale and cottage industries sector. Going by the investment proposals, this industry has also drawn the attention of outsiders. While food grains are fully processed, processing of fruits and vegetables is not more than one pre cent of the available, i.e. raw materials. Over the years, exports of processed foods have gone up form a very low level of Rs. 7 crores in 1960-61 to over Rs. 3100 crores in 1992-93; of which exports from SSI sector is about Rs. 1350 crores. The items which are important from the angle of exports are sea foods, spices, cashew nuts, fruits and vegetables covering fruit pulp, juices, jams, pickles, canned fruits and vegetables, dehydrated vegetables and guar gums. India's share in the world exports of fruit and vegetable and fish and fish products is just 0.3 per cent and 1.7 per cent respectively. Evidently, the country bas not been able to make its presence felt in the international market due to various factors like over-dependence on a few international markets, lack of quality control, poor packaging system, high cost of production, non-adherence to delivery schedule and other endogenous factors like inadequate infrastructures particularly transport and power, non-availability of right quality of inputs at reasonable prices etc. Considering the growing international demand for processed foods, concerted efforts are needed to address these problems and take the initiative to enter new and untapped markets.

The items which are important from the angle of exports are sea foods, spices, cashew nuts, fruits and vegetables covering fruit pulp, juices, jams, pickles, canned fruits and vegetables, dehydrated vegetables and guar gums.

Plastic Goods

The plastic industry has undergone a phenomenal change in recent years. Although, the basic raw material, polymer is mainly manufactured in the organised sector, the processing industry is predominantly in the small scale sector. Around 18,000 units manufacturing various industrial and consumer plastics are in the small scale sector and about 500 units in large sector. Plastics products such as carrier bags, garbage bags, shopping bags, woven sacks, plastic moulded household items like insulated thermoware, plastic body vacuum flasks, pens, spectacle frames, PVC hoses, mathematical instruments, PVC leather cloth, laminated collapsible tubes, etc. are being exported to various countries. In 1992-93, the SSI sector accounted for 45 per cent of these exports. The rate at which the demand for these items is expanding is well known. There is enormous scope to diversify to new items and penetrate new markets. An idea of the export potential of the SSI sector could be obtained just by glancing at the export figures for two years. It increased from Rs. 80 crores in 1991-92 to Rs. 175 crores in 1992-93 raising the share in total plastic exports from 26.45 per cent to 45.02 per cent while total exports increased from Rs. 302.45 crores to Rs. 389.55 crores during the same period. The main problem this industry is facing is shortage of plastic raw materials and high prices of virgin material. But this has helped the development of recycling of plastic waste industry, an eco-friendly measure.

Leather Goods

Leather industry occupies a position of pre-eminence in the economy characterised, as it is by its massive potential for employment, growth and exports. With the increasing cost in the production of leather products in affluent countries, the main production centres for leather and leather products have shifted to countries which have low wage levels along with requisite technological, financial and entrepreneurial skills. A major part of this industry is reserved for the SSI sector. Even then, large units can take up production provided they agree to meet the export obligation. The country has a substantial raw material base. It also has vast traditionally trained skills as well trainable and affordable human resources.

At present, the country's share in the world market is about 4 per cent and the targets are to raise it to 10 per cent by 2000 and 17 per cent by 2010 because this sector has vast potential. In the context of primary focus being given to exports, the strength and weaknesses of this industry need to be understood to find out its capability to meet the demand for increased exports. India has the

largest cattle population and thus has a substantial raw-material base, competitive wage levels, traditional skills, links with markets in affluent countries and strong domestic demand for absorbing any stocks of fluctuations in export markets. There are, however, a few weaknesses which need to be attended to, these are; low volume of production units, lack of quality consistency, lack of standardisation, poor delivery, absence of product development, market and technological upgradation. There is an immediate need for strengthening the existing programmes of technology upgradation particularly at regional levels. Organisation of more international trade fairs (like the one which was held in New Delhi in the third week of October, 1994) and dissemination of market information will solve the major problems faced by this sector.

There is an immediate need for strengthening the existing programmes of technology upgradation particularly at regional levels.

Electronic Goods

The electronics industry has registered a phenomenal growth in the last decade. The industry had a compound growth rate of 35 per cent during the period 1981-90. The increase in exports of electronics in 12 years' period has been from Rs. 55 crores in 1981 to Rs. 1044 crores in 1993-94. The share of SSI sector in this industry is 40 per cent of the total output and 30 per cent of the total exports (both hardware and software). While SSI sector has been exporting items like transistor radios, P.A. systems since early 1950s, it has now penetrated the global market and is exporting a wide range of hi-tech products in consumer electronics, computeres, electronic instruments, telecommunication products and electronic computers. India's share in the global market is just 0.15 per cent which is very low and about 80 per cent of exports are from Export Processing Zones. A good feature, however, is that this industry has been drawing qualified engineers within the SSI fold and some of them have made quite a good name within a short period. We have quite a large number of technically qualified persons in the country who are willing to take it up self-employment ventures provided support in terms of developed industrial sheds/plants and credit are made available to them. The opportunities for exports in electronics, software and contract manufacturing are tremendous. With proper guidance and inputs, the SSI sector can emerge as a global player in this field.

Conclusion

These are some of the illustrations and not an exhaustive list of exportable items, but it definitely shows the potential of SSI sector which can be tapped to the full extent if issues like simplification of procedures, easier access to bank credit and improvement in infrastructure are attended to expeditiously and adequately. The promotional and protective policies of the Government have ensured the presence of this sector in an astonishing range of products, particularly in consumer goods. However, the bug bear of the sector has been the inadequacies of capital, technology and marketing. The process of liberalisation will therefore attract the infusion of these things to small scale sector.

The potential of SSI sector can be tapped to the full extent if issues like simplification of procedures, easier access to bank credit and improvement in infrastructure are attended to expeditiously and adequately.

In the liberalised policy environment of today, it would not be difficult for the small scale industries to rise to the occasion and help the country to achieve a target of, atleast 1.5 per cent of share in the world export in the next 15 years. Special attractions exist for improving productivity, quality and reduction of cost in the availability of all types of raw materials, skilled and unskilled manpower and priority accorded by the Government to promotion of the small scale sector. □

The Policy Framework for Small and Medium Enterprises in Japan

Basic Measures Study Sub-Committee

Excluding the primary industries, small and medium enterprises have a 99% share in the total no. of private businesses accounting for about 79% of the total workforce in Japan. It is believed to be indispensable for SMEs to positively overcome the structural changes presently in progress. However, SMEs are faced with difficulties in recent periods as seen from the decline in the rate of opening new businesses and an increase in the rate of closing the businesses. It is feared that the basis of their existence may weaken. This study outlines a concept of policy for SMEs in Japan. It also analyses the future directions of policy for SMEs.

Excerpts from a recent report by the Basic Measures Study Sub-Committee of the Small and Medium Enterprises Policy Deliberation Council, Japan.

SMEs in Japan

In 1950's, the small and medium enterprises were, generally regarded as a group of problematic enterprises with low productivity, low wages and over-employment. As a matter of fact, value added and wage levels of small and medium enterprises were limited to half those of large enterprises by the mid-1950's, and the Economic White Paper for fiscal 1957 described small and medium enterprises as "forming the bottom of the dual structure and problem enterprises which have fallen into a vicious circle of low productivity and low wages."

However, various gaps with large enterprises as pointed out in 1950's narrowed in the high-rate growth period. It can not be denied that there still exist some gaps, but small and medium enterprises have, especially in the manufacturing industries, significantly contributed to the construction of the highly efficient specialization system of the Japanese industry. At the same time, they have greatly contributed toward the elevation of productivity as well as the maintenance and advances of quality levels of products by providing industry with meticulous production technology and know-how accumulated by them in keen competition.

It is expected, today, that small and medium enterprises support specialization structure forms a core of the regional economy, answers user's needs by putting them in close tie with the users and provide them with the needed products and services. Through these activities, they are expected to become vital source of our economy, supporting our entire socio-economy as a group.

In the visions for small and medium enterprises in the 1990's, they, being described as "a majority with vitality" and "the source of creation," are expected to play the following six roles: (1) players in competition, (2) contributors toward the creative challenges and society where humanity is respected, (3) those toward construc-

tion of communities with individual characters, (4) those toward grass-root internationalization, (5) those toward affluent life of the people, and (6) those toward technological innovation and information-intensive society. The existence of small and medium enterprises full of creative ability and vitality is believed to be indispensable in order for the country to realize affluent life for the people with free time while the country maintains vitality in its socio-economic condition amid the trends toward further maturity and internationalization. In this sense, the role of small and medium enterprises is increasingly important.

The existence of small and medium enterprises full of creative ability and vitality is believed to be indispensable in order for the country to realize affluent life for the people with free time.

The Basic Principles

As for the target of the policy toward small and medium enterprises, it is clearly stated in the Article 1 of the "Small and Medium Enterprise Basic Law," to promote the growth and development of small and medium enterprises and at the same time contribute to the elevation of the economic and social status of employees of small and medium enterprises, by aiming at the improvement of productivity and trading conditions" and "to correct disadvantages due to the economic and social conditions of small and medium enterprises as well as to encourage voluntary efforts of small and medium enterprises and to correct various disparities in productivity, etc., among enterprises."

In the days of so-called "Dual Structure" Controversy, emphasis in the policy for small and medium enterprises were placed upon the dissolvement of the dual structure itself and the enhancement of the international competitiveness. In order to dissolve the dual structure, it is quite necessary for small and medium enterprises to improve organizational adjustment, appropriate sizing, modernization of their facilities, and rationalization of their management. They are quite indispensable conditions for small and medium enterprise to narrow the gap between larger enterprises and themselves.

However, with the development of industry and the economy, emphasis in recent policy for small and medium enterprises is on the promotion of structural reforms in a smooth manner in order for them to meet changes of the socio-economic condition such as the trends of internationalization, technological innovation, information-intensive social trend, securing of labour force, etc., although the correction of disadvantages for small and medium enterprises vis-a-vis large enterprises is still the main policy base.

As mentioned above, emphasis has shifted to the changes of the time. However, the primary policy toward small and medium enterprises is believed to make the market more functional and, at the same time, assist structural changes of the country's economy in progress in a smoother manner. This purpose is to be attained by encouraging small and medium enterprises, which are the source of vitality of economic activities of the country, to get better suited in their competitiveness and also to encourage them to correctly respond to the changes of their environment on the prerequisite that small and medium enterprises make their voluntary efforts in the market mechanism. In this sense, policy for small and medium enterprises may well be positioned as the fundamental part of our industrial policy.

Small-scale enterprises, are expected to actively carry out their activities in the market by taking advantages of their flexibility. However, there are many small-scale enterprises, called "pop and mom" operations which are weak in their management base. Consequently, the special policy consideration may be needed to assist them to strengthen and improve their management.

Policy for small and medium enterprises may well be positioned as the fundamental part of our industrial policy.

The Targets of Policy

(1) Multi-layered Grasp of the Targets

There is a diversity in scales, kinds of businesses, types of operations among the small and medium enterprises. Besides, the fields in which they operate, the forms of which they are made up, etc., differ from one company to another. Therefore, it is necessary to deal with each case in multi-layered way in accordance with their actual situations.

(1) The Nurturing of Enterprises with High Morale and Vitality

Small and medium enterprises form the foundation of the Japanese socio-economy. In order for the country, which is reaching the maturity to continue its development with creative ability, it is believed to be indispen-

sable for small and medium enterprises to continue to display their entreprenurship in their business activities. It may well be said to be an important policy task to nurture small and medium enterprises full of vitality that are run by the proprietors and managers conscious of entrepreneurship, and it is believed to be the purpose of the policy for small and medium enterprises to nurture just this high morale and full vitality.

(2) Consideration for Small-Scale Enterprises

On the other hand, small-scale enterprises, which account for more than 70% of the total number of places of business, form the foundation of our socio-economy. Especially in regional economy. they are playing an important role of making use of resources and techniques available in that scale, and providing the regional communities with employment opportunities there. However, they are faced with the problem of not being able to meet changes of their environment due to the fact that their management base is weak.

There are many small-scale enterprises carrying out their activities by utilizing their own ideas and techniques. From the point of view of nurturing enterprises full of vitality, it is strongly hoped that many small-scale enterprises conscious of their existence as "enterprises" rather than the mere "pop and mom operation" will emerge and they will positively carry out business activities unique to them. It is also hoped that such enterprises will form "a majority with vitality" bearing up economic activities of this society as a whole. It is also important that these small-scale enterprises will continue their operations in a stable manner for the stable development of the economy as a whole.

Based on the points stated above, special consideration is needed for the small-scale enterprises to be strengthened, in the overall policy for the small and medium enterprises.

The Scope of Small and Medium Enterprises

(1) Problem Points

With 20 years passed since the amendment in 1973 of the scope of enterprises covered by the "Small and Medium Enterprises Basic Law", it is being pointed out that the Law no longer meets the current situations.

(1) On the Number of Employees Base

As for the number of employees base, the coverage of small and medium enterprises by the present definition is 97.5% in the service industries but it is over 99% in other industries. Also, there has not been any significant change in the number of employees per place of business. As a result, it is believed that there is no reason to make a review of the base at the present stage.

(2) On the Capitalization Base

The coverage on the capitalization base has not shown any recognizable change at 98.2% in the manufacturing industries. However, it has declined in the wholesaling and retailing trades as well as in the service industries. In the retailing trade and service industries, especially, it is below 90%. Since 1973, gross national product in real terms and its deflator have both doubled, representing expansion of the economy's scale, price increases, etc. Also, small and medium enterprises have increased their own equity. Based on these facts, there are reasons to consider raising the capitalization base.

(3) On the Service Industries

As for the information service industry and some other service industries, the capital equipment ratio is high and there are also some similarity in their manufacturing process, too. Because of this fact, there are some points worth taking into consideration in regard to the opinion that the particular industries should be separately treated from other service industries. However, there is not an established notion on classification of the service industries, and it is not considered as appropriate to make classification in the Basic Law due to the nature of the law. Therefore, it is believed to be proper to give case-by-case consideration to individual measures to be adopted, on this particular issue.

Revision of the Scope

On the other hand, some such problem points as mentioned below are being pointed out on the issue of the expansion of the scope of small and medium enterprises.

(1) Problem of Upward Shifting of Various Measures

If the scope of small and medium enterprises is expanded, does the effect of the policy get thinner, unless the budget, etc, are increased accordingly?

Because of the fact that nearly all small and medium enterprises are covered on the number of employees' base, it is expected that the number of small and medium enterprises the increase in with the elevation of the capitalization base will be limited. As present measures for small and medium enterprises are more generous for small-scale enterprises, the increase in the capitalization base will have relatively little effects.

(2) Relations with Regulations and Coordination Law

In the fields where the "Law for Coordination of Business Activities of Large Enterprises to Secure Oppor-

tunities of Business Activities of Small and Medium Enterprises, the "Law on the Prevention of Delay in the Payment of Subcontracting Charges and Related Matters", the "Law on the Promotion of Subcontracting Small and Medium Enterprises", are put in force to regulate and coordinate business activities by the scale of enterprises, there might emerge cases where those enterprises which have so far been regulated, may conversely come under the category of enterprises to be protected. The question of how to deal with such cases remains.

(3) Relationship with Taxation System

At Present, small and medium enterprises are defined as those with the capital of less than ¥100 million under the "Corporation Tax Law" and the "Special Taxation Measures Law". How to deal with it in this context?

How to Go Forward

It is believed to be appropriate to continue a study, while attempting to grasp the current state with the above mentioned points in mind as for the revision of the scope of small and medium enterprises as defined in the "Small and Medium Enterprise Basic Law". Considering the fact that there are problem points pointed out on the present basis, it is necessary to treat in a flexible manner small and medium enterprises, which may become the objects of some measures, and give case-by-case consideration particularly when they require urgent actions in the individual policy implementation for the time being. There are opinions expressed especially in some service industries that the present basis do not fit the current status of industry and there are some objective data supporting such opinions. Therefore, it is necessary to consider responding to the prevailing state in adopting measures in finance and other aspects on the case-by-case basis.

Past History

Amendment in 1973

At the time the Basic Law was legislated			Amendment in 1973	
Manufacturing:	less than ¥50 million or the employed force of less than 300	→	Manufacturing	¥100 million or less than 300 employees
Commerce and Service:	less than ¥10 million or the employed force of less than 50	→	Wholesaling:	¥30 million or less than 100 employees
		→	Retailing and Services:	less than ¥10 million or less than 50 employees

Number of Employees per Place of Business

	1963	1972	1986
Total for industries other than agriculture, forestry and fisheries	7.0	7.6	7.5
Manufacturing	16.8	16.8	15.3
Wholesaling	9.1	10.4	9.8
Retailing	3.2	3.7	4.3
Services	4.1	5.3	6.4

(Place of Business Statistics)

Coverage of Small and Medium Enterprises by Present Definition

Number of Places of Business on Employee Base, Number of Enterprises on Capitalization Base

		1972	1986	1990
Manufacturing	Capital	98.6	98.4	98.2
	Employee	99.4	99.5	99.5
Wholesaling	Capital	98.2	96.8	96.3
	Employee	99.1	99.3	99.2
Retailing	Capital	97.1	89.9	87.0
	Employee	99.7	99.5	99.4
Services	Capital	92.4	84.2	81.0
	Employee	98.8	98.3	97.5

Note 1: "Corporate Enterprise Statistical Yearbook" for figures on the capitalization base, "Place of Business Statistics" for those on the number of employees base.
"Preliminary Report on Place of Business Statistics for 1991" for figures on the number of employees base in 1990.
Note 2: Rates calculated on the basis of present definitions.
Note 3: Figures for wholesaling on the capitalization base have been calculated on wholesalers with the capital of less than ¥50 million due to difficulties of obtaining data on other wholesalers.

Policy System

Stated in the "Small and Medium Enterprise Basic Law" are the following three Chapters: "Advancement and Modernization etc. in Structure of Small and Medium Enterprises" to encourage modernization of facilities, rationalization of management and advances of technological capability to improve the constitution of small and medium enterprises, and to encourage them to strengthen the management base by correcting excessively small scales of them to realize optimum scales of business and basis for growth and by carrying out joint operation of business and cooperative activities; "Revision of Disadvantages of Business Activities" to prevent excessive competition and to make subcontracting transactions proper with a view to correcting the tendency that small and medium enterprises are often placed in disadvantageous positions in transaction with large corporations, and "Smaller Scale Enterprises" to

take special measures for improvement and development of management of small-scale enterprises vulnerable in the management base.

When an attempt is made to organize a policy system at the present in reference with the system provided for in the Basic Law and on the basis of developments in the past, it would be divided up into the following three pillars: "Measures for the Strengthening of the Management Base, Measures to Assist Structural Changes", and "Measures for Small-scale Enterprises" (Fig. 1).

The "Measures for the Strengthening of the Management Base" are the measures considered to have the nature of industrial organization policy in order to strengthen the basic strength of small and medium enterprises by correcting their disadvantages and to put in order the competitive conditions with large enterprises. These are considered to form the base of the policy for small and medium enterprises. These include finance (general loans and credits), taxation, organization, diagnosis and guidance, measures for subcontractors, etc.; and, they are the indispensable requisites to rendering them assistance for their structural reforms.

The "Measures to Assist Structural Reforms", on the basis already mentioned, are set to enable small and medium enterprises to meet structural changes taking place with changes of the time, to deal with specific challenges accordingly. Therefore, the measure have the nature of industrial structural policy. Currently, these include a series of measures, such as dealing with modernization and upgrading, internationalization, securing of manpower, regional small and medium enterprises measures, conservation of the environment etc.

The "Measures for Small-Scale Enterprises" may be described as a policy to ensure various measures meant for strengthening small-scale enterprise's management base and assisting their structural reforms in smoother ways since there are rather many minute operations run by an individual with weak management base, and vulnerable to the changes in the local economy.

However, the classification stated above is a sort of summing up the basic ideas. There are also cases in which a specific policy is set in conjunction with other standpoints, often intermingled with each other.

Considering the necessity to bring out the vitality of small and medium enterprises in the ongoing structural changes in our socio-economic conditions, the followings must be positively pursued as the core of the Small and Medium enterprise policy. As its base, the "Measures for Strengthening the Management Base" shall be set, since small and medium enterprises usually have their limitations in capital, human resources, technology and information etc, when compared with larger enterprises. At the same time, the "Measures for Assistance for Structural Reforms" meant for supporting Small and Medium enterprises fighting to overcome difficulties in a torrent of over-all structural change, and the "Measures for small-scale enterprises", meant to assist small-scale enterprises which are expected to encounter difficulty in adjusting to the structural change mainly due to their weaker management base, must be positively implemented.

Emphasis in Policy from Now on

The Japanese economy is now in a transition period to be rarely seen and the environment surrounding small and medium enterprises is radically changing. While the domestic market is reaching its maturity and a limit is being predicted in the dependence on exports, diversification and individualization of consumer needs are in progress, economic activities are being internationalized and production bases are being transferred overseas, and foreign imports are on the rise. All this means that competition will be increasingly intensified. Also, the restructuring of large enterprises is changing the nature of the subcontracting specialization and small and medium enterprises are compelled to display their original ideas by forwarding unique products and services to the market to establish their own for survival. On the other hand, there is a tendency that labour will be short in supply and the securing of manpower is one of the most important problems confronting small and medium enterprises.

The environment surrounding small and medium enterprises is radically changing.

It is not enough for small and medium enterprises to respond to these changes of the socio-economic structure but necessary for themselves to positively play the role as the subject of the changes not in a passive way. Small and medium enterprises are expected to display their entrepreneurship and carry out activities full in original ideas to impact upon the market in order for the country to maintain dynamism of its economy to realize continuing development.

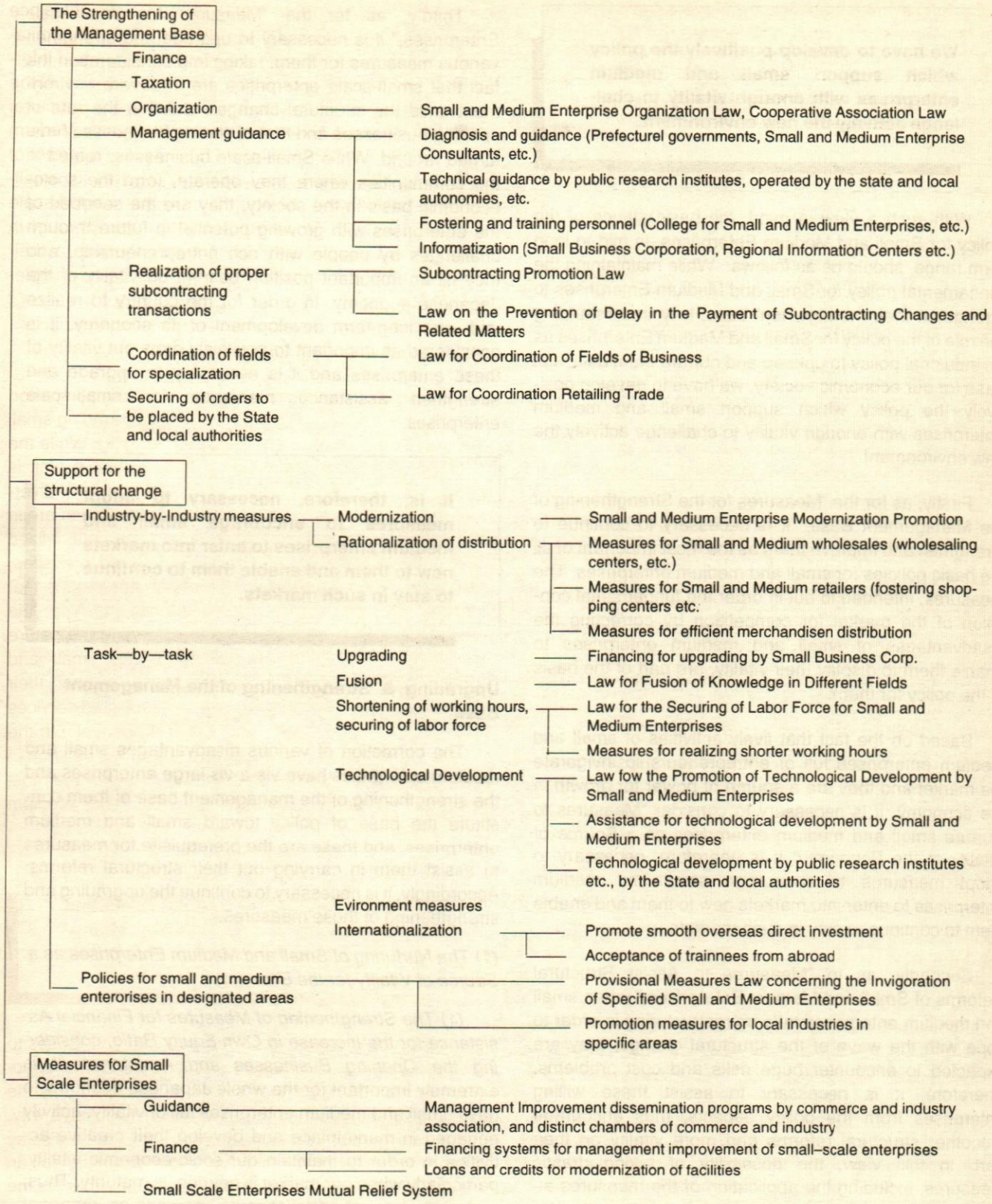

Fig. 1. Systematic diagram of the Policies for Small and Medium Enterprises

We have to develop positively the policy which support small and medium enterprises with enough vitality to challenge actively the new environment.

With such a view in mind, the basic stance of the policy for Small and Medium Enterprises, in mid to long term range, should be as follows. While maintaining the fundamental policy for Small and Medium Enterprises to strengthen their management base, fully understanding the role of the policy for Small and Medium Enterprises as an industrial policy to upkeep and nurture them as a vital base for our economic society, we have to develop positively the policy which support small and medium enterprises with enough vitality to challenge actively the new environment.

Firstly, as for the "Measures for the Strengthening of the Management Base," it is necessary to continue to strengthen and improve them as the most important of all the basic policies for small and medium enterprises. The measures, intended to put in order the fundamental condition of the market for competition by correcting the disadvantages of small and medium enterprises to enable them to display their vitality, are part of the basis of the policy for them.

Based on the fact that lively activities of small and medium enterprises full of entrepreneurship invigorate the market and they are a source of power for growth in the economy, it is necessary to consider "Measures to Nurture small and medium enterprises as a Source of Vitality of the Economy." It is, therefore, necessary to adopt measures to encourage small and medium enterprises to enter into markets new to them and enable them to continue to stay in such markets.

Secondly, as to "Measures to Assist Structural Reforms of Small and Medium Enterprises," when small and medium enterprises take on restructuring in order to cope with the wave of the structural change, they are expected to encounter huge risks and cost problems. Therefore, it is necessary to assist these willing enterprises from the policy aspects, thus encourage smoother structural reforms and more vitality on their part. In this view, the possibility of taking drastic measures, including the application of the measures already set more effectively and the reassessment, shall be examined.

Thirdly, as for the "Measures for Small-scale Enterprises," it is necessary to upgrade and strengthen various measures for them, taking into consideration the fact that small-scale enterprises are in severe environment amid the structural changes and that the rate of opening businesses and that of closing businesses have turned around. While Small-scale businesses, rooted in the communities where they operate, form the socio-economic basis in the society, they are the seedbed of the enterprises with growing potential in future through challenges by people with rich entrepreneurship, and they fill an important position bearing up vitality of the Japanese economy. In order for the country to realize mid- and long-term development of its economy, it is considered as important to positively draw out vitality of these enterprises and it is necessary to upgrade and strengthen assistance measures for small-scale enterprises.

It is, therefore, necessary to adopt measures to encourage small and medium enterprises to enter into markets new to them and enable them to continue to stay in such markets.

Upgrading & Strengthening of the Management Base

The correction of various disadvantages small and medium enterprises have vis-a-vis large enterprises and the strengthening of the management base of them constitute the base of policy toward small and medium enterprises, and these are the prerequisite for measures to assist them in carrying out their structural reforms. Accordingly, it is necessary to continue the upgrading and strengthening of those measures.

(1) The Nurturing of Small and Medium Enterprises as a Source of Vitality for the Economy

(1) The Strengthening of Measures for Financial Assistance for the Increase in Own Equity Ratio, considering the Opening Businesses and Assistance: It is extremely important for the whole Japanese economy to have small and medium enterprises full of vitality, activity engaged in marketplace and develop their creative activities in order to maintain our socio-economic vitality, particularly when our market is nearing its maturity. Thus, nurturing of eager entrepreneurs becomes an important issue.

One of the most serious problems such entrepreneurs face is the securing of funds.

However, one of the most serious problems such entrepreneurs face is the securing of funds. Attitudes of private financial institutions toward small and medium enterprises are becoming severe because of the mid- and long-term prospects of tight money supply and liberalization of financial operations. Under the current systems, the Government-sponsored financial institutions also find it difficult, compared with usual cases, to grant loans and credits to enterprises planning to enter into new business because of the uncertainty of growth prospects of the markets, lack of credibility, etc. There is also a limit to the ability for small and medium enterprises to raise funds by themselves under the present situations.

Considering these situations in view of bringing up small and medium enterprises full of vitality, in addition to the appropriate training as an entrepreneur, and management guidance, it is quite necessary to examine assisting measures in financial aspects such as financing support and assistance for their improvement in their own equity ratio which include opening business assistance, support for venture business etc.

(2) Measures to Enable Small and Medium Enterprises to Solve the Succession and Continuance Problems: In view of the maintenance of vitality of industry, securing of manpower, effects on the regional economy where they operate, it is important for production basis built by them, engineering capability, technical know-how, etc., to be succeeded to and continued in a smooth manner in order to ensure small and medium enterprises to grow and develop.

Therefore, after fully grasping the prevailing condition, it is necessary to study measures to facilitate the succession and continuity of small and medium enterprises, including a study on taxation.

It is necessary to study measures to facilitate the succession and continuity of small and medium enterprises.

(2) The Improvement and Upgrading of Financial and Taxation Systems for Small and Medium Enterprises

The financial and taxation systems are indirect measures to induce small and medium enterprises to carry out constructive activities on the prerequisite that they make voluntary efforts, and it is believed that they will continue to play important roles to attain policy objectives. Therefore, it is necessary to put them in order and improve them further.

Since it is predicted that the saving ratio starts to decline and in the mid and long terms with the advancing ages of population, money supply will grow tight in the macro economic viewpoint, and private financial institutions will become more selective in lending, the importance of the complementary functions of the Government-sponsored financial agencies will further increase, and it is necessary for the Government-sponsored financial institutions to make efforts for smooth supply of funds for small and medium enterprises on the basis of their respective policy objectives and specialties.

It is necessary for the Government-sponsored financial institutions to make efforts for smooth supply of funds for small and medium enterprises on the basis of their respective policy objectives and specialties.

(3) New Evolvement of Organization Policy

The system of cooperatives has played an important role as the core of organization of small and medium enterprises and as the channel of policy measures. With changes of the economic structure, the way small and medium enterprises are operated has as well shown changes and there have emerged joint investment companies, public corporations and other forms of organizations.

In carrying out structural reforms of small and medium enterprises, there are many cases where organizational improvement such as enhancement of information processing systems, measures to shorten working hours, environmental protections, etc. were proven effective. It is expected that these organizations will fully display the function as the channel of policy measures. From these points of view, it is necessary to reconsider the organization policy as a whole such as the significance of

organizations, role of the system of cooperatives, measures to assimilate other organizations than cooperatives, and the flexible management of the system of cooperatives. It is also necessary to consider such issues as strengthening and elevating efficiency of guidance and businesses of cooperatives and their members, positive use of diagnosis and guidance for the upgrading and the strengthening of the function of the Federation of Small Business Associations.

(4) Measures to Improve Software of Managerial Resources

It is important to improve software of managerial resources, such as personnel, technology, information, etc., in order to carry out structural reforms in a smoother manner. It is also indispensable to prepare the social environment in order to bring forth new types of entrepreneurs. Therefore, it is necessary to continue to strengthen measures in this aspect.

It is necessary to change the present system so that private small and medium enterprise consultants give general diagnosis and guidance.

(1) Diagnosis and Guidance: As small and medium enterprises are now in need of more intensive and specialized knowledge and information, the present systems are not necessarily sufficient to meet their needs. For this reason, it is necessary from the mid- and long-term viewpoints to change the present system so that private small and medium enterprise consultants give general diagnosis and guidance and the prefectural governments, etc., supervise them. It is also necessary to strengthen the role of Regional Small and Medium Enterprise Information centers as the basis of activities for private corporate management consultants corporate management for small and medium enterprise.

It is also necessary to improve and strengthen guidance through public research institutes and test facilities in order to enhance technological capability of small and medium enterprises.

(2) Informatization: As information is the most important element of management, the importance of providing small and medium enterprises with information correctly satisfying their needs and assisting them for their full usage will remain unchanged. It is necessary, in this sense, to emphasize on the information services while strengthening the ties between the Small Business Corporation and Regional Small and Medium Enterprise Information Centers.

The importance of providing small and medium enterprises with information correctly satisfying their needs and assisting them for their full usage.

(3) The Training of Personnel: One of the most important tasks for the development of small and medium enterprises in the future is the training of the rising generation of entrepreneurs, and it is necessary to improve the curricula and facilities of the Training Institute for small and medium enterprises and make use of its leading function in order to train personnel capable of meeting the changing situations.

It is also important to create the social environment favorable for education of small and medium enterprises (including improvement of the public image of small and medium enterprises, fermentation of interest in "manufacturing activities", encouragement for creativity, etc.).

Assistance for Structural Reforms of Small and Medium Enterprises

It is necessary to evolve comprehensive policy to assist small and medium enterprises in their attempts for structural reforms to adapt themselves to the new socio-economic environment by grasping the multiple of layers of them. Particularly as for the nurturing of groups of enterprises full of vitality to assume the leading role in the Japanese economy in the future, it is necessary to take into consideration those medium-scale enterprises. It is, then, necessary to adopt various measures under policy for small and medium enterprises in conjunction with the industrial policy covering large enterprises and medium-scale enterprises.

(1) Assistance Measures for Structural Reforms for Small and Medium Manufacturers

(1) New Assistance Measures for Structural Reforms: In the current of great changes of the economic structure, small and medium manufacturers, who have formed the Japanese industrial production system base, are now confronted with serious challenges in its environment, such as the maturing market, tight labor supply, transfer of production base overseas, increases in imports, chan-

ges in the subcontracting specialization structure, etc. As a result, they are compelled to carry out radical reconstruction of management by rearranging the systems under which they have been operating. Such reconstruction attempts include reassessment of businesses they have thus far conducted, entries into the new fields, cultivating transactions with new clients, etc. Unless they appropriately meet these challenges, vitality of small and medium enterprises, which have supported the Japanese industrial structure, may decline, and it is feared that it will have adverse effects upon the foundation of the Japanese industrial production itself.

In this view, it is necessary to formulate new assistance measures for the structural reforms for small and medium manufacturers, beginning with measures for subcontracting small and medium enterprises. In so doing, it is necessary to envision for the future, considering the characteristics of the sites, whether the enterprises for which various measures are to be taken are located inside or outside urban districts and the current state of small and medium manufacturers who are located inside or outside, etc.

(2) Assistance for Internationalization: In the severe circumstances of management accelerated by the shift of production bases to foreign countries by large enterprises, intensifying competition with foreign imports and restructuring in progress at large, small and medium enterprises in Japan are activity investing overseas. Many nations, mainly in Asia, are calling for the expansion of the Japanese small and medium enterprises into their countries in the hope that such a movement would promote the development of their own domestic supporting industries.

Small and medium enterprises in Japan are activity investing overseas.

Considering these points, it becomes quite necessary to study the significance of the internationalization of the small and medium enterprises, as well as the most appropriate policy support for them. These policies should be implemented on the premises that the small and medium enterprises are now being engaged in a global market today.

(3) Strengthening of Technology Policy: Technology is one of the key elements in the structural reforms of small and medium enterprises, and it is necessary to improve and strengthen measures for the enhancement of technological capability of small and medium enterprises. However, some point out that current systems and arrangements are not adequate. For this reason, it is necessary for the State to clarify its vision on the technology policy for small and medium enterprises, organize for the future new systems in which local autonomies are also to participate, and examine the necessary implementation policy including the promotion of the sessions for exchanging knowledge and information, beyond the frame-work of the existing sectorial boundary, etc.

Energy and environment measures, are international subjects, and a problem small and medium enterprises cannot evade.

(4) Assistance for Energy and Environment Measures: Energy and environment measures, such as measures to protect the ozone layer, to contain global warming, etc., are international subjects, and a problem small and medium enterprises cannot evade. The "Provisional Measures Law for the Promotion of Business Activities concerning the Rationalization of Use of Energy and Utilization of Recycled Resources" has late been introduced, under which various measures are to be adopted. In the light of the grave nature of the problem and the heavy financial burden to carry it out, it is necessary to strengthen further the measures for small and medium enterprises.

(5) Regional Measures for Small and Medium Enterprises: As for small and medium manufacturers in close tie with the regional socio-economy where they operate, the "Law on Provisional Measures for Invigoration of Specified Small and Medium Enterprises" was enacted in 1992 and various promotional measures for local industry are being taken for them to make use of resources, technologies, traditions, etc., in the specific communities to meet the particular conditions there. Considering the importance of small and medium enterprises in the regional economy, it is necessary to strengthen those measures further.

(2) Small and Medium Enterprises in Commerce and Service Industries

(1) Small and Medium Wholesaler: The Japanese merchandise distribution systems are undergoing

remarkable changes with the advancement of information networks, realignment of the trades by means of mergers and tie-ups, development of new types of business, etc. As a result, the environment for small and medium enterprises in the wholesale trade are getting increasingly severe. In order to assist small and medium enterprises in the wholesale trade in meeting these changes of the environment positively and formulating their strategies by themselves, it is necessary to clarify a vision of the future for small and medium enterprises in the trade and further promote such measures as to help them improve transaction practices and rearrange the wholesaling centers.

(2) Small and Medium Enterprises in Retailing: Against the backgrounds of the diversification and elevation of consumer needs, development of motorization and consequent changes of urban structures and transport systems, relaxation of regulations under the "Large-Scale Retail Stores Law", growth of new types of trade including discount stores and sales without stores or shops, recent economic stagnation, declines in personal consumption, etc., competition among commercial centers, and different retail sectors are intensifying and conspicuous changes are taking place in the management environment. Also, changes are taking place in the vertical relationships between wholesalers and retailers due to the introduction of information processing systems, changes in the merchandise distribution structure. Considering these situations, it is necessary to make a clear vision of the functions and roles of small and medium enterprises engaged in the retailing trade. It is, at the same time, necessary to invigorate small and medium enterprises in the retailing trade through assistance to individual stores and shops by strengthening policy support further for the improvement of shopping centers in coordinated efforts with town-building by strengthening of retail support services, and by organizing chains of stores and shops, in both hardwares and softwares.

(3) Small and Medium Enterprises in Service Industries: In the small and medium service industries, demands from both businesses and individuals have been rising, and enterprises in the industry now offer upgraded services and some of them specialize in certain fields. This trend is expected to be accelerated. In these situations, there have emerged new types of services accommodating new needs, showing vigorous activities. In view of the affluent society for the people, it is certainly an important element to have the service which satisfies people's needs. However, the current status of the service industry is not fully grasped yet. Therefore, we must, first, try to grasp the current status in the industry and what is needed in the policy aspect for them.

(3) Assistance Measures Common to All Industries for Structural Reforms

(1) The Securing of Labor Force for Small and Medium Enterprise: The Securing of labor force for small and medium enterprises, responding to the reduction of working hours, etc., are extremely important problems in the mid and long terms, and the "Law for the Promotion of Improvement of Employment Administration for the Securing of Labor Force for small and medium Enterprises" was enacted and various measures have been adopted. However, there are many cases in which the working hours at small and medium enterprises are influenced by relations with parent firms and other order-placing enterprises. It is, therefore, necessary to take measures covering order-placing enterprises. From these points of view, it is necessary to promote efforts to "build attractive places of work" by adopting measures for subcontractors that involve parent firms, by reviewing the formulas under which the State and local autonomies place orders, and by adopting various measures including retailing such as securing labor force, improving the working environment and welfare arrangement, and shortening the working hours, by the voluntary efforts on the part of small and medium enterprise.

(2) Improvement of Infrastructure for Smooth Structural Reforms: It is necessary to reassess the software side of management issues for structural reforms for small and medium enterprises. At the same time, it is necessary to improve hardware, such as facilities and equipment, especially commercial infrastructures as well as the industrial infrastructures at factory complexes to solve the environmental problems. It is also necessary to review regulations in urban districts, and improve and strengthen measures for sophistication of infrastructures in order to promote organizing with the aid of special upgrading finances as mentioned above and other structural reform programs in a smooth manner.

(3) Strengthening of Measures for Small-Scale Enterprises: It is necessary to improve and strengthen their own managerial resources and further promote management maneuverability, a strong point of them, in order for them to sustain and develop their businesses. As small-scale enterprises are in close tie with the communities where they operate, it is important for them to build firm management bases as a member of the community.

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Consequently, it is necessary to further improve measures, systems and environment so that small-scale enterprises with morale to positively promote their businesses by displaying high entrepreneurship may be rewarded. From this point of view, the "Law concerning Support to Small-Scale Enterprises by Commerce and Industry Associations and Chambers of Commerce and Industry" has been enacted and various measures are being taken for small-scale enterprises through Commerce and industry associations and Chambers of commerce and industry. It is necessary to continue taking these steps.

Conclusion

Japan has achieved the targets of catching up with European powers and the United States and filling the people's needs in quantitative terms, and it is now in the process of great structural changes toward a new socio-economy while the international political and economic systems have entered into a period of historic changes.

Under these circumstances, small and medium enterprises are faced with severe environmental changes, such as the diversification of social needs, changes in the specialization structure, globalization of the economy, etc., and they are compelled to seriously tackle with the issue of structural reforms of themselves. On the other hand, a diversity of demand is being created in response to new social needs, and reforms in the conventional organization and structure of the economy to bring forth new business opportunities.

Amid the maturing market for merchandise, intensification of international competition, transfer of technology overseas, etc., there is a limit to the attempts to meet these situations with a conventional cost cut and quality improvement by upgrading production technology, etc. only. What is needed now is to create and develop new markets with innovative products, technologies and services to meet the new needs. In order for this to be successful, it is necessary to display entrepreneurship based on new ideas beyond the conventional sectorial frames. It is also quite necessary to expand innovative entrepreneurship with broad global view which contains such a notion as closer ties with overseas markets, production base etc.

It is, therefore, necessary for small and medium enterprises to make radical reviews of conventional way they have managed and organized their businesses to rebuild their enterprises. At the same time, it is necessary for them to make positive challenges to the fields new to them with the display of entrepreneurship making best use of their maneuverability.

It is believed that the development of lively imaginative activities by small and medium enterprises to bring innovations and vitality to the market as "a majority with vitality" is an indispensable condition for the country's maturing economy to maintain vitality for the future to realize affluent society for the people with ample free time.

From these points of view, this Report proposes as directions of the policy for small and medium enterprises assistance to voluntary efforts for structural reforms by those small and medium enterprises which positively challenge the wave of structural changes, nurturing of small and medium enterprises as a source of vitality of the economy, positive assistance to small-scale enterprises with high morale, which form the foundation of the economy, as seedbeds for growth of enterprises with vitality or as the important player in the local society where they operate and other policy measures, placing emphasis upon growth and development of small and medium enterprises with high morale and vitality to for coming generation.

It is expected that discussions will further deepen and concrete measures will be comprehensively adopted in line with the contents of this Report. □

Strategic Outsourcing for Global Competition

Tetsuo Minato

Why there are so many small firms in Japan? The key to this question lies in the sub-contracting system which is basic to the character of Japanese industries. Major Japanese companies do not produce all goods on their own. Instead, they rely on sub-contractors for a great deal of production and most of these purchases are from very small sub-contractors, according to the author.

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1. Economic Performance & Small Business

The Obstacle Turns into a Driving Force

Japanese industry consists of a large number of firms, most of which are of small to medium-size. Surprisingly, there were 713,000 firms in the Japanese manufacturing sector, with 12,509,000 people involved in these enterprises in 1988. In comparison, the number of manufacturing companies in the U.S. was 371,148, employing 23,660,000 people. People working for companies with less than 100 employees constitute 58 percent of the entire workforce against 20.4 percent in the U.S. Such characteristics of the structure reflect differences in the production system of each country.

Why then are there so many small firms in Japanese industry? The key to the answer of this question lies in the subcontracting system, which is basic to the character of Japanese industry. In other words, major Japanese companies do not produce all their own goods. Instead they rely on subcontractors for great deal of production. And most of these purchases were from smaller subcontractors. Of the small manufacturing companies (having less than 300 employees), 56 percent are producing under subcontract systems.

This existence of an enormous number of subcontracted small business was once considered an indication of Japan's lag in industrial development. It was strongly viewed as an obstacle to the modernization of Japanese industry untill end of 1960s. However, because of the sophisticated subcontracted production system and their remarkably high share in the market they are now regarded as the source of dynamism and competitive power in Japanese industry.

The Age of "Interfirm Productivity"

What has caused such a drastic change of views in the evaluation of the subcontracting system, which formerly regarded these companies as obstacles? As business environments have changed rapidly and uncertanity has increased, more contingent and flexible business systems are required. Thus, Interfirm systems which combine small and large firm have become more important. Small businesses have their own efficient behavioral and organizational features; quick decision making processes, focused product developments, and good incentives for workers. This combination is seldom found in highly integrated large businesses. The interfirm systems possessing different managerial characteristics; create synergies and raise interfirm productivity. This alleviates various defects of large businesses and makes possible flexible responses to changes in their environment.

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Japanese subcontracting systems with slimmed-down large firms and a controllable number of smaller suppliers connected to them, confer important competitive advantages upon the industries. Figure 1 shows a significant relationship between the export performance of Japanese industries (Y-axis), and the degree of utilization of subcontractors in each industry (X-axis):

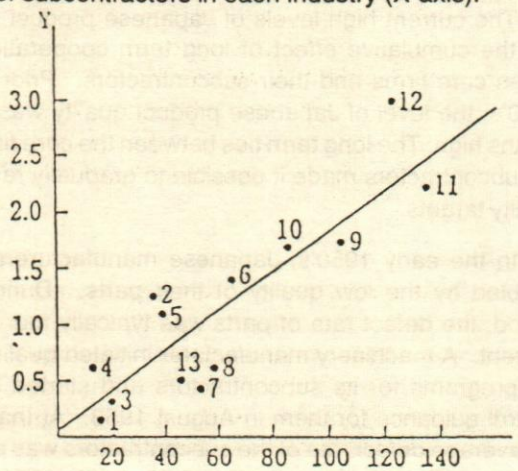

Fig. 1. Sub-Contracting and Export Performance
$Y_1 = 0.01540+0.01847X_1$
(r=0.87261, SE=0.00330, T value=4.57566)

2. Structual Features of the Japanese System

Small Numbers in Transaction

Japanese manufacturers have rather different business practices; they deal with a significantly smaller number of suppliers directly and pursue long term business relationships with them. These Japanese business relations have been gradually adopted by leading industries worldwide.

The United States International trade Commission's report stated that "European and US auto producers have tended to adopt Japanese practices in recent years. The resulting trend to limit the number of suppliers has accelerated dramatically during the last five years. European manufacturers are switching their purchases of parts from multiple to dual or single sources. One of the important factor behind the preference for a smaller numbers of suppliers is the increasing need for organizing organic interfirm production systems that can manage advanced joint tasks with the suppliers.

Because, present day industrial competition emphasizes non-price factors, products differentiation and the rapid advent of new products have come to bear crucial importance. Core firms would have no access to these advantages without the cooperation of suppliers.

Hierarchical Subcontracting System

The other important feature of the Japanese subcontracting system lies in the business relations between the core firms and their sub-contractors.

For example, in the automobile industry, which is based on typical hierarchical subcontracting, an automaker deals directly with only about 250 primary subcontractors under which are about 4,000 secondary subcontractors. These secondary subcontractors are related to about 30,000 tertiary subcontractors. In the end, a total of more than 35,000 companies are systematized under major manufacturers.

This "pyramid" type of production system, in which production work is divided, makes it possible for many small business to participate in production. This is one of the main reasons for the existence of a huge number of small or very small firms in Japan. As a matter of course, in other countries there exists subcontracted production and direct business relations (not through and open type market) between companies. However, the rate of use of secondary or tertiary subcontractors is not so popular.

It is not unusual for subcontractors to deal with more than one contractor. Yet, 54 percent of all subcontractors

It is essential to maintain close communication between companies and to keep cost for these low.

are dependent on a major, specified contractor for more than half of their sales.

3. Performances of the Subcontracting System

Keeping Transaction Cost Down

This large number of smaller subcontractors enables production to be specialized and can take full advantage of the merits of the social divisions of labor. On the other hand, however, if it fails to be well-organized and integrated in its functions, or transaction costs are so large, it will lose its efficiency. To avoid this, it is essential to maintain close communications between companies and to keep cost for these low.

The Japanese production system enjoys a high standard of close, low-cost interfirm communication through this hierarchical subcontracting system and longterm, close business relations between parent or contracting companies and subcontractors.

In the Japanese system, core companies with in the hierarchy deal with any where between a few to a few dozen sobcontractors on the level below, according to their management capabilities. A comparison between the communication costs of the Japanese and U.S. automobile industries reveals that costs are obviously lower in Japan (where contractors on each hierarchical level function as a terminal in the subcontracting hierarchy), because communication costs are characterized by gradual increase.

In Japan, the purchasing staffs in a core company have personal meetings with the subcontractors on average once to twice a week.

In Japan, the purchasing staffs in a core company have personal meetings with the subcontractors on average once to twice a week. Such regular contact encourages friendship and a willingness to cooperate, as well as being a way of collecting detailed information. The reason for making such close face to face communication possible is the fact that each core firms deals with only a limited number of suppliers.

Cost Performance

Clearly, the learning effect that results from the long-term, ongoing relationship between the core firm and its suppliers contributes greatly to reducing costs. This learning effect is a particularly large in Japan because core firm relationships are stable and the processes used by suppliers are well defined, allowing even small suppliers to use fully specified equipment and well trained firm-specific skill. Recent technological advances have made specific-purpose machines many times more productive than multi-purpose systems.

Today, core firms set input prices so as to provide a reasonable level of profits, based on their detailed understanding of the subcontractor's cost structure. Most purchasing managers have confidence regarding the underlying factors that determine the costs of their subcontractors. They say "we actually 'create' our purchasing price". Cost reduction achieved by Japanese industries are the result of extensive collaboration between a core firm and their subcontractors.

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Quality Control

The current high levels of Japanese product quality are the cumulative effect of long term cooperation between core firms and their subcontractors. Prior to the 1970's, the level of Japanese product quality was by no means high. The long term ties between the core firm and its subcontractors made it possible to gradually raise the quality targets.

In the early 1950's, Japanese manufacturers were troubled by the low quality of their parts. During this period, the defect rate of parts was typically four to five percent. A machinery manufacturer initiated quality control programs for its subcontractors and started quality control guidance for them in August 1953. At that time, the average defect rate of the subcontractors was around 4 percent. This rate improved to 2.8% in May 1954, and to 1.8% in June 1955. The current superiority of Japanese quality control is the cumulative fruits of over

twenty years of those collaborations between large and small firms. Recently, many Japanese firms have begun to measure their quality level as parts per million (PPM), typically 20 to 30 PPM. In these firms, responsibility for quality control is gradually being transferred entirely to the subcontracting firms, resulting in a system where no parts are inspected as they come into the core firms. This excellent performance in quality control has been achieved by using specific assets for the core customers. The specific equipment is designed for a high degree of automation in operation as well as inspection, which leaves little room for the careless mistakes of operators manipulation.

The current superiority of Japanese quality control is the cumulative fruits of over twenty years of those collaborations between large and small firms.

Technological Performance

Socially divided production processes result in divisions in technological areas as well. Because of this, opportunities for technical development and improvement can reach all levels. Thus, even very small companies are able to secure their own technical realm, compatible with their managerial resources. Most of these technologies would not be appropriate for development by large-scale enterprises and would be ignored by them. On the contrary, for the companies which cannot afford to go into any other technical fields, the minor technical subjects they are involved in mean a matter of life and death. Improvement in those areas is affected by strong incentives. As opportunities for technical development expand in the vast area at the bottom of the pyramid structure, cumulatively improved technologies are integrated into final products.

The subcontracting system is also a destribution channel for technical information. For instance, at the request of a core company, one plating manufacturer developed a technique for plating the inside of an extremely thin pipe for electronic parts attachment. It was a simple device that enabled the penetration of plating liquid inside the pipe by conducting it in a vacuum. This know-how was passed through the core firm to other companies in the same field. Through such channels the spread of technology serves to maintain the technical standards of subcontractors. In our survey, over fifty percent of subcontractors questioned identified subcontracting systems as a means for improving technologies.

The subcontracting system is also a destribution channel for technical information.

The existence of various subcontracting companies facilitates diversification of product items and production shift to growing sectors. Furthermore, Japanese companies are more flexible.

Take the case of the Canon, a leading camera maker, share of camera production has decreased rapidly in the last decade and cameras now take up less than a 20% share of total production; the company has shifted its production to copiers and printers which have a higher growth rate.

These successful stories are one side of the edges, the systems also have some weakness and limitations. Since Japanese production is so finely divided by these many companies, its techniques are also finely divided. Excellent results have been obtained through cumulative technical improvement on a small scale, but actually the results have not been sufficient for advancement in technical fields which require comprehensive ideas and an intensive investment in research and development.

Furthermore, Japanese companies are more flexible.

4. Historical Background

In Japan, assembly type machinery industries started their full scale expansion since 1930's, mainly to stimulate voluminous increase of military demand. However, well organized, efficient relationship between large and small industries, which we can observe today in Japanese industrial society, did not exist in the early stage of industrialization of assembly type machinery industries. On the contrary, lack of eligible supporting industries and weakness of technical, managerial skill in small industries were most serious bottle neck for development of industry. Till the end of 1930's, most of subcontractor did not have direct access to the core firm, transactions between two parties were often meditated by

the brokers who took high rate of commissions. The major reason to use subcontracting was adjusting fluctuations of demand in the parent firms, thus, they could not build any stable and long-term business relations.

As military demand for machinery industries expanded enormously, large firm could not meet the orders. For instance, Mitsubishi Heavy Industry accumulated unsettling up orders equivalent to over its two years production capacity in 1938. Increasing production capacity of machinery industries had crucial importance. For this purpose, not only small business but also cottage industries that engaged in making traditional products like a Buddhist ornaments, shifted their production to support the large machinery firms. Naturally, traditional small firms had too poor technological knowledge and equipments to link with modern large firms. To cope with the problems, drastic changes were needed in the production system as a whole, the reformation was introduced to the subcontracting system to make long-term and direct trade relations between small and large industries, in stead of floating and short-term relations which had been mediated by a broker. For this purpose, various measures had been taken. For instance, production process was divided into extremely small fields for each small subcontractor to meet their technological levels, limiting gages were given to them to produce compatible component.

Various measures had to the introduced to control a great number of small enterprises efficiently. Ministry of commerce and industry was reorganized to correspond to each industry. Incentive was provided to organize the manufacturer's cooperations and these industrial organizations functioned as a cross sectoral interface between government and private enterprises.

Japanese larger firms recognized the high adaptability of small business in improving technology as well as unexpected productive performances of interfirm division of labor. They also acquired numerious know-how to manage interfirm organizations through the war time experiences. This is the important reason why Japanese large firm prefer using small subcontractors without government guidance after the War.

4. External Control & Harness Opportunism

Early sourcing, joint products development, and the production of intangible goods such as a software products have gradually increased their importance. These activities operate under numerous uncertainties, risks of opportunities and demand a large amount of specific asset investments, including specific know how, most of them are matters of the internal confidence. We cannot make complete specifications or detailed contracts for these types of transactions in advance to the collaborations. Therefore, they require new advanced structure to govern these types of interfirm transactions, and some governance structures have to be built in to the system to harness opportunities and to control external firms efficiently. As Japanese core firms have access to the internal information of their suppliers, opportunistic behavior is well controlled. Core firm has a greater capacity to control than its subcontractors. As a result of this asymmetric bargaining power, one might expect core firm to indulge in opportunism and reduce a supplier's profits to a minimum. However extreme exploitation of a subcontractor is rarely found at least since the late 1960's.

Why is it that the core firms do not behave like tyrants, given their dominant positions? A first consideration is that continuous business relations have generated a mutual understanding and trust value within the systems. Second, social norms existing in the business society serve to regulate the transactions. Actually, firms that violated these norms have been taken as a social sanctions. A third factor concerns the increasing needs for collaborations with suppliers, the core firm in recognizing this, may try to strengthen the business relations and restrain any type of opportunism.

5. Evolution of Interfirm Relations

There are two key factors that characterize interfirm relations. One is the core firm's degree of control, in which can be defined in terms of their power and the supplier's relative dependency on the resources. The other factor is the accumulation level of trust value among parties. For example, strength and extent of a core firm's control over its subcontractors is defined by differences in the managerial resources possessed by the two parties. If the core firm has abundant resources and the subcontractor is heaving dependent on those resources, the latter will accept the authority of the former. This condition changes according to the accumulation of the subcontractors' resources. Transaction practices and business relations will also change according to the accumulation of trust values within systems. We can predict the development of interfirm relations based on these two factors.

Phase I, *Floating Relations;* At first, small firms had poor resources; large firms had no desire to incorporate them into the production process. Outsourcing was mainly used to adjust to fluctuations in demand; trust value was negligible.

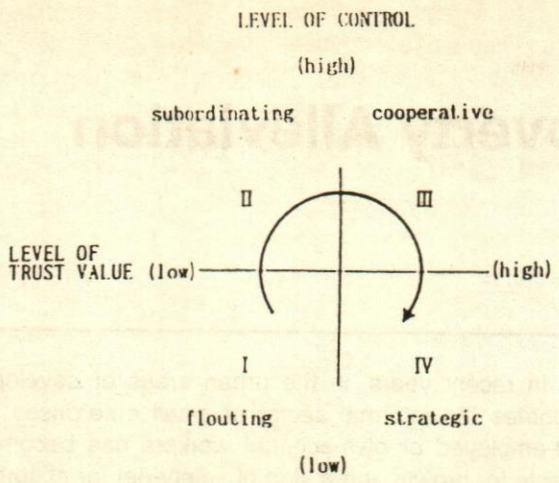

Fig. 2. Evolution of Inter-firm relations

Phase II, *Dominant-Subordinate Relations;* Small firms were incorporated into the large firm's systems to meet huge demand expansions. Core firms provided the resources to their subcontractors who were, inturn, heavily dependent on the resources, and subjected to their severe control. Trust values were not high enough to harness opportunities.

Phase III, *Cooperative Relations;* Subcontractors have accumulated their resources and improved their skills. However, core firms still retain some power resources and take initiative in the interfirm system.

Phase IV, *Strategic Relations;* Balanced bargaining power and mutual reliances exist within the systems. Different types of resources are exchanged to achieve advanced joint tasks and to realize a high rate of interfirm productivity. □

Don't start an improvement process to improve customer satisfaction or employee morale. It will do that, but the real reason you need an improvement process is to increase the organization's performance (PROFITS).

DR. H. JAMES HARRINGTON

The Informal Sector & Poverty Alleviation

S. Nanjundan

The author reviews the increasing role of the informal sector of small enterprises in the urban manufacturing and service sectors of developing countries. These migrants from rural areas have promoted growth and alleviated poverty, without much help from governments, who have concentrated assistance on the organised registered modern small enterprises. There is a case for a sustainable policy and programme to improve productivity in the informal sector, particularly in urban services. These enterprises should eventually operate within the legal framework; systematic human resource and infrastructure development is needed to attain this goal.

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In recent years, in the urban areas of developing countries the informal sector of small enterprises and self-employed or own-account workers has become a vehicle for growth and a kind of safety-net for absorbing migrants from rural areas in income-generating activities.

Unemployment & Poverty

The International Labour Office has recently, estimated that 800 million or 28% of the worlds 2.8 billion labour force is unemployed. The incidence of unemployment is high in heavily populated countries like India. Those depending on wages and salaries as employees are the worst affected. However, for a good proportion of the labour force parttime or seasonal employment or contribution to family labour is a means of livelihood. Dwindling opportunities in rural areas especially for the landless and other non asset-owning families lead to their migration to urban areas and the phenomenon of the informal sector.

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Unemployment in developed countries is largely due to the rapid technological developments arising from the computer chip and fast telecommunications, and the consequent structural changes required in industry, services, management, organisation, and skills. These trends undoubtedly affect developing countries through globalisation, and in the absence of or acute inadequacy of the requisite skills, result in the phenomena of jobless growth and further unemployment. The informal sector in many ways provides a safety valve in this scenario at least

temporarily. It cannot provide a longterm or permanent solution. It gives breathing time to governments, industry and business to develop the human resources for the national economy to function effectively in the global network, eventually enabling the informal sector to become a part of the legal structure.

Unemployment and underemployment in developing countries make their impact through poverty. About 1.1 billion people or one-third of the total population of the developing countries is reckoned to be below the poverty line. About half are in South Asia and 80 per cent in rural areas. While countries like India fear that urban poverty may become crucial in the future, the problem for the present is less acute than it should be because of the operation of the informal sector.

Small-scale enterprises

The availability of infrastructure and markets in urban areas in developing countries, as contrasted to the rural areas, leads to industrial concentration in and around cities. Often depressed agriculture and unfavourable terms of trade against rural areas leads to migration of cheap (and unemployed) labour to the urban areas. Urban industries thus provide employment and to that extent may be said to alliviate poverty. However, a policy of denudation of rural areas, deliberate or not, is self-defeating and leads to crowding of urban areas, depression of wages and further poverty. A policy and programme for agricultural and rural development, is a prerequisite both for rural and urban prosperity.

Experience of industrial growth as per capita income increases underlines the advantages of economies of scale and increase in the proportion of employment and income generated by large-scale enterprises. This has been accompanied by increased capital-intensiveness and a tendency for total employment generated by manufacturing industry to stagnate or even decline in mature economies. Promotion of small-scale enterprises has long been advocated and undertaken as a countervailing antimonopoly measure, as a seedbed for new entrepreneurship, as it is labour-intensive rather than capital-intensive, as it is catering at less cost to speciality and niche markets, and as being able to provide servicing in addition to manufacturing. While the number of small enterprises in an economy form 80 to 90 per cent of the total, their share of total employment and total output or income declines with growth, from 70 per cent of employment and 50 per cent of manufacturing value added at early stages of development, to 20 and 10 per cent respectively for industrialized economies.

A policy and programme for agricultural and rural development, is a prerequisite both for rural and urban prosperity.

The case for small enterprise promotion in developing countries has of course been stronger than in developed countries because of their lower skill and technology endowment and their higher social cost of capital versus labour. Programmes combining training, provision of factory space, capital and credit, extension services covering production and marketing, assistance in subcontracting from large enterprises or catering to government and institutional purchases or exports, had been undertaken in many countries with different degrees of success. They have indeed contributed to poverty-alleviation by providing employment and incomes in urban areas.

Promotion of small-scale enterprises has been undertaken as a countervailing antimonopoly measure, as a seedbed for new entrepreneurship.

The Informal Sector

More important than the organized sector of small-scale enterprises has been the so called informal sector in the alleviation of urban poverty. This sector consists of small-scale units engaged in production, assembling or distribution of goods and services, with a view to generating employment and incomes for the participants, notwithstanding constraints of capital and credit, technology and knowhow, organization and factory space. The sector is characterized by family or clan ownership usually from a migrant group to the urban area, which is another common trait of the sector. Furthermore, employment and a means of livelihood, and not the profit maximization motive is a specific feature of the activities. Subcontracted production to the informal sector takes place in clothing, garments, footwear and some types of engineering, and interestingly, more recently in some countries, in computer storing of data for large companies, both domestic and international. Within the urban informal sector, there are interlinkages from manufacturing to construction, transport, trade and services. Globalization, liberalization and the new technology provide more opportunities in the tertiary sectors in urban

areas. Attempts at formalization of the informal sector may be counterproductive until the developing country achieves a much higher level of per capita income and education and health standards for its people.

The informal sector is reported to employ about 30 million people (estimates by ILO in 1991). It has been regarded as the panacea for ameliorating urban poverty. Not being formally registered, it did not until recently receive the kind of government aid which has been concentrated on the modern organized small-scale industry sector. Governments of developing countries and international organizations have only very recently realized that the informal sector meets the social objectives of employment creation and poverty reduction, and needs to be strengthend, through their own groups, clusters or associations, with infrastructure, credits, training and technology and market information.

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The informal sector is important in most development. In Mexico 90.95 per cent of the number of enterprises are classified in the category of micro enterprises engaging 15 or less persons, 7.27 per cent in small enterprises engaging 16-100 employees. The micro enterprises synonymous with the informal sector contributed about 10 per cent of GDP; they were mostly in the tertiary sector, manufacturing being in the households and often in the small-scale category. In Indonesia, there were in 1986 1.4 million cottage industries accounting for 2.7 million of the 5.2 million persons engaged in manufacturing; 94,500 small-scale enterprises accounted for an employment of 770,000. Medium and large enterprises numbered 12,800 and employed 1.7 million. In India it has been estimated that in 1984-85 the informal sector accounted for nearly 34 million, representing 83 per cent of total industrial employment and 27 per cent of gross value added. (The informal sector is here defined as selfemployed persons and the non-factory non-registered enterprises). Table 1 provides the breakdown of industrial employment share of micro, small and large enterprises for some countries.

Table 1: Employment in industry according to size of firm

Country	Year	GNP per capita (US$82)	Employment (%) according to size of firm		
			Micro (0-10)	Small (10-49)	Large (59+)
India	1971	260	42	20	38
Tanzania	1967	280	56	7	37
Kenya	1969	390	49	10	41
Indonesia	1977	580	77	7	16
Zambia	1985	640	83	1	16
Philippines	1974	820	66	5	29
Columbia	1973	1,460	52	13	35
Republic of Korea	1975	1910	40	7	53

Source: Liedholm and Mead (1987), Small Scale Industries in Developing Countries, USAID, Washington D.C.

Globalisation & Effects on Industry

Since the 1980s, the concept of the role and significance of small-scale enterprises has undergone a considerable change in both developed and developing countries. For the former, globalization has involved free movement across country boundaries of materials, products, services and funds, and often people, seeking lowest factor costs and their optimum use in manufacturing in the face of competition amongst scores of mega firms. Globalization has been accompanied by the revolution in technology and management caused by the computer chip and instant telecommunications, which has decentralized operations, deconglomerized management, led towards change in production technology from mass production to flexible specialization thus making it economical to cater to differentiated fast changing market demand. There has been a tendency towards smaller scale of operations as contrasted to the gigantism until the 1970s, towards widely dispersed location of separable operations, and the increased role of servicing in the nature of assembling or finishing and marketing to meet different requirements, computerized accounting and financing.

These developments could not but affect profoundly the structure and pattern of industrialization in developing countries. Structural adjustment programmes in a score of developing countries in the 1980s is to correct the imbalances caused by the oil shock, crash in commodity prices, protectionism and stagnant agriculture, provided its own momentum to the changes required. The influence of globalization in the nineties has further led to policies of liberalization and market-friendliness in developing countries. What is of relevance in the present context is the impact of these changes on industry's role

vis-a-vis poverty eradication. Structural reform policies are favourable to agriculture and strengthen linkages with industry and trade. As regards urban industry, there is an initial setback to enterprises overly dependent on protection. But the informal sector whose operations are characterized by flexibility and innovation does not seem to face adverse effects in the short-term. However, skill upgradation, computer literacy and organizational arrangements to derive benefits of clustering are essential for the informal sector to meet market competition, locally and globally. Attention will now be drawn to the policies and programmes required for this purpose.

Skill upgradation, computer literacy and organizational arrangements to derive benefits of clustering are essential for the informal sector to meet market competition, locally and globally.

Policies for the Informal Sector

The policies and programmes for amelioration of urban poverty in India — where the incidence of urban poverty is considered likely to be higher in the future than rural poverty — is illustrative of public measures required. The Indian government adopted a four-pronged strategy in the 1980s, comprising employment creation for low income communities through promotion of micro enterprises and public works; housing and shelter upgradation; social development through special attention to children and women; and environment upgradation of slums. Through the *Nehru Rojgar Yojana*, both self-employment and wage employment are generated. People's representatives are involved through municipalities in formulating and implementing the scheme of urban micro enterprises; the scheme of urban wage employment; and the scheme of housing and shelter upgradation. For the self-employed, training and infrastructure support, as well as subsidy and loan are provided for setting up micro-enterprises in servicing, petty business and manufacturing. Wage employment is provided to the poor in urban areas with a population of less than 100,000 for creation of economically and socially useful assets, e.g. community centre, common workshop, common market place, water supply and drainage and sewerage works, community baths, roads, parks, etc. In housing and shelter upgrading, the poor are involved directly *in situ*, training, infrastructure support subsidy and loan being made available. Considerable success is claimed over a three and a half year period. Since 1990, Neighbourhood Development Committees have been set up under a pilot project for investment and participation by 10 women slum dwellers in each case, for carrying out programmes on mother and child health, non-formal and adult education, and assistance to the handicapped, delinquents drug addicts, etc. It is realized that particular attention needs to be paid to upgrade continuously the skills of youth and women, and develop service skills in different areas required in urban areas, e.g., plumbing carpentry, electric repairs, TV and VCR repairs, driving, domestic service, tourism, catering, etc. The enormity of the tasks to be achieved in a country of the size of India leads to the conclusion that a continuous longterm sustainable programme of human resource development (health, housing, education, family planning and child care) needs to be built up as part of the physical and social infrastructure.

The Future

There is no permanent role for the informal sector. The exploitation of women, children and bonded labour may not be more than in the legal sector, but prevention is more difficult to enforce in the informal areas. While inherent advantages of small scale of operation and management to cater to differentiated, specialised and niche markets and deserves promotion, there is no rational case for discriminatory exploitative wages and no other benefits to labour or for the exploitation of children. Increase in efficiency and productivity leads to higher wages. Dear labour produces cheaper products in terms of quality and performance, and *vice versa*. Furthermore it is irrational not to reap economies of scale and scope on the plea of protecting the small man and reserving products for exclusive manufacture to one sector or the other. On the other hand modern manufacturing and servicing provides interlinkages, inter and intra-sectorally, and immense scope for profitable cooperation based on mutual advantage. Finally, a successful programme should involve the beneficiaries themselves interacting with local agencies e.g., municipalities, associations and professional institutes e.g., NPC and LPCs, rather than the central government topdown through a hierarchy. The agents for change in urban areas should turn their attention to such groups as rag pickers, vegetable vendors, clothing pressers, three wheeler drivers, building labour of various categories, furniture makers, coolers and AC assemblers, retail shops, catering establishments etc. In short the modernization and productivity movement is as vital if not more so in the informal service sector, than in the manufacturing sector, large and small. □

Eighth Five Year Plan — Role of Small Industry

T.L.N. Swamy

While the Eighth Plan, like its predecessors, has several objectives, it differs from them in regard to the central thrust. The central thrust is now employment, whereas in the earlier plans, it was growth. The reason for this could be the observed slow-down in the rate of growth of employment in the manufacturing sector as well as in the economy. This article presents a study of the growth and productivity of the small industry in the context of employment generation.

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The last two decades have witnessed a substantial growth in unemployment. According to the recent estimates of the Planning Commission, (Working Paper, 1990), at the beginning of 1990-91, 16 million persons were fully unemployed and 12 million severely unemployed, giving thus a backlog of 28 million unemployed. The labour force is presently growing at the rate of 2.5 per cent per annum so that during 1990-95, it will be 37 million by 1995-2000, 41 million persons would have been added to the labour force. For full employment to be achieved by 1995, employment has to grow at the rate of 4 per cent and by 2000 A.D., at the rate of 3 per cent per annum (Sandesara 1992).

The labour absorbing capacity of large industry is limited and has been declining over a period of time due to the fact that it became more capital intensive (Hirway, 1991). Similarly, growth in agriculture facilitated by irrigation was labour-intensive in the initial stages but became capital-intensive later and was accompanied by reduced labour absorption (Mehra, 1976; Vaidyanathan, 1986). Moreover, the pressure of population on land is already high and increasing and has already resulted in a large surplus of labour in rural areas (Papola, 1982). It is in this context, the small scale industry whose employment potentiality is generally considered to be high, occupies an important place in fulfilling the central thrust of the Eighth Plan.

The labour absorbing capacity of large industry is limited and has been declining over a period of time due to the fact that it became more capital intensive.

The Government of India has been encouraging and supporting the promotion of small scale industries since Independence through deliberate policies such as protection from large scale industries, capital subsidies, differential tax treatment, reservation of specific items of production for small scale sector etc. Keeping its importance in view, a brief study was made to examine the growth and productivity of small industry and thereby its role in fulfilling the central thrust of the Eighth Plan for the period 1973-90 by using the data obtained through RBI Reports on Currency and Finance of various years. Output series at constant prices have been obtained by deflating the current series of output by the wholesale price index for industrial products for the relevant years.

Capital has also been corrected for price changes. For this, yearly additions in capital are deflated by the yearwise wholesale price index for machinery and transport and added to the base year stock of capital.

Growth of SSI

The number of small scale units has increased at 10.19 per cent per annum during the period 1973-90 but its growth was higher during 73-80 compared to that of 1989-90 (Table 1). Employment in these industries has grown at the rate of 7.35 per cent per annum for the entire study period. The sub-period analysis shows that the period 1973-80 has registered higher growth of employment (9.44%) compared to the period 1980-90 (5.93%). Similarly, capital investment has grown at a higher rate (12.24%) during the first sub-period compared to that of the later period (11.70%). On the whole it has grown at the rate of 13.32 per cent per annum. If the growth rates of factor inputs are compared, capital has grown at a higher rate than employment particularly during the eighties giving evidence to the fact that the small industry became capital-intensive over the study period.

Capital has grown at a higher rate than employment giving evidence to the fact that the small industry became capital-intensive.

Output has grown at a lower rate (11.58%) during the first period compared to that (12.57%) during the second sub-period. On the whole, it has registered a significant rate of growth of output to the extent of 12.62 per cent per annum.

Table 1: Growth rates* of small industry in India 1973-90

(Percent per annum)

Period	No. of units	Employment	Capital	Output
1973-74–80-81	10.55	9.46	12.24	11.58
1980-81–90-91	8.33	5.93	11.70	12.57
1973-74–90-91	10.19	7.35	13.32	12.62

* Computed by using the linear trend equation of the form Y = a+bt.
Source: RBI Report on Currency and Finance, 1979-80, 85-86, 89-90 and 90-91.

One may tend to believe on the basis of these observations that the relative higher growth in employment and capital during the seventies was not associated with the relative higher growth in output during the same period indicating that factor inputs have not been efficiently utilised during the seventies compared to the eighties. In order to probe the factor efficiency, partial productivity and capital intensity were estimated (Table 2).

Table 2: Estimates of partial productivities for small industry in India 73-90

Year	Labour Productivity (O/L)	Capital Productivity (O/K)
1973	181	3.14
1974	185	2.87
1975	189	2.96
1976	197	3.08
1977	198	3.07
1978	185	3.16
1979	201	3.24
1980	206	3.24
1981	215	3.90
1982	212	3.91
1983	223	4.22
1984	237	4.47
1985	254	4.92
1986	273	5.27
1987	292	5.66
1988	308	5.97
1989	326	6.38
1990	344	6.84
Trend growth* rate (percent per annum)		
1973-80	1.51	2.69
1980-90	5.69	6.90
1973-90	4.06	5.04

* Computed by using the linear trend equation of the form Y = a + bt.
Source: op. cit.

Factor Productivity & Intensity

The results clearly show that the labour productivity (O/L) has increased from 181 to 344 indicating the posi-

tive rate of growth of 4.06 per cent per annum over the study period, while the sub-period analysis shows that its rate of growth was higher (5.69%) during the eighties compared to that (1.51%) during the seventies. Capital productivity (O/K) has also shown an increase from 3.14 to 6.84 indicating the positive rate of growth of 5.04 per cent per annum. Its growth was also higher (6.90%) during the eighties compared to that (2.69%) during the seventies.

One may conclude on the basis of these observations that increase in capital intensity is associated with the technological improvements in the small industry and hence capital productivity has increased particularly at a higher rate during the eighties. By means of capital intensification, output as well as output per unit of worker may increase but output per unit of capital may not increase unless the expansion of capital is associated with technological development. Since the small industry has exhibited productive efficiency, it may be interesting to know the relationship of the amount of capital invested to the size of output on the one hand and the employment generated on the other. In order to examine this, a simple regression technique was applied for the data and results are presented in table 3.

By capital intensification, output as well as output per unit of worker may increase but output per unit of capital may not increase unless the expansion of capital is associated with technological development.

Table 3: Regression estimates for small industry 1973-1990

(1)	Relationship between output and employment	
	Equation*	
	$0 = -11605.07 + 398.0124\ E^{**}$	$R^2 = 0.94$
	(23.02606)	
(2)	Relationship between output and capital	
	Equation***	
	$0 = -19753.3 + 9.1179\ K^{**}$	$R^2 = 0.93$
	(0.6396)	

Note: Figures in parentheses are standard errors.

* Equation is of the form $0 = \alpha + \beta E$ where 0 refers to output E refers to employment.

** Significant at 1 per cent level of confidence

*** Equation is of the form $0 = \alpha + \beta K$ where 0 refers to output and K refers to capital.

Source: op. cit

Determinants of Output

The first relationship examined is between output and employment. The hypothesis which is implicitly tested here is that a large number of employees does not necessarily lead to higher output in industry. It is clear that in respect of small scale industries this hypothesis has been rejected. Employment generated is positively and significantly related to the value of output, since one unit increase in employment leads to substantial variation in output. Similarly, capital is also positively and significantly related to output since one unit increase in capital leads to an increase in output to the extent of Rs. 9 in respect of these industries.

During the last forty years, small industry has received very poor allocations in the plan outlays compared to large industry in India.

If this is the position of small industry in terms of growth and productivity, then what about its plan outlays? Has it received proper allocation which is important for the growth of any sector? In order to examine this, the relative shares of small and large industry were obtained and presented in table 4. Small industry was provided 2.1 per cent of total outlays on public sector during the First Plan period. From the Second Plan till 1979-80, the outlay of large industry was in the range of 1.5 to 4 per cent, while the outlay of large industry ranged between 19.6 to 20.1 per cent. During the Sixth and Seventh Plans, small industry has received just 1.8 to 1.5 per cent of total outlay whereas large industry obtained 13.7 and 11 per cent respectively. Thus during the last forty years, small industry has received very poor allocations in the plan outlays compared to large industry in India.

Table 4: Percentage of plan outlays of small and large industry in the total outlay of public sector 1951-1990

Plan/Year	Public Sector	
	Village and small industry	Industry and minerals
I Plan 51-56	2.1	2.8
II Plan 56-61	4.0	20.1
III Plan 61-66	2.8	20.1
Annual Plans 66-69	1.9	22.8
IV Plan 69-74	1.5	18.2
V Plan 74-79	1.5	22.8
Annual Plans 79-80	2.1	19.6
VI Plan 80-85	1.8	13.7
VII Plan 85-90	1.5	11.0

Source: Sandesara (1992).

Concluding Remarks

It is evident from the preceding analysis that small industry has exhibited high growth of productivity and low growth of employment during 1980-90 compared to that in 1973-80 in India. It may be due to the fact that small industry became capital-intensive particularly during the eighties since capital has grown at a very high rate compared to employment and moreover, growth in capital is also associated with technological advancement which reduces labour employment. In view of this, will the proposed policy measures by the Government including the New Small Enterprise Policy (NSEP) in the context of liberalisation help the small industry to achieve higher employment growth during the Eighth Plan than the rate during the eighties? If it is so, will this rate be so high as to push up the overall employment growth in the manufacturing sector in order to achieve the objective of full employment? It seems to be doubtful and unrealistic. Of course, the traditional type of small industry such as handicrafts and its ancillaries on which the NSEP also concentrates may achieve higher employment growth during the Eighth Plan period but on the whole, this rate may not be so high as to achieve the full employment objective envisaged by the Planning Commission.

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Too many managers expect their employees to correct the problems that are created by management. They cannot. Management must solve 80 per cent of the problems that face most organizations.

DR. H. JAMES HARRINGTON

Feature

Factor Productivity in the Manufacturing Sector in Gujarat

Hina Sidhu

The decade of 1980-91 has witnessed major structural changes in the manufacturing sector in Gujarat. The traditionally dominant textile industry, which had been holding first rank in contribution to the net value added in the manufacturing sector, has lost its prime place to the rapidly developing chemicals & chemical products and the electricals and electrical machinery industries. The study analyses the productivity trends in major manufacturing industries in Gujarat and India.

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The study of factor productivity is an important aspect of the analysis of development since it quantities the contribution of the different factors of production. Higher levels of growth can be attained through better utilisation of available resources i.e. capital and labour. Therefore, the study of factor productivity has particular significance in the formulations of policies at the state as well as national levels.

Higher levels of growth can be attained through better utilisation of available resources i.e. capital and labour.

When Gujarat was carved out as an autonomous State in 1960, its per capita cultivable land was less than one acre and 92 percent of its net cultivated land was rainfed. Erratic behaviour of rainfall in the State has left little scope for the agricultural sector to make additional contributions to the State Domestic Product (SDP). In order to achieve sustainable economic growth, industrial development was the only option. Therefore, the Govt. of Gujarat announced various policies along with emphasis on the creation of the required infrastructural facilities conducive for rapid industrial development. Congenial environment, necessary infrastructure, adequate power supply and peaceful and productive labour force have been attracting Indian as well as multinational entrepreneurs to set up/collaborate in setting up of units in Gujarat. This has resulted in Gujarat achieving 2nd rank among the industrially developed States in the country. The study of trends in factor productivity in the manufacturing industries is important for deciding future policies and measures so as to achieve desired levels of industrial growth.

Status of Manufacturing Sector in Gujarat

The manufacturing sector in Gujarat has been dominated by the textiles and chemicals & chemical products industries — the former being a traditional lion while the latter is an emerging giant. Other industries which have been contributing significantly to the SDP (in terms of value added) are electricals & electrical machinery, and food products.

The decade of 1980-91 witnessed major structural changes in the manufacturing sector in Gujarat. The traditionally dominant textile industry, lost its prime place to the chemicals & chemical products industry in 1981-82. The second jolt to the textiles industry occurred in 1987-88 when the electricals & electrical machinery captured the second rank in value addition (table 1). The place of other groups of industries, which have not been covered under this study, have remained almost unchanged over the years.

Table 1: Industry-wise Share in Total Value Added (Fig. in %)

Year	Food Products	Textiles	Chemicals & Chemical Products	Electricals & Electrical Machinery	Total
I. GUJARAT STATE					
1980-81	5.55	30.77	22.41	10.69	69.41
1981-82	6.12	25.08	26.94	11.68	69.82
1982-83	6.59	22.33	32.15	9.83	70.91
1983-84	6.81	22.44	23.07	9.52	61.84
1984-85	4.15	18.91	37.65	12.90	73.61
1985-86	5.48	17.02	37.51	12.23	72.25
1986-87	4.51	16.07	37.61	12.23	70.43
1987-88	5.86	13.08	43.01	14.24	76.19
1988-89	4.97	10.14	48.78	11.53	75.41
1989-90	9.86	12.47	37.12	12.95	72.40
1990-91	7.91	13.37	41.93	13.41	76.62
II. ALL INDIA					
1980-81	6.22	13.84	14.18	16.58	50.81
1981-82	7.64	11.11	14.16	15.90	48.82
1982-83	8.88	9.24	14.39	17.31	49.82
1983-84	10.17	10.15	15.80	17.24	53.37
1984-95	9.37	8.79	14.86	19.74	52.76
1985-86	9.36	8.71	15.14	17.58	50.79
1986-87	9.18	9.97	14.83	16.77	50.74
1987-88	9.85	8.52	16.22	18.22	51.81
1988-89	9.76	8.15	16.47	16.40	50.78
1989-90	10.89	9.28	16.93	17.42	54.52
1990-91	8.82	9.31	17.03	17.09	52.25

Concept of Productivity

The study of productivity of the factors of production is important in view of the limited availability of the factors of production, particularly capital. Depending upon the nature of the product and the process of production, different industries employ different combinations of the factor inputs. With the advancement in process technology, various alternatives are now available to manufacture a particular product. Due to various reasons, however, the entrepreneurs generally opt for capital intensive processes. This not only puts pressure on the limited capital resources but also restricts the generation of employment opportunities. In the labour intensive industries using unskilled and/or semi-skilled workers with a relatively low wage rate, the emphasis is on increasing the productivity of capital. On the other hand, in the capital intensive industries which use complex technology and employ specialised labour with spiralling wage levels, the prime concern is to increase labour productivity. As such, there are considerable variations in the factor intensities across different industries as well as different States. Therefore, when the objective is to examine variations in the levels of productivities, the concept of total productivity rather than partial productivity becomes more relevant.

When the objective is to examine variations in the levels of productivities, the concept of total productivity rather than partial productivity becomes more relevant.

Measurement of Productivity

The trends in total factor productivity (TFP) in this study have been measured by the use of four different methods of productivity. They are Direct method, Kendrick method, Solow method and Divisia method.

Direct Method of TFP

Total factor productivity index (TFPI) can be directly obtained through the geometric average of the partial factor productivity indices. Partial factor productivity has been obtained by dividing value-added by the respective factors of production. If we define partial factor productivity index of capital by PFPI (K), labour by PFPI (L), and total factor productivity index by TFPI, then

$$PFPI_{(K)} = \frac{V(t)}{K(t)}$$

and

$$PFPI_{(L)} = \frac{V(t)}{L(t)}$$

where V(t) = index of value added for the year t.

K(t) = index of capital employed for the year t, and

L(t) = index of labour employment for the year t.

The TFPI through the Direct Method will be calculated as

$$TFPI = \text{Squareroot } [\{PFPI (K)\} \times \{(PFPI (L)\}]$$

Kendrick Productivity Index

Total factor productivity index of Kendrick has been computed from the production function of the following form:

$$V(t) = r_0 K(t) + W_0 L(t)$$

where r_0 = share of capital in the value added in the base year,

W_0 = share of labour (total emoluments) in the value added in the base year.

K(t) = index of capital employed for the year t, and

L(t) = index of labour employment for the year t.

The Kendrick TFPI takes the following form

$$\text{Kendrick TFPI} = \frac{V(t)}{r_0 K(t) + w_0 L(t)}$$

Since Kendrick TFPI is based on the indices of value added, capital employed and labour employment, the denominator has been calculated through the geometric average of the weighted indices of capital and labour.

Solow Productivity Index

Solow TFPI is based on the production function.

$$V = f(K, L, t)$$

This production function takes the form of

$$V = Ae^{zt} K^r L^w$$

where V = value added,

K = capital employed,

L = labour employment,

t = time variable to serve as proxy for technological change.

r = production elasticity of capital

w = production elasticity of labour, and

z = annual rate of shift in the production function

The aforesaid production function when presented in the regression equation will be as follows.

$$\text{Log } V = a + z \text{ Log } A(t) + r \text{ Log } K + w \text{ Log } L$$

where A(t) = time trend series, and

a = constant or regression intercept.

Further, if we calculate the compound growth rates of Value added, capital employed, and labour employment separately and denote them by g, k and l respectively, then the following relation holds true:

$$g = z + rk + wl$$

In this equation,

z = shift in production function over time or the rate of technical progress,

rk = annual growth in value added due to growth in capital, and

wl = annual growth in value added due to growth in employment.

From the above relation, we get

$$z = g - (rk + wl)$$

Under the assumptions of perfect competition, the factors have been rewarded on the basis of their marginal products. In Solow TFPI, the technological progress, i.e. z has been taken as the measuring rod of productivity. The TFPI therefore has been calculated by z(Vt) i.e. the contribution of technological progress to the growth in value added. Components of growth in the selected industries have been presented in Annexure I.

Divisia Productivity Index

Divisia TFPI has been derived from the Solow decomposition of factor contributions. Divisia method takes into account the contribution of capital (rk) and labour (wl) in the computation of total factor productivity. Thus

$$\text{Divisia TFPI} = \frac{Vt}{[\{Kt (1 + rk)\} + \{Lt (1 + wl)\}]}$$

where Vt = value added in year t,

Kt = capital employed in year t, and

Lt = labour employment in year t

Methodology

Time series data on capital employed, labour employment, total emoluments paid, and value added in the major manufacturing industries (at two digit classification) were obtained from various issues of the Annual Survey of Industries (ASI). This study has taken into account total capital employed instead of fixed capital which is generally considered for the studies of productivity. The justification for considering total capital

employed is that, two factors of inputs viz., capital and labour contribute to the total value added. After accounting for the total share of labour i.e. total emoluments paid, the balance remains the share of total capital. Total capital includes paid up share capital, reserves and surpluses and long term borrowings. In other words, total capital employed includes total fixed capital, variable capital and non-current assets. As such, the exclusion of variable capital and non-current assets would underestimate the contribution of capital in the study of factor productivity.

The ASI data which is available at current prices has been converted into 1981-82 prices for the purpose of meaningful comparison. Wholesale price index of plant and machinery has been used to deflate the value of capital employed while the wholesale price indices of respective industries have been used to deflate other financial data.

The industries selected for this study are food products, textiles, chemicals & chemical products, and electricals & electric machinery. Their contribution to total value added in the manufacturing sector in Gujarat has increased from 69 percent in 1980-81 to 77 percent in 1990-91. As such these industries are the major contributors to the SDP. Other groups of industries have been excluded from the scope of this study. With a view to comparing the variations in factor productivities across industries at the State and National levels same groups of industries have been selected for All India.

Analysis of Productivity Indices

Productivity analysis takes into account the shifts in partial as well as total factor productivities which take place with the change in factor intensity due to modernisation in plant and machinery and/or adoption of improved process of production. An increase in factor inputs often may not bring about proportionate increases in their productivities. Sometimes an increase in one factor may influence the productivity of other factor. For example labour efficiency tends to improve with the adoption of improved technology. Therefore, the measurement of productivity of a single factor of input (capital or labour) would not be sufficient to interpret the trend of productive efficiency. Because total factor productivity (TFP) takes into account the productive efficiencies of both capital as well as labour, TFP is a more comprehensive measure to understand the overall trends in productive efficiencies of the factors of production. Thrends of partial factor productivities, however, do provide an inference about the movements of TFPI becaue it is a composite index of capital productivity and labour productivity indices. The analysis of partial as well as total factor productivities in the major manufacturing industries in Gujarat vis-a-vis all India were carried out.

An increase in factor inputs often may not bring about proportionate increases in their productivities.

Capital Productivity Index

Partial factor productivity of capital in Gujarat during the decade 1980-91 recorded a decline in all the major manufacturing industries except food products and chemicals & chemical products in which the compound annual rates of growth (CARGs) of PFPI (K) were 3.95 percent and 1.64 percent respectively (table 2). The aforesaid statement also holds good for the factor productivities in other groups of industries which have not been discussed in this study. Electricals & electrical machinery industry experienced major oscillations in PFPI (K) the net effect of which was a marginal decline (-0.76) in capital productivity over the 1980-91 period. Textiles industry registered a decline of 3.44 percent per annum in capital productivity. The net effect of variations in the capital productivities in different industries in the manufacturing sector was a fall of 2.07 percent per annum in the PFPI (K) during the decade 1980-91 in Gujarat.

A comparison of capital productivity in the selected manufacturing industries in Gujarat with all India (table 2) shows that in Gujarat, the capital productivity in the manufacruring industries, except food products, was lower than the national average. Although the capital productivity in the manufacuring sector registered a negative growth, the decline was higher in Gujarat (CARG –2.07%) compared to all India (CARG –0.09%).

Table 2: Indices of Partial Factor Productivity

Year	Food Products	Textiles	Chemicals & Chemical Products	Electricals & Electrical Machinery	All Manufacturing
I. GUJARAT STATE					
A. Capital Productivity					
1980-81	100.00	100.00	100.00	100.00	10.00
1981-82	117.93	86.09	131.15	100.69	105.37
1982-83	109.78	72.38	163.16	90.95	103.07
1983-84	142.88	81.01	115.19	89.40	108.51
1984-85	71.25	62.90	155.01	107.30	93.03

1985.86	107.50	62.95	130.42	108.55	91.78
1986-87	95.42	65.17	125.06	106.31	91.37
1987-88	118.80	56.77	140.82	105.47	90.02
1988-89	105.69	51.51	210.58	94.25	105.80
1989-90	166.44	63.80	148.65	96.69	98.26
1990-91	147.38	70.44	117.66	92.69	81.09
CARG (%)	3.95	–3.44	1.64	–0.76	–2.07
B. Labour Productivity					
1980-81	100.00	100.00	100.00	100.00	100.00
1981-82	110.61	99.44	122.67	108.58	107.46
1982-83	122.17	82.03	163.82	201.00	109.98
1983-84	186-60	109.25	136.79	120.93	141.74
1984-85	105.16	104.25	188.42	143.34	133.02
1985.86	157.45	125.63	198.41	154.70	153.90
1986-87	154.72	125.60	211.99	169.10	167.50
1987-88	209.52	114.81	210.91	185.28	167.09
1988-89	207.09	112.46	310.77	180.59	201.41
1989-90	326.16	118.60	212.93	179.03	181.01
1990-90	272.73	148.88	252.46	201.02	196.99
CARG (%)	10.55	4.06	9.70	7.23	7.01
II. ALL INDIA					
A. Capital Productivity					
1980-81	100.00	100.00	100.00	100.00	100.00
1981-82	133.09	86.98	105.28	100.11	101.55
1982-83	129.78	72.34	121.49	107.27	101.84
1983-84	132.04	77.32	128.00	107.44	99.34
1984-85	137.46	66.53	122.93	123.53	97.91
1985-86	150.86	67.51	114.83	104.26	100.25
1986-87	141.67	80.79	104.10	109.30	98.01
1987-88	126.79	68.55	113.81	107.23	94.16
1988-89	136.91	72.49	128.87	99.44	99.20
1989-90	140.58	86.07	126.94	109.70	103.69
1990-91	111.79	87.84	122.40	107.78	98.14
CARG (%)	1.12	–.29	2.04	0.75	–0.19
B. Labour Productivity					
1980-81	100.00	100.00	100.00	100.00	100.00
1981-82	135.77	100.04	110.20	105.65	110.57
1982-83	185.14	89.62	124.72	121.64	120.12
1983-84	281.15	109.08	145.58	130.90	136.05
1984-85	270.70	104.14	139.98	153.65	141.02
1985.86	297.63	113.94	142.84	142.12	154.05
1986-87	304.07	133.75	147.03	147.31	158.34
1987-88	289.92	125.17	161.03	154.70	160.57
1988-89	364.06	139.76	179.64	157.73	181.42
1989-90	415.59	163.18	207.43	184.98	194.17
1990-91	364.90	183.27	235.06	192.18	211.03
CARG (%)	13.82	6.25	8.92	6.75	7.75

Labour Productivity Index

Partial factor productivity indices of labour display that during the period 1980-91, the labour productivity in Gujarat increased in all the manufacturing industries under study. The table also exhibits sizable increases in PFPI(L) in food products (CARG 10.55%) and chemicals & chemical products (CARG 9.0%). In the other industries, the CARG of labour productivity was 7.23 percent in electicals & electrical machinery, and 4.06 percent in textiles.

Food Products and chemicals & chemical products industries also registered higher growths in labour productivities at the national level (table 2). Interestingly, the labour productivity in the total manufacturing sector in Gujarat is almost comparable with all India. The CARG of labour productivity in the total manufacturing sector was 7.01 percent for Gujarat and 7.75 percent for all India.

Total Factor Productivity Index (TFPI)

Total factor productivity indices (TFPIs) in this study have been obtained through four different methods viz., Direct method, Kendrick method, Solow Method, and Divisia Method. While the TFPIs obtained through the Direct and Kendrick methods provide the same results, the TFPIs obtained through Solow and Divisia methods although providing different values are almost in consonance with Direct and Kendrick TFPIs in their trend.

TFP in Food Products Industry

Total factor productivity in the food products industry in Gujarat registered an appreciable growth during the period 1980-91. Compound annual rate of growth (CARG of TFP as per Kendrick and Direct Method was 7.20 percent, Solow method 10.18 percent and Divisia method 7.65 percent (table 3).

TFPIs obtained through Direct, Kendrick and Divisia methods registered a decline during the years 1984-85, 1986-87, 1988-89 and 1990-91. Except for the year 1988-89, Solow method also shows a declining trend in TFP during the aforesaid years. The decline in TFP may be caused by strained profit margins in the food products industry as the value added in food products industry as percentage of the total value added in the manufacturing sector recorded a decline during the respective years (table 1).

TFP in the food products industry at the national level also recorded a declining trend during the years 1984-85, 1986-87, and 1990-91.There are, however, certain variations in the TFPIs obtained through different methods.

Table 3: TFPI of Food Products Industry

Year	Direct Method	Kendrick Method	Solow Method	Divisia Method
GUJARAT				
1980-81	100.00	100.00	100.00	100.00
1981-82	114.21	114.21	113.21	113.13
1982-83	115.81	115.81	142.34	117.42
1983-84	163.29	163.29	190.74	168.14
1984-85	86.56	86.56	95.50	89.83
1985-86	130.10	130.10	141.35	134.95
1986-87	121.51	121.51	128.62	126.52
1987-88	157.77	157.77	166.62	164.46
1988-89	147.94	147.94	168.80	154.06
1989-90	232.99	232.99	317.45	242.63
1990-91	200.49	200.49	263.56	208.97
CARG (%)	7.20	7.20	10.18	7.65
ALL INDIA				
1980-81	100.00	100.00	100.00	100.00
1981-82	134.43	134.43	136.74	135.23
1982-83	155.01	155.01	178.19	170.68
1983-84	192.67	192.67	223.80	229.65
1984-85	192.90	192.90	211.21	227.01
1985-86	211.90	211.90	221.35	249.44
1986-87	207.55	207.55	220.93	247.69
1987-88	191.72	191.72	225.76	230.92
1988-89	223.25	223.25	282.56	273.84
1989-90	241.71	241.71	350.95	299.32
1990-91	201.97	201.97	311.21	251.72
CARG (%)	7.28	7.28	12.02	9.67

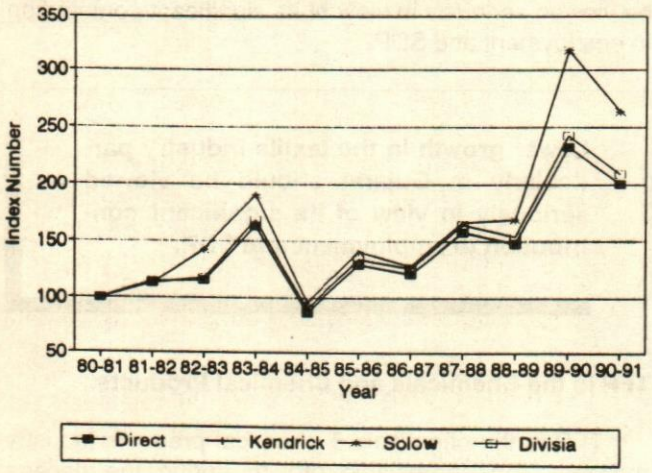

Fig. 1a TFPI of Food Industry (Gujarat State)

While the Kendrick and Direct Methods have shown an increase in TFPI in 1984-85 and a decrease in TFPI in 1987-88, the Solow and Divisia indices have shown a reverse picture during the respective years,(table 3). The CARGs of TFP in the food products industry in India were 7.28 percent as per Direct and Kendrick methods, 12.02 percent in Solow and 9.67 percent in Divisia Indices. Trends of TFPIs obtained though different methods have been graphically presented in Fig. 1a for Gujarat and Fig. 1b for all India.

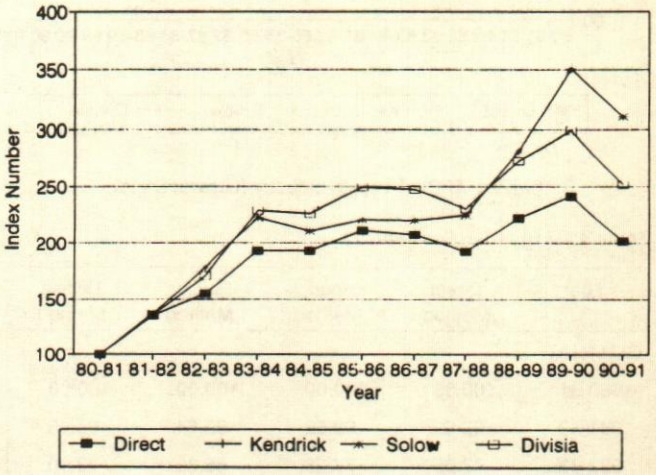

Fig. 1b TFPI of Food Industry (All India)

TFP in the Textiles Industry

TFP in the textiles industry in Gujarat did not show appreciable growth during the period 1980-91. TFPIs obtained through Kendrick and Direct methods indicate that the trends of TFP have remained below the 1980-81 levels during the period 1981-82 to 1989-90 (table 4). Table 4 and Fig. 2a show that the TFPIs registered a decline over the corresponding previous years in 1981-82, 1982-83, 1984-85, 1987-88 and 1988-89. The Solow and Divisia TFPIs also registered a decline during the aforesaid years. However, the Divisia TFPI recorded higher productivity during the years 1983-84, 1985-86, 1986-87, and 1990-91 and Solow method registered higher TFPs in 1983-84 which contradict the results obtained through Kendrick and Direct methods. From the analysis of partial factor productivity, it appears that TFPs in the textile industry were low due to lower capital productivities. The CARGs of TFP obtained through different methods show an increase of 0.24 percent in Kendrick as well as Direct TFPIs, a decline of 2.17 percent in Solow TFPI and an increase of 1.99 percent in Divisia TFPIs.

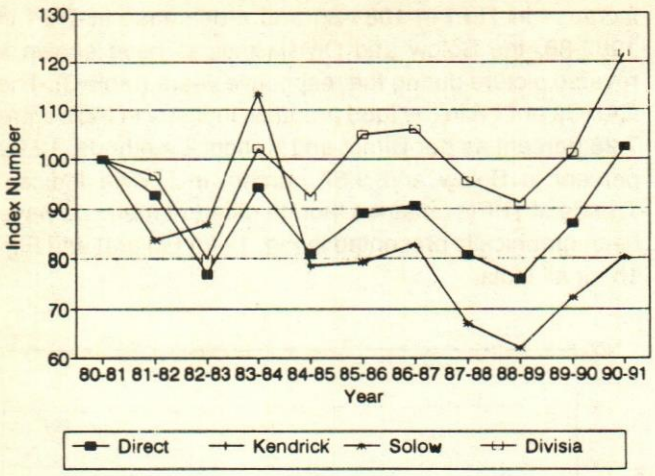

Fig. 2a TFPI of Textile Industry (Gujarat State)

Table 4: TFPI of Textiles Industry

Year	Direct Method	Kendrick Method	Solow Method	Divisia Method
GUJARAT				
1980-81	100.00	100.00	100.00	100.00
1981-82	92.52	92.52	83.64	96.45
1982-83	77.05	77.05	86.89	79.90
1983-84	94.08	94.08	113.38	102.14
1984-85	81.01	81.01	78.52	92.20
1985-86	88.93	88.93	79.22	104.77
1986-87	90.47	90.47	82.66	105.96
1987-88	80.73	80.73	67.07	95.33
1988-89	76.11	76.11	62.07	90.95
1989-90	86.99	86.99	72.34	101.22
1990-91	102.40	102.40	80.28	121.77
CARG (%)	0.24	0.24	–2.17	1.99
ALL INDIA				
1980-81	100.00	100.00	100.00	100.00
1981-82	93.28	93.28	89.38	96.66
1982.83	80.51	80.51	83.40	84.90
1983-84	91.83	91.83	100.41	99.57
1984-85	83.24	83.24	89.17	92.05
1985-86	87.71	87.71	92.67	98.24
1986-87	103.95	103.95	107.94	116.07
1987-88	92.63	92.63	97.77	105.02
1988-89	100.69	100.66	106.15	114.97
1989-90	118.51	118.51	134.41	135.06
1990-91	136.88	126.88	147.72	146.33
CARG (%)	2.41	2.41	3.98	3.88

At the all India level also, the fluctuations in the trends of TFPIs in the textiles industry were almost in consonance with Gujarat State (table 4 and Fig. 2b). TFPIs

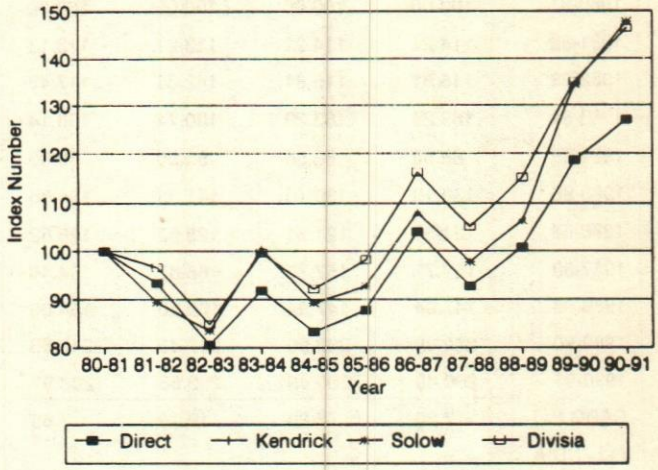

Fig. 2b TFPI of Textile Industry (All India)

at the national level also recorded a decline in productivity over the corresponding previous years for 1981-82, 1982-83, 1984-85, and 1987-88. The values of TFPIs were higher than the Gujarat State for all except one year (1983-84) in the Kendrick, and Direct TFPIs, two years (1982-84) in Solow TFPI, and two years (1983-84 and 1985-86) in Divisia TFPI. The CARG of TFP in the textiles industry at the all India level recorded an icrease of 2.41 percent in the Kendrick and Direct TFPIs, 3.98 percent in Solow and 3.88 percent in Divisia TFPIs. Table 4 shows that the CARG of TFP in textiles industry was higher at the all India level compared to Gujarat State. Lower growth in the textile industry particularly in Gujarat should be viewed seriously in view of its significant contribution to employment and SDP.

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TFP in the Chemicals and Chemical Products

TFP in the chemicals & chemical products industry registered an appreciable growth during the decade 1980-91. In Gujarat, the TFPIs obtained through different methods show significant increases during all the years

except 1983-84 and 1989-90 (Table 5 and Fig. 3a). The dips in the TFPIs during the aforesaid years were the cumulative effects of decline in capital as well labour productivities. The trends of TFP recorded by the Kendrick and Direct TFPIs contracticted the Solow and Divisia TFPIs for the years 1985-86 and 1980-90; the former two methods show a decline while the latter two methods show an increase in the TFPIs during the respective years. The CARGs of TFPIs recorded by different methods were 5.59 percent in Direct and Kendrick TFPIs, 13.21 percent in Solow and 3.77 percent in Divisia TFPIs.

Table 5: TFPI of Chemicals and Chemical Products Industry

Year	Direct Method	Kendrick Method	Solow Method	Divisia Method
GUJARAT STATE				
1980-81	100.00	100.00	100.00	100.00
1981-82	126.84	126.84	123.35	128.04
1982-83	163.49	163.49	171.81	163.39
1983-84	125.52	125.52	160.01	121.95
1984-85	170.90	170.90	214.60	165.31
1985-86	160.86	160.86	239.67	148.26
1686-87	162.83	162.83	265.60	146.10
1987-88	172.34	172.34	302.84	159.42
1988-89	255.82	255.82	410.18	237.47
1989-90	177.91	177.91	295.91	166.27
1990-91	172.35	172.35	345.76	144.81
CARG (%)	5.59	5.59	13.21	3.77
ALL INDIA				
1980-81	100.00	100.00	100.00	100.00
1981-82	107.71	107.71	111.23	107.19
1982-83	123.09	123.09	126.69	122.76
1983-84	136.51	136.51	152.58	134.50
1984-85	131.18	131.18	147.05	129.23
1985-86	128.07	128.07	157.18	124.62
1986-87	123.72	123.72	156.67	117.89
1987-88	135.38	135.38	181.59	128.96
1988-89	152.15	152.15	209.37	145.32
1989-90	162.27	162.27	239.37	150.30
1990-91	169.62	169.62	263.80	151.48
CARG (%)	5.43	5.43	10.19	4.24

At the all India level, the TFP in the chemicals & chemical products industry recorded an appreciable growth during the decade 1980-91. Marginal declines in the TFPIs were recorded during three consecurtive years 1984-85 to 1986-87. TFPIs obtained through different methods show almost similar trends throughout the

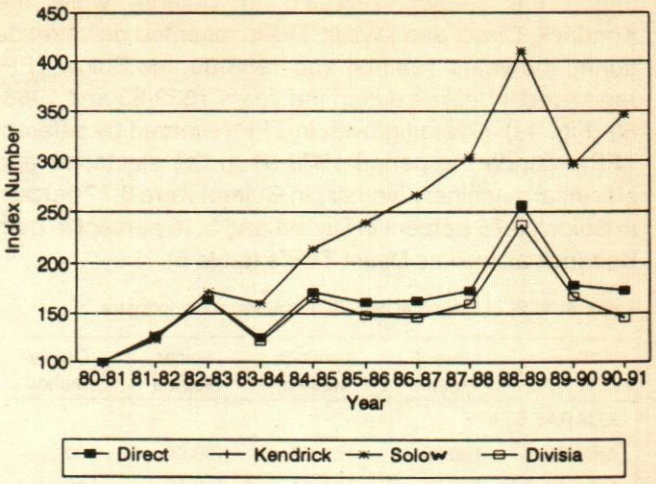

Fig. 3a TFPI of Chemicals & Products Industry (Gujarat State)

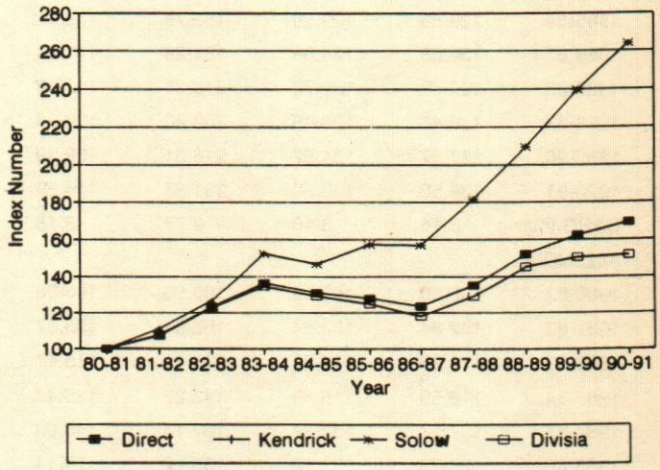

Fig. 3b TFPI of Chemicals & Products Industry (All India)

period 1980-91 except one year (1985-86) for which the Solow TFPI deviated from other TFPIs (Fig. 3b). An inference from the partial factor productivity indices (table 2) is that while capital productivity affected the TFP during three consecutive years 1984-87, labour productivity might have retarded during the year 1984-85. Inspite of minor dips during 1984-87 the overall growth in TFP was respectable; the CARGs of TFP recorded by different methods was 5.43 percent by Kendrick and Direct TFPIs, 10.19 percent by Solow and 4.24 percent by Divisis TFPIs.

TFP in Electricals and Electical Machinery Industry

TFP in the electicals & electrical machinery industry recorded a steady growth except two minor downtrends

during the decade 1980-91. In Gujarat, while the Kendrick, Direct and Divisia TFPIs recorded downtrends during the years 1983-84 and 1988-89, the Solow TFPI registered a decline during the years 1882-83 and 1988-89 (Fig. 4a). Overall growth in TFP recorded by different TFPIs during the period 1980-91 in the electricals and electrical machinery industry in Gujarat were 8.77 percent in Solow, 3.76 percent in Divisia and 3.16 percent in both Kendrick as well as Direct TFPIs (table 6).

Table 6: TFPI of Electrical and Electrical Products Industry

Year	Direct Method	Kendrick Method	Solow Method	Divisia Method
GUJARAT STATE				
1980-81	100.00	100.00	100.00	100.00
1981-82	104.56	104.56	112.09	105.81
1982-83	135.21	135.21	110.14	143.15
1983-84	103.98	103.98	138.42	108.19
1984-85	124.02	124.02	154.11	128.88
1985-86	129.59	129.59	163.78	135.47
1986-87	134.08	134.08	181.23	141.24
1987-88	139.79	139.79	210.21	147.90
1988-89	130.46	130.46	203.20	138.28
1989-90	131.57	131.57	216.21	139.39
1990-91	136.50	136.50	231.83	144.59
CARG (%)	3.16	3.16	8.77	3.76
ALL INDIA				
1980-81	100.00	100.00	100.00	100.00
1981-82	102.84	102.84	106.84	103.37
1982-83	114.23	114.23	130.41	115.47
1983-84	118.59	118.59	142.29	120.41
1984-85	137.77	137.77	167.14	140.03
1985-86	121.72	121.72	156.12	124.14
1986-87	126.89	126.89	151.55	129.37
1987-88	128.80	128.80	174.44	131.49
1988-89	125.24	125.24	178.37	127.85
1989-90	142.45	142.45	210.72	145.23
1990-91	143.93	143.93	226.46	146.45
CARG (%)	3.71	3.71	8.52	3.89

At all India level also, the TFPs in the electricals & electrical industry registered a steady growth during the decade 1980-91 except two sub-periods. While TFPIs obtained through Kendrick, Direct and Divisia methods recorded a decline in 1985-86 and 1988-89, the Solow TFPI registered down-trends during two consecutive years of 1985-86 and 1986-87 (Fig. 4b). The CARGs of TFP recorded by different methods were 8.52 percent in Solow, 3.89 percent in Divisia and 3.71 percent in both Kendrick and Direct TFPIs. It is worth mentioning that the growth in TFP in the electricals and electrical machinery

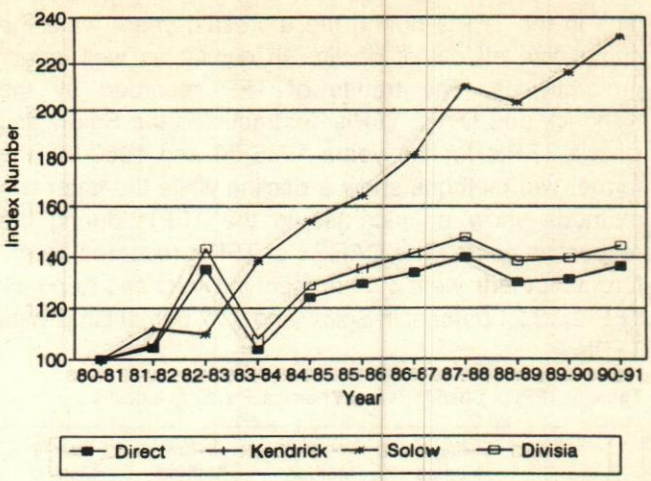

Fig. 4a TFPI of Electricals and Products Industry (Gujarat State)

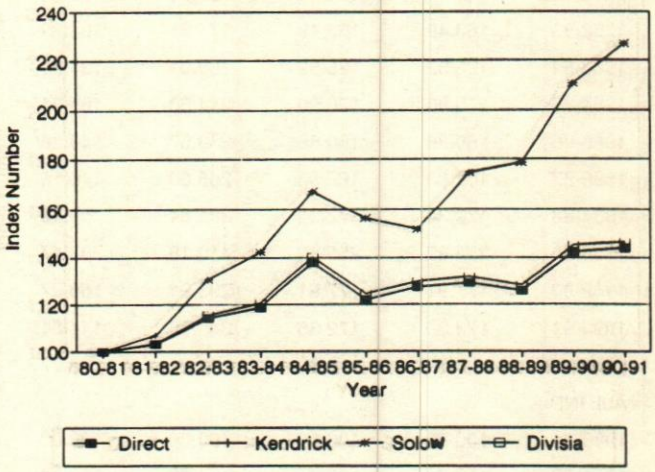

Fig. 4b TFPI of Electricals and Products Industry (All India)

industry at the all India level have been almost comparatable with Gujarat State (table 6).

TFP in All the Manufacturing Industries

TFPIs obtained through Kendrick, Direct and Divisia methods registered declining trends during the years 1984-85, 1987-88, 1989-90, and 1990-91. While the variations in the Solow TFPI were in consonance with TFPIs obtained through other methods, it registered an increasing trend during 1990-91 which is contrary (Figs 5a and 5b). The CARGs of TFP in the manufacturing sector in Gujarat during the decade 1980-91 recorded by different methods were 6.33 percent in Solow, 2.40 percent in Divisia and 2.37 percent in both Kendrick and Direct methods (table 7).

The TFPs in the manufacturing sector at all India level recorded steady growths during the decade 1980-91 except one year (1987-88) in which the TFPIs obtained though Kendrick, Direct and Divisia methods recorded downward trends. The Solow TFPI however recorded a steady growth throughout the decade 1980-91. The CARGs of TFP recorded by different TFPIs were 8.19 percent in Solow, 3.88 percent in Divisia and 3.71 percent in both Kendrick and Direct methods. The analysis also reveals that the TFP in the manufacturing sector was higher at the national level, compared to Gujarat State.

Table 7: TFPI of All Manufacturing Industries

Year	Direct Method	Kendrick Method	Solow Method	Divisia Method
GUJARAT STATE				
1980-81	100.00	100.00	100.00	100.00
1981-82	106.41	106.41	102.61	106.64
1982-83	106.47	106.47	119.74	107.20
1983-84	124.01	124.01	155.43	126.71
1984-85	111.24	111.24	127.73	114.04
1985-86	118.85	118.85	143.16	121.95
1986-87	123.71	123.71	158.25	126.65
1687-88	122.65	122.65	157.78	125.49
1988-89	145.98	145.98	188.43	149.21
1989-90	133.37	133.37	178.54	136.51
1990-91	126.38	126.38	184.79	126.81
CARG (%)	2.37	2.37	6.33	2.40
ALL INDIA				
1980-81	100.00	100.00	100.00	100.00
1981-82	105.97	105.97	111.35	106.93
1982-83	110.61	110.61	124.86	112.38
1983-84	116.25	116.25	136.90	119.14
1984-85	117.51	117.51	140.33	120.62
1985-86	124.28	124.28	147.20	127.73
1986-87	124.58	124.58	149.83	128.07
1987-88	122.96	122.96	158.73	126.35
1988-89	134.15	134.15	180.24	137.61
1989-90	141.89	141.89	200.48	145.43
1990-91	143.91	143.91	219.62	146.37
CARG (%)	3.71	3.71	8.19	3.88

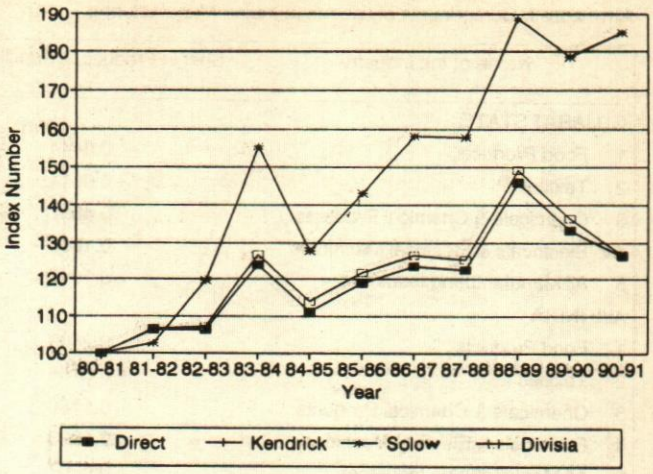

Fig. 5a TFPI of All Manufacturing Industries (Gujarat State)

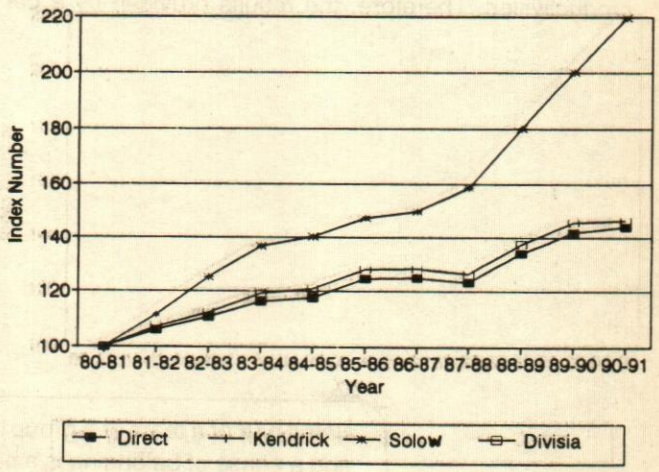

Fig. 5b TFPI of All Manufacturing Industries (All India)

Conclusion

The study of factor productivity in the major manufacturing industries in Gujarat and India reveals that during the decade 1980-91 capital productivity recorded lower growth than lobour productivity. This may be due to increasing capital intensity resulting from the modernisation of existing plants and adoption of improved process technology by the new industrial units. The increase in capital intensity on the other hand has reduced the scope for generation of employment opportunities. This must be viewed seriously and steps must be taken to absorb the increasing surplus labour in order to avoid large scale unemployment.

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Annexure I: Components of Growth in Indian Manufacturing

Name of the Industry	Shift in Production Function (t) z	Growth in (capital) rk	Growth in (labour) wl	Growth in Value Added g
GUJARAT STATE				
1 Food Products	0.0444	0.3801	– 0.0804	0.3441
2 Textiles	– 0.0511	0.0268	– 0.1209	– 0.1453
3 Chemicals & Chemical Products	0.4837	0.0445	0.0398	0.5680
4 Electricals & Electrical Machinery	0.1866	0.1691	0.0263	0.3820
5 All Manufacturing Industries	0.1047	0.1955	– 0.0207	0.2795
ALL INDIA				
1 Food Products	0.2608	0.1955	0.0048	0.4611
2 Textiles	– 0.3186	0.4458	0.0078	0.1350
3 Chemicals & Chemical Products	0.1130	0.2168	0.0486	0.3785
4 Electricals & Electical Machinery	0.1223	0.1407	0.0615	0.3235
5 All Manufacturing Industries	0.0207	0.2808	– 0.008	0.3007

It has been observed that different methods have provided different pictures about the trends of total factor productivities. Therefore, the results provided by a particular method should be used cautiously and various alternative methods should be tried in order to draw a meaningful conclusion. □

Being part of a team or a group that provides security, acceptance and a sense of belonging is a basic need for most human beings.

DR. H. JAMES HARRINGTON

Feature

Manpower Mobility in An Era of Globalization: Some Issues

Bhaskar Majumder

We accept a relation of proportionality between the rate of economic growth and the rate of increase in quality-weighted manpower. We also accept that education is the root of power of people and also local and global power-differential. Globalization is then conditioned and constrained by manpower planning. Effectively it would imply development of the power of man for participation in activities and hence mobility, with the aid of knowledge. Globalization or environment of competition thus requires the nation states to get prepared in the front of manpower planning.

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Globalization of production (Gordon, 1988) often described as a process of a 'Decline of Nationalism' (Griffin, 1981) is an event of the recent past. The post-Second World War would have been compartmentalized into a few but dominant group of industrialized countries, and a large but subordinate group of non-industrialized or industrializing countries. Globalization is a process of enveloping the latter by the former by application of finance-military-technology power. The industrializing countries of the 1990s have accepted, by choice or by compulsion, market mechanism rather than centralized control for allocation of resources. It is at the same time true that the State in each country now industrialized has been the driving force for transformation of resources to offer the infra-structure necessary for capitalist industrialization.

We accept a relation of proportionality between the rate of economic growth and the rate of increase in quality-weighted labour force or manpower. In the context of globalization, manpower planning will have dual dimensions: planning for men and planning for industrialization. In the former, the aim is to ensure a sense of participation for man in production and related activities. This rests on development and hence mobility of man with the aid of knowledge. In the latter, planning for structural adjustment in an industrial society today requires that man is thrown in, and not thrown out of,

The market-determined strategy of manpower mobility is to be supported by, and often preceded by, the generation of job opportunities to ensure the success of globalization for man and for industrialization of the nation state.

industrial production activities. Both these dimensions require that the market-determined strategy of manpower mobility is to be supported by, and often preceded by, the generation of job opportunities to ensure the success of globalization for man and for industrialization of the nation state.

Technology, Employment & Manpower Mobility

Less developed countries in general are characterised by immobility of labourers, not because of the labourers do not like to be mobile but because they are not informed about 'better' job opportunities elsewhere, if job opportunities exist at all, or because they are unable, individually and institutionally, to be present elsewhere. Thus when we talk about manpower mobility, we mean 'vertical mobility' and not a horizontal one. The question of capability and opportunity is relevant in the case of vertical mobility. It involves higher wages and better working conditions and/or better establishment/status.

We consider here inter-industrial mobility and rule out dual existence of man. He is not a casual labourer, nor a part-timer. He is a full time permanent employee in a single firm at a time. We consider, in short, inter-industrial vertical mobility of man and exclude the other types (Kerr, 1954).

Labour mobility as such is conditioned at the starting point, by additional job opportunities, and subsequently supported by wage flexibility and wage-differential. With no additional labour absorption in the macro economy, there may occur intra and intersectoral reallocation of labour. But in a state of increasing population, it would imply increasing unemployment that may cross the limit of socio-political tolerance. Thus effective labour mobility also requires increasing job opportunities.

Labour mobility is conditioned at the starting point, by additional job opportunities, and subsequently supported by wage flexibility and wage-differential.

Let K denote capital-labour ratio or capital per capita.

K physical capital stock

L labour number (quantity).

Then $k = \frac{K}{L} \rightarrow$ (1)

Taking log in (1) and differentiating with respect to time (t) we get:

$$\frac{\dot{L}}{L} = \frac{\dot{K}}{K} - \frac{\dot{k}}{k} \rightarrow (2), \text{ where dot (.) mean } \frac{d(\,)}{dt}$$

Equation (2) implies that

Rate of additional labour absorption = Rate of capital accumulation — Rate of capital intensity.

So, labour employment is conditioned by the way capital is used and added.

Let V denote capital output ratio,

Q the physical volume of output

AP_L average product of labour.

Thus, $V = \frac{K}{Q} \rightarrow$ (3)

or, $V = \frac{K/L}{Q/L}$

or, $V = \frac{k}{AL_L} \rightarrow$ (4)

Taking log in (4) and differentiating with respect to time (t) we get

$$\frac{\dot{V}}{V} = \frac{\dot{k}}{k} - \frac{\dot{AP}_L}{AP_L} \rightarrow \quad (5)$$

or, $$\frac{\dot{k}}{k} = \frac{\dot{V}}{V} + \frac{\dot{AP}_L}{AP_L} \rightarrow \quad (6)$$

From (3), similarly,

$$\frac{\dot{K}}{K} = \frac{\dot{Q}}{Q} + \frac{\dot{V}}{V} \rightarrow \quad (7)$$

From (2) and (6)

$$\frac{\dot{L}}{L} = \frac{\dot{K}}{K} - \frac{\dot{V}}{V} - \frac{\dot{AP}_L}{AP_L} \rightarrow \quad (8)$$

From (2) and (7),

$$\frac{\dot{L}}{L} = \frac{\dot{Q}}{Q} + \frac{\dot{V}}{V} = \frac{\dot{k}}{k} \rightarrow \quad (9)$$

From (8) and (9),

$$\frac{\dot{K}}{K} = 2\frac{\dot{V}}{V} + \frac{\dot{Q}}{Q} + \frac{\dot{AP}_L}{AP_L} - \frac{\dot{k}}{k} \rightarrow \quad (10)$$

From (2) and (10),

$$\frac{\dot{L}}{L} = 2\frac{\dot{V}}{V} + \frac{\dot{Q}}{Q} + \frac{\dot{AP}_L}{AP_L} - 2\frac{\dot{k}}{k} \rightarrow \quad (11)$$

Obviously R. H. S. in (11) shows non-exhaustive technological conditions of labour employment. The forces that favour labour employment are productivity of labour and growth of output, inverse of productivity of capital and inverse of capital-intensity.

The forces that favour labour employment are productivity of labour and growth of output, inverse of productivity of capital and inverse of capital-intensity.

We have considered the technological options for additional labour absorption, and hence labour mobility. We use an example to explain its rationality.

Let there be two firms in two industries producing two different products paying different wage rates. Two persons, a and b, (or two groups of persons) are employed in firms A and B respectively. We assume no exit of firms and persons. We assume existence of job-seekers outside at the prevailing wage rate, wherever it is.

Example

(1)	Firms	A	B		
(2)	Existing Manpower:	a	b		
(3)	Mobility cases				Reaction (Implication)
	I. No Entry →	(i)	0	b + a	Exit of A
		(ii)	a + b	0	Exit of B
		(iii)	c	b + a	Person c is a new entry in A, while a moves to B.
		(iv)	a + c	b	Person c is a new entry in A, with no mobility.
	II. Positive Entry →	(v)	a + b	c	Person c is a new entry in B, while b moves to A.
		(vi)	b + c	a	Person c is a new entry in A, while b moves to A and a to B.
		(vii)	a	b + c	Person c is a new entry in B, with no mobility.
		(viii)	b	a + c	Person c is a new entry in B, while a moves to B and b moves to A.

Here (i) and (ii) are ruled out by assumption; (iv) and (vii) show only new absorption and no mobility. The cases (iii), (v), (vi), and (viii), indicate labour mobility in a situation of additional labour absorption.

One firm does not employ only one person, but a hierarchy of persons, interdependent in production of commodities. Even then if a person moves to another job, his position is to be filled in by absorption of another person, on the assumption that the initial appointment was rational and on the assumption of continuance of complementarity between other inputs and manpower. Thus the question of labour mobility is to be seen in a frame of labour absorption.

It is rational for a firm to discourage the exit of skilled labourers, thereby obstructing mobility. But paradoxically, the same firm encourages the entry of skilled labourers from other firms, thereby inviting mobility. Every firm thus has a dual face on the question of labour mobility. From the viewpoint of all the firms taken together, it is a zero-sum game, the question being initial allocation of manpower and its subsequent reallocation. It becomes a non-zero-sum game when the implications of altered allocation are considered. Thus the movement of a national economy requires manpower mobility.

It is by now generally accepted that the global development gap "does not lie merely in the difference in the technological levels. ..... In particular, the demand for high level manpower (in developed countries) arises not from the current technological structure but from the concern for improving the technology. In other words, the demand for such manpower arises from a concern for raising the output per man, i.e., the productivity of labour" (Dasgupta, 1991, p. 64-65).

The demand for high level manpower arises from a concern for raising the output per man, i.e., the productivity of labour.

Not only did the governments in developing countries for non-economic reasons commit to raising labour employment often at the cost of surrendering labour productivity, but the governments in developed countries also at some historical juncture adopted similar types of policies, e.g., the Employment Act of 1946 in U.S. economy (Magnum, 1967, when in fact, in the context of choosing appropriate technologies, an apparent conflict between labour employment and labour productivity disappears.

'Repetitive import of technologies' in counties like India is seen, as an easy substitute, often rationalized as a techno-economic perfectionist attitude of the Government, for generation of socially appropriate technologies, technologies which would have selected in, and not selected out, labourers with non-falling productivity (Mascarenhas, 1982. There was no internal compulsion for the choice of appropriate technology in a 'protected regime' for firms characterised by monopolistic and oligopolistic features (Majumder, 1990).

The indifference towards raising labour productivity, by the Governments in such countries breaks down in the context of globalization. While this globalization is likely to lead to increasing demand for skilled labourers because of increasing weightage of research-intensive products and projects, it also makes some employed labourers obsolete and some potential labourers unemployable. The relevance of manpower planning comes here.

Manpower Mobility in Terms of Wage-differential

The New International Economic Order (Streeten, 1982), has brought about a compelling necessity to concentrate on the problems related to the supply and mobility of labour, the compulsion reflected in the exit of labourers and often the exit of the product/firm itself. The problem is not a new one, however. On the theoretical plane, "Since 1940 .... considerable interest in the movement of labour within a local labour market . . . grew out of a dissatisfaction with the traditional assumption of the economic theory about the movement of workers from one job to another in response to differences in wage rates" (Myers, 1954, p. 68). Functionally, irrespective of the globalization, there occurred 'Brain Drain' from the LDCs even in a situation of internal shortage of supervisors and technicians at all levels of skill (ILO, 1966).

While the international wage-differential dominantly drains manpower out from an LDC, it is not always the case for vertical labour mobility inside the country. Given the industrial order, the workers move from one industry to another, if they move at all, without requiring any remarkable wage-differential, e.g., "a higher wage might be necessary to attract workers to an expanding industry, or it might simply reflect the fact that the union concerned has taken advantage of the increasing level of demand to negotiate a higher wage, even though enough workers would in fact have been forthcoming at the old wage in response to offers of employment" (Reddaway, 1968, p. 194-195). In countries like India, often, the exercise of bargaining power for higher wage is productivity-neutral and psephology-determined (Bardhan, 1984). This wage rate is fixed in advance generally for not less than five years whatever be the productivity conditions. This is no exception for LDCs. In advanced counties, e.g., in the USA in the 1960\s it was the case (Lester, 1967). It is, however likely that some research-intensive firms in need of techonologists may be forced temporarily to shoot up the wage rate, when in particular demand for such skilled labour exceeds its supply, it takes much time to re-educate and re-train mass of labourers, or face the consequences of 'brain drain' (OECD, 1965).

In countries like India, often, the exercise of bargaining power for higher wage is productivity-neutral and psephology-determined.

Generally the flexibility in wage rate is product-specific and skill-specific. If the products are research-intensive, the wage-rate is expected to be high to attract 'brain' or to obstruct brain drain'. Wage rate is often raised for ranks above some level to exclude unskilled labourers. Also, in a setting of wage-ranked hierarchy of industries, an industry in the rank of a high wage may feel it less necessary to raise the wage rate relative to industries in the low wage category to attract labourers. The introduction of globalization by the leaders of the globe may complicate the situation, e.g., imposition of artificial wage-structure for a few firms selected by bias.

In spite of its many shortcomings, the wage rate is often used as an instrument for allocating labour among alternative production areas since the wage rate is quantifiable, the labourers foresee this rate and make their expectations about this rate, *ceteris paribus*, the labourers prefer a higher-wage job to a lower-wage one. The question is who is going to honour the choice of the

The wage rate is often used as an instrument for allocating labour among alternative production areas since the wage rate is quantifiable, the labourers foresee this rate and make their expectations about this rate, the labourers prefer a higher-wage job to a lower-wage one.

potential labourers even when this preference pattern is known to the employers/Trade Unions/Government and which is backed by the capability of the labourers? The solution is constrained further by the existence of an unlimited supply of labourers in such countries.

The fact is that a labourer joins a job often independent of his own choice or in conditions of ignorance (Rottenberg, 1968). What the labourer can choose is to change the job after acquiring the power to be mobile. For vertical mobility, the summation of benefits must be higher for the labourer willing to move. However, workers' "knowledge of wage and non-wage terms of employment in other companies is very meagre" (Reyholds, 1951, p. 213). In fact if we assume that the labourers are aware of the existence of the wage-differential in similar jobs, then it makes sense that, *ceteris paribus*, the labour mobility will be a direct function of wage-differential. If the labour market is perfect, the labourers are rational optimizers. However, in practice, the labour market is heterogeneous and highly imperfect (Benerjee, 1988). In this situation labour mobility, if any, is wage-insensitive or there come non-wage factors and forces to cause immobility of labourers.

Rigidity & Flexibility in Labour Market

Mixed capitalist economies like India subject to 'State Control' via economic planning and public enterprises are characterised by an industrial sector dual in character. In most cases, the establishments develop an 'internally closed system', allowing entry into the establishments at the lowest level or providing limited entry points. Most positions in the establishments are filled through internal promotions, offering little opportunities for competition. This is peculiar not only to LDCs. In advanced countries, e.g., in the U.K. "all members of bureaucracy stand to gain from further bureaucratic growth, since this tends to accentuate personal incomes, promotion prospects, power, patronage and sometimes public respect. Rent-seeing typically is more effective in the public than in the private sector because the public sector is more monopolistic, tends to be less efficient, and information flows more easily are distorted" (Rowley, 1980, p. 44). Again from the U.K. experience it is revealed that not only the employers and bureaucrats but also the trade unions may obstruct the entry of the outsiders, (Mackay, 1971, p. 300). Thus there come institutional-cum-administrative barriers to entry and mobility of labourers, more so when the public sector dominates.

In LDCs in particular non-contractual, productivity-neutral labour employment based on provision for time-scale salary and seniority-based uplift leads to higher designation and probably higher degradation. Often labourers do not like to move from low-wage certainty to high-wage uncertainty. As labour mobility requires execution of additional responsibilities by establishments, it is generally discouraged. All these lead to a situation where the small well-knit-organized sector becomes immune from market forces. The private sector units also, through acquisition of license, become instruments of the government, and cease to behave as competitive economic units, gaining more from collusion, and less from competitive entrepreneurship.

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Thus the rigidity experienced from the increased domination of public sector may continue to prevail even if the private sector gains domination via reducing 'State Control' disinvestment in public enterprises and economic liberalization (GOI, 1991, p. 4). The rigidity in labour market thus is sector-neutral and plan-neutral. It is basically rooted in the socio-political structure of the society.

Often inter-industrial vertical mobility of labour is constrained by imposition of political (in) discipline, e.g., manpower absorption in enterprises, both public and private, above some wage-category is determined by 'political quota'; family-centred business, where not only in tiny, informal and unorganized sector but also in organized industrial production areas, there is limited entry for 'outsiders' and often jobs in the high-wage occupations are reserved for persons in, or connected with, the affluent society; colonial heritage, where people educated abroad are preferred to people educated inside; non-innovative or stereotype jobs, where internal manpower is preferred to external ones.

Some segmented entry and obstructions may be there in such an imperfect, often 'externally open' and 'internally closed' labour market. For example, for budding technologists and managers often there is provision for 'campus recruitment' by established firms. Here the rate of reward per rupee spent on education is high relative to the social average expenditure on education. If

this rate falls short of the expectation of the individual by international comparison, there may occur brain drain. Often the nature of entry into the job market is 'time-tied', making manpower mobility non-operational for the stipulated period. Often highly qualified persons are obstructed from entering middle-level, and below that rank jobs lest they leave the job at the very first opportunity because of their positive opportunity cost. Potential vertical mobility becomes a disqualification for such persons. Some types of entry may be delinked from any guarantee of jobs, e.g., Apprenticeship Schemes.

The rigidity and flexibility of the hetrogeneous labour market in countries like India thus are linked with such factors, often excluded as 'residuals'. They however may affect the market more than the wage-rate, its flexibility and differential.

Necessity of Manpower Planning

Whatever be the constraints and peculiarities of labour mobility in LDCs like India, it is a universal fact that knowledge is space-neutral and hence application of knowledge in production, or technology, is a global aspect.

In the context of globalization then, the process of scientific and technological collaboration between countries has to be based on an 'Open door, Open window' model as opposed to a 'Closed door, Open window' model (Dandekar, 1968, p. 232). Science has to move freely for the generation of scientific outlook in man and the formation of a birth-neutral society. Manpower planning in this context has to work both as a transmitter and an antenna, the former transmitting knowledge (may be via the outflow of skilled personnel), the latter receiving knowledge (via, the inflow of skilled personnel and relevant technology, relevance determined by initial condition and future choice). While the former is a moral compulsion for the State to ensure international mobility to the individual optimizers, the latter is an economic compulsion. In fact, inflow of information is the power of the State.

In the context of globalization the process of scientific and technological collaboration between countries has to be based on an 'Open door, Open window' model as opposed to a 'Closed door, Open window' model.

By implication, globalization is not an end or even a decline of nationalism. One merely moves beyond the national orbit. Occasionally we talk about initial conditions posing problems in the sense of imposing constraints on labour mobility in particular and on the process of development of the late-starters in general. Apparently these initial conditions manifest themselves in the lack of power to generate and absorb technologies for revolutionalization of a society. The real roots for countries like India lie in ignorance, illiteracy and rampant miseducation of the mass, often anti-life outlook, alienation of the educated elite from the mass and often more vulnerability of this section alienated from the mainstream in the shape of acute dependence on and collusion with foreign rulers and powers (Myrdal, 1982).

Effectively it would mean that manpower planning has to take care of ensuring education and training for the workforce inside the job, initiating programmes in the sphere of production for ensuring the flow of required machinery and equipment, initiating educational planning for people out of jobs to make them employable and job guarantee for the employable inside and outside the nation State. Since production is a reflection of social cooperation, reflected in the plant between labourers of varying skills, in the consensus between people inside the plant and people outside, the State has to adopt two mutually supporting steps, product-cum-technology planning and manpower planning. The second type of planning is vital for the development of 'consensus' of the agents of change inside the nation to accept the first type. Education is the root of power, the root of local and global power-differential. Educational planning is the instrument of manpower planning for the nation and that is non-ending nationalism.

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No man really knows about other human beings. The best he can do is suppose that they are like himself.

JOHN STEINBECK,
The Winter of Our Discontent

Feature

SWOT Analysis for Designing the Corporate Planning Process — A Survey

B.S. Sahay, Prem Vrat & P.K. Jain

The paper aims at appraising the environment within which Indian organisations, particularly core sectors like oil, petrochemicals and fertilisers operate SWOT analysis has been carried out with a view to identifying and analysing the formulation of corporate plans and implementation of strategies.

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Increasing techno-socio-economic complexities of the business and industrial environment, liberalisation and globalisation of the Indian economy, tough competition in the domestic and world market, scarcity of resources and new Government policies have made corporate planning inevitable. The survival and growth of a firm depends upon its ability to match its strength to the threats and opportunities ushered in by the environmental changes. While the analysis of the firm's internal environment helps to identify its strength and weakness regarding the philosophy and ethos, general position of the company, employee-employer relations, human resource development, etc,; analysis of the external environment helps in anticipating the impending threats as well as opportunities. Analysis of the external and internal environment is, therefore known as SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. The SWOT analysis refers to an assessment of the past, present and future of an organisation and provides a base for pursuing the corporate planning process (Gupta, 1992, Grinyer & Noburn, 1974, Hetrick 1969, Sahay, 1994). While some sincere efforts have been made in India by big and established companies (core sectors e.g. oil, petrochemicals, fertilisers, steel etc.) to develop corporate plans, still very little literature is available on the subject. Hence a survey was conducted in oil, petrochemical and fertiliser industries in India to assess the corporate planning process.

The survival and growth of a firm depends upon its ability to match its strength to the threats and opportunities ushered in by the environmental changes.

Methodology

It has been experienced that organisations are hard pressed for time and cannot provide quantitative information for any type of survey questionnaire seeking statistical data. These data are published in the balance sheet and other documents of the organisations. Hence it was decided to develop and design detailed qualitative questionnaire (Kaiter, 1970, Naylor, 1979, Sahay, 1994, Shankar et al, 1980 and Steiner, 1979). The survey questionnaire was designed in consultation with researchers and practising corporate planners keeping in view the available previous survey questionnaires. The questionnaire, so designed, was validated with a sample survey and modifications wherever required were made in order to get the required information.

Analysis of Feedback

The survey questionnaire was mailed to Chief Executives/Managing Directors of 101 organisations covering oil, petrochemicals and fertilisers. Feedbacks were received form 31 organisations. These responses were collected after making more than one personal visit and sending two-three reminders. Series of detailed discussions were held with the practising corporate planners and chief executives of the organisations to share their rich experience with formal corporate planning to identify the major elements, methods and practices followed. The response was markedly better from public sector organisations. Such organisations constituted nearly three-fifths (58%) of the total sample and the private sector accounted for the balance (42%). Analysed from the point of view of activity, the fertiliser sector has the maximum representation (42%) followed by oil (35%) and petrochemicals (23%) as shown in fig. 1.

Assessment of strengths and weaknesses was made using a five point scale of values constituting excellent, good, average, fair and poor performance levels. The first degree indicates relative strength and the last relative weakness. Similarly, opportunities were measured on a five points scale varying from excellent to poor so that the management can recognise their relative importance. Degree of threats was measured as very high, high, moderate, low and negligible.

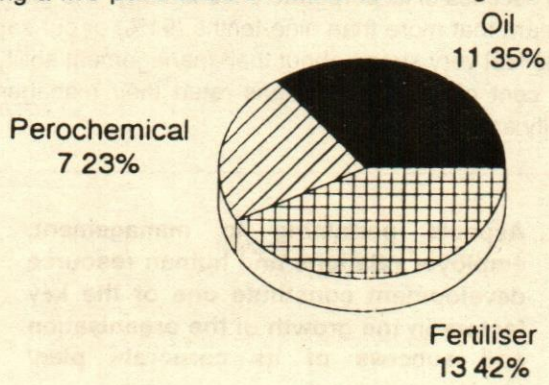

Fig. 1: Sectorwise Feedback Received

Most of the organistations expressed that SWOT analysis is carried out in their organisations in some form or the other to arrive at a suitable policy for achieving the company's objectives. However, the process is loose and unstructured due to unavailability of appropriate methodology.

Strengths & Weaknesses of the Organisation

Assessment of internal strengths and weaknesses is considered to be one of the important exercises to be carried out in any organisation, though the coverage and details vary from company to company.

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Company's Philosophy

Most of the organisations reported the company's philosophy as their major strength. The survey reveals that most of the organisations (94%) accord utmost importance to the quality of the product; nearly four fifths of the organisations have rated this as excellent. This is in tune with the requirements of Indian economy which is looking for globalisation. To match international standards, organisations are now going for total quality management.

Though the survey is confined to core sectors like oil, petrochemicals and fertiliser, profitability was reported as a strength by 78 per cent of the organisations, only 12 per cent of the organisations expressed this as their weakness. It is interesting to note that 87 per cent of the organisations believe that their key strength is the high morale of the their employees. 32 per cent of these organisations rate their manpower as excellent while 55 per cent of the organisations are satisfied with their manpower.

To cope with the fast changing technical world, organisations (74%) give due importance to technological innovation. On the other hand, transfer of technology takes too much time. Only one third of the organisations were doing excellent in this aspect whereas one fourth are directing their sincere efforts to cope with the change. 10 per cent of the organisations are lagging far behind in their efforts.

The philosophy of the organisations (around 83%) is to maintain good relations with customers as well as suppliers and maintain payment and delivery commitments; only few of them (6%) expressed this as their weakness. While half the organisations (52%) maintain excellent customer goodwill and delivery commitment, 43% give more importance to payment in time to their suppliers to maintain goodwill.

Pricing policy is yet another major consideration. Since pricing of oil and fertilisers is administered by the government, organisations have to fall in line and have little discretion on the subject. As per statistics, 18% of the organisations consider their pricing as excellent, 8% have expressed weakness in this regard.

General Position of the Company

It was gratifying to learn that more than three-fourths (77%) of oil, petrochemical and fertiliser organisations, their capital intensive nature notwithstanding, reported sound financial position. 45 per cent of these organisations reported their financial position as excellent; only 10 per cent reported their financial position as poor. In operational terms, lack of finance is not likely to be a major bottleneck for carrying out modernisation and expansion programme for our sample enterprises.

Organisations seem to be equally strong on the marketing front. It is evidenced by the fact that more than four-fifths (81%) of the organisations feel vast potentials for their products and to realise the same, they have strengthened their marketing departments.

This apart, the majority of the organisations (53%) rate their marketing ability as excellent and 28 per cent rate this as good; only less than one-fifth (19%) need to strengthen their marketing ability.

As far as production facilities are concerned, 87 per cent of the organisations are happy with their plant infrastructure, i.e., production/manufacturing facilities; only 13 per cent are deficient in this respect.

Another aspect of interest was the capacity utilisation; 81 per cent of the organisations reported good capacity utilisation.

The survey also indicates that there is ample scope for good technical knowhow. However, research and development facilities are not upto the mark. Another weak area is availability of raw material. While 55 per cent of the organisations do not have any raw material problem, 29 per cent are just satisfied with the situation and 9 per cent reported this as their weakness.

Ownership stability is not a problem in these organisations as most of them belong to the public sector (58%). Even private sector enterprises (35%) had similar perception; only 6 per cent of the private organisations showed some apprehension about this. 3 per cent of the organisations expressed that their plant location is not good. Transport faicility and power availability are the other weaknesses reported by 7 per cent and 10 per cent respectively. Thus, on the whole, the general position of sample organisations seems to be very satisfactory and sound.

As mentioned most of the organisations give utmost importance to quality assurance. Lastly, save 4 per cent of the organisations, the others maintain reasonably good relations with the government. In fact, nearly two-fifths of the organisations (38%) expressed that they have excellent relations with the government.

Management, Employer Relation & Human Resource Development

The aspects pertaining to management, employer relations and human resource development constitute one of the key factors in the growth of the organisation and success of its corporate plan/strategy. It is gratifying to learn that more than nine-tenths (91%) or our sample firms feel very strong about their management ability, 52 per cent of the organisations rated their management ability as excellent.

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The survey also reported very satisfactory state of affairs regarding feedback and control system, both within and outside of the company. Only a handful of organisations (6%) badly lack in both feedback and control system within and outside the company. Similarly, most of the organisations, save (6%), have good management and workers relationship.

The survey exposes poor HRD activity. It is borne out by the fact that 11 per cent of the organisations reported about their poor HRD functions and training & development activities; 30 per cent of the organisations are required to improve their HRD and training activities from their average standard; 13 per cent reported bad wage policy and structure, and promotion policy. This may be one of the reasons for high personnel turnover (35%). Obviously, this is required to be checked immediately as it is not in line with the organisations philosophy. Finally, the survey brings to the fore the fact that organisations fare reasonably well on the front of productivity. One fourth of the organisations reported their productivity as excellent followed by half of the organisations (52%) stating it as good; only 10 per cent reported poor value added per employee. Welfare scheme is average and requires brushing.

Opportunities & Threats before the Organisations

As per Kotler (Henry, 1980), a company's environmental opportunity is an attractive area in which the particular company would enjoy a competitive advantage. In contrast, an environmental threat is a challenge posed by an unfavourable trend or development in the environment that would lead, in the absence of purposeful action to the erosion of the company's position. A detailed survey was conducted to identify opportunities and threat present in the environment from the perspective of corporate policies and practices.

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Opportunities

The following four categories of opportunities listed in the questionnaire evoked very good response from the organisations.

Product and Technology

Most the organisations (91%) feel that technological development not only unfold fast but they are the most far reaching expanding opportunities for an organisation. 80 per cent of the organisations speculate that the future is likely to see more product innovations, product develpment and faster pace of design/process developments.

Industrial

Growth by acquisition (in terms of product, corporate takeover, merger or joint venture) is contemplated as the major force of corporate expansion. Expansion by product acquisition is contemplated by 65 per cent of the organisations; 50 per cent of organisations, particularly in private sector, view growth through corporate acquisition as best.

More than three fourth of the organisations expressed that organisations can take full advantage of backward location and associated tax benefits.

82 per cent of the organisations feel that due to the growing population of India there is likely to be no dearth of demand for their products. From the view point of corporate strategy, the quantum, behavior and structure of demand become important strategic considerations in investment decisions and business performance. These organisations also feel that human resource development is a must and they can be exposed to latest management tools and techniques to increase value added per employee. However, while one fourth of organisations consider quality circle programme as a failure, three fourth answered favourable. These organisations feel that quality circles on the one hand contribute to the improvement and development of the organisation, on the other hand display human capabilities fully and eventually draw out infinite possibilities.

Economic and Financial Environment

Economic environment plays and important role in the performance of any industrial unit and more than three fourth of the organisations consider this environment favourable. While 66 per cent are satisfied with the availability of the finance from bank, 31 per cent have had adverse experience and find difficulty in refinancing.

Further, 83 per cent of the organisations feel that since prices are administered it will be either stable or go upward but will never come down. However it has to be borne in mind that in India, a critical aspect affecting strategic choices relates to the government's economic policies and regulatory mechanisms.

Social and Political

The political environment has an undeniable impact on the performance of industrial units. While two-third (68%) of the organisations find government policies favourable, one-third (32%) think the revers. These organisations feel that the actions of the functionaries of the political system are more important viz-a-viz the provisions of the written law and constitutional provisions. However, the recent liberalisation in Industrial Policies, exemptions and concessions on certain duties and taxes for setting up industries in certain specified areas, incentive for export and import substitution will prove beneficial in years to come. 80 per cent of the organisation have responded that social values and awareness also play a prominent role in strategy and policy formulation. Since organisations exist in society, they must adapt or change their goals as the society demands. This increased concern is opening up newer opportunities. And lastly, two-third of the organisations feel sky is the limit for their growth and development.

Threats

All the four categories of threats listed in the questionnaire are a matter of concern for all organisations. Maximum threats are posed by economic cosiderations followed by the industrial climate. Other threats pointed out by the survey are fast changes in technology. Industries are equally threatened by turbulence in the social and political environment.

Technological

Obsolescence of existing product has been reported as thigh by only 8 per cent of the organisations; other organisations accord much less weightage to this threat. However, 30 per cent of the orgainsations are very much concerned with obsolescence of existing manufacturing facilities, delay in inducting research and development activities and alternate technology. Nearly one-third of the organisations (33%) consider alternate technology as the major challenge to their existing technology because of their higher productivity level and cheap raw material availability in abundance. Slightly less than one-third (29%) of the organisations apprehended that there will be enormous increase in their operating cost. Old machinery causing frequent breakdown on the one hand, and loss of production in both quantity and quality on the other are ascribed as major factors for such an apprehension.

Industrial

A peaceful or disturbed climate can make or break an organisation. More than half the organisations observed that total dependence on one unit of production may lead to temporary break of business in case of any sort of disturbance. This fear has bad strategic implications on the corporate strategies of a large number of business organisations in India. However, the offsetting factor is that only 5 per cent of the organisations feel a high degree of threat from strikes and lockouts due to disturbed industrial relations and stifled growth. Similarly, only 12 per cent feel that imbalances due to political affiliations of unions pose a real threat to the performance of the organisation.

Turnover of trained and qualified personnel is the burning problem of 37 per cent organisations. This threat may be attributed to the phenomenal issue of licence to a number of organisations (17%) to start business in a similar line; they lured away trained and qualified personnel.

Availability of raw materials and mounting increase in its price pose a major threat to the organisations. Around half the organisations feel that dependence on a single source for supplies is not conducive for continuous production. Power shortages for long periods in many States of India have become a major threat to industrial units. 66 per cent of the organisations reported that increase in raw material price and high cost of power can become a major disadvantage.

Economic

Despite immense efforts and resources spent on economic development, the restrictive and poorly implemented economic polices do no bode well for industrial growth. 38 per cent of the organisations are concerned about the decrease in GNP because this reduces the buying and consuming power of the customers. 62 per cent of the organisations are concerned with the increasing rate of inflation. Decrease in GNP has severly restricted growth and badly affected the national economy as reported by 50 per cent of the organisations; another 40 per cent of the organisations reported that globalisation of Indian economy causing competition with well established multinationals will be another major threat. This is due to the industrial liberalisation policy adopted by the Government which has opened the door widely to foreign investors. These organisations have to look abroad now for increasing their market share. One fifth of the organisations expressed their apprehension regarding the export trend as they have to compete with the international market. Furthermore, more than 50 per cent of the organisations are perturbed with the increase in excise duty and taxes and trends in government control.

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Social and Political

It is alarming to note that more than 50 per cent of the organisations reported that change in the government, change in government policy and frequent changes of portfolios in the government are some of the major obstructions for the economic growth of the country in general and organisations in particular.

Concluding Remarks

After economic liberalisation, the business environment in India is becoming increasingly dynamic and vibrant. The survey reveals that changes in social and political level, growth of industrialisation, technology innovations and inflationary pressures will have potential impact on the formulation of corporate plans and implementation of strategies. Best results can be achieved if these forces are identified before their impact can be felt. The survey reveals that the organisations are satisfied with their product quality, customer satisfaction, marketing ability, production facilities and utilisation, still there is ample scope for improvement. However, organisational weaknesses like delivery commitment, supplier goodwill and raw material problems require management attention at the time of formulating corporate plans. In addition to this, human resource development should be strengthened to arrest personnel turnover. Further, no organisation can ever assume the environment to remain static. The survey reveals that growth by acquisition (in terms of product, corporate takeover, merger or joint venture) is contemplated as the major force of corporate expansion. Unlike the economic scenario and technology, most of the organisations feel that the political environment plays an important role in the performance of an industrial unit particularity in any core sector. The survey also shows that threats result from new competition, substitute product, new technology, etc.

It may be concluded that in order to survive in the past liberalisation era under a potentially hostile environment, organisations must be adaptive. They must monitor and anticipate change, assess their capabilities and set realistic objectives for themselves. In the industrial scenario of India, SWOT analysis can help in designing the corporate planning process successfully.

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Feature

Equipment Effectiveness & Six Big Losses

Chandan Chowdhury & T.K. Mandal

Total Productive Maintenance (TPM) is not just a technique of maintenance management. It is a philosophy or corporate culture encompassing primarily the maximisation of equipment effectiveness through autonomous maintenance by operators and total employee participation in maintenance in the form of small group activities. To improve equipment effectiveness, the authors suggest that the six big losses should be identified and preventive measures taken.

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Total Productive Maintenance (TPM) originated from Japan way back in 1969 when Nippondenso Co. Ltd., belonging to the Toyata automobile group, implemented it. In 1971, the Japan Institute of Plant Maintenance (JIPM) instituted the prestigious PM prize for successful implementation of TPM. Nippondenso bagged the PM prize in the first year of its institution. Earlier, Nippondenso had introduced productive maintenance in 1960 which had been imported form America. Menanwhile, Nippondenso also implemented the TQC and developed Quality circles (QC) in which all employees participated. This QC activities led to the company's decision to modify the American-style productive maintenance with all employees participating through small group activities. This gave birth to the concept of TPM. Since then, TPM has been spreading rapidly throughout Japan's manufacturing plants.

In two different surveys of 124 Japanese companies contacted by the Japan Institute of Plant Engineers (presently known as Japan Institute of Plant Maintenance) in 1976 and 1979, the state of maintenance management in Japan was captured (Nakajima, 1982, 1989). The results of the surveys are summarised in table 1.

Table 1: State of maintenance management in Japan in 1976 and 1979

Stage	Percentage of Enterprises (1976)	Percentage of Enterprises (1979)
Corrective Maintenance	12.7	6.7
Preventive Maintenance	37.3	28.8
Productive Maintenance	39.4	41.7
Total Productive Maintenance	10.6	22.8

It is interesting to note that in 1979, only 6.7% of the companies were practising corrective or breakdown maintenance against 12.7% in 1976. As much as 64.5% of the companies were either in productive maintenance

or TPM stages in 1979 as against 50% of the companies in 1976. The percentage of enterprises in productive maintenance and TPM stages have since been on the rise.

In Japan, the number of companies winning PM prizes has also been on the rise, indicating the successful implementation of TPM. The PM prize winning companies have achieved the following major results (Nakajima, 1986):

- the number of unexpected failures have almost been eliminated.
- equipment effectiveness has increased by 50% — process defects have been reduced by 90% and maintenance cost has reduced by 30%.

TPM made its debut in American industry in 1987. Tennessee Eastman Compnay took the lead in implementation of TPM in the U.S. (Rhyne, 1989). This company has reported approximately $5 million annual savings in 2 years since 1987.

Of late, the industrial units in developing countries have also started adopting TPM. In the Philippines, cases of implementing TPM have been reported (Villages, 1989). An electronic parts manufacturing company near Manila introduced TPM in its Recording Head Department and has come out with the following benefits in less than two years (Villamin, 1988):

- more than 50% increase in production,
- a 27% reduction in downtime
- zero serious machine failures,
- an 80% reduction in defect rates, and
- intangible benefits such as higher employee morale, increased safety, motivated and more responsible workforce.

Some industries in China also introduced TPM to improve equipment effectiveness (Chien, 1989). In India too, some leading industrial houses have reportedly started adopting TPM. But information regarding their success is not available. A recent survey carried out by the authors covering 139 Indian industries reveals that only 4.3% of the organisations have adopted the TPM culture. The percentage of companies following various stages of maintenance viz, breakdown, preventive, productive and TPM is shown in table 2. The same has been compared with the state of Japan in 1979. It is seen that 53.2% of the organisations still follow breakdown maintenance in India as against 6.7% in Japan in 1979.

Table 2: State of maintenance in India and its comparison with that of Japan

Stage	Percentage of companies	
	India (1992)	Japan (1979)
Breakdown Maintenance	53.2	6.7
Preventive Maintenance	23.1	28.8
Productive Maintenance	19.4	41.7
T.P.M.	4.3	22.8

Features of TPM

According to Mandal and Chowdhary (1993), the overall objective of TPM is to improve the whole production process by encompassing a broad range of activities which are designed to

- improve equipment effectiveness in quality and performance readiness, and
- involve all departments and functions of the company from top management to shop-floor personnel.

TPM has two goals — zero breakdown and zero defect. The indicator for achievement of these goals is equipment effectiveness, TPM is not just a maintenance management technique. It is a philosophy or a corporate culture which has two core components.

- Focus on improvement of equipment effectiveness
- Total employee participation in maintenance improvement.

The main features on TPM as given by the JIPM in 1971 are as follows:

- It is aimed at maximising overall equipment effectiveness.
- It establishes a total system of productive maintenance covering the whole life of the equipment.
- TPM covers all departments such as design, operation, maintenance, quality control, etc.
- TPM calls for participation of all members from top management to shop floor workers.
- It promotes small group autonomous maintenance activities.

Conventional preventive maintenance practices aim at profitable preventive maintenance. American-style productive maintenance calls for a maintenance plan covering the entire life of the equipment. TPM encompasses the above two besides its unique feature of autonomous maintenance by operators through small group activities.

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The word 'total' in total productive maintenance has three connotations as follows:

- *Total effectiveness*: This is ensured by a scientifically established preventive maintenance system taking care of the economic efficiency of the system. A large number of time-based preventive maintenance systems have been developed by researchers with the objective of maximising the economic efficiency of such systems (Mandal & Chowdhury, 1994).
- *Total maintenance system*: It means establishing a maintenance plan for the entire life of the equipment. During the equipment design stage, it is pursued by the concept of maintenance prevention (MP), or maintenance free design. During the operation stage of the equipment, it means a thorugh preventive maintenance (PM) plan coupled with maintainability improvement (MI), that is prevention of maintenance and facilitating ease of maintenance by repair or modification of the equipment.
- *Total participation*: As mentioned earlier, this is unique to TPM. Employee participation from top to bottom in small groups and automobile maintenance by operators are the basics of total participation in total productive maintenance.

The features of total productive maintenance, productive maintenance and preventive maintenance are presented in table 3.

Table 3: Features of TPM, productive maintenance and preventive maintenance

	Total Productive maintenance	Productive Maintenance	Preventive Maintenance
Economic efficiency through profitable preventive maintenance.	Yes	Yes	Yes
Total maintenance system (MP-PM-MI).	Yes	Yes	No
Total participation including autonomous maintenance and small group activities	Yes	No	No

Equipment Effectiveness

Total productive maintenance is aimed at maximising equipment effectiveness. Value added to production by an equipment is normally measured in terms of the capability of performing or producing uninterrupted. The equipment is said to be capable of producing as long as it is in working condition. The traditional mesure of this capability is equipment availability. If the equipment is under breakdown, it is said that it is not available. However, when the equipment is available, there may be three situations associated with it (Mandal & Chowdhury, 1993):

- The equipment is perfectly working as is expected from it. That is, it is producing at the designed rate and quality.
- The equipment is producing at a lower rate.
- The equipment is producing defective products.

The expression 'availability' does not actually encompass the possibility of the equipment being in neither of the three situations or a combination of the three. Thus, expressing the capability or the 'health' of the equipment in terms of availability does not explain the precise state.

Equipment effectiveness is the true measure of the value added to production by the equipment.

Equipment effectiveness is the true measure of the value added to production by the equipment. One hundred percent equipment effectiveness indicates that zero breakdown and zero defects have been achieved and the equipment is working to its full potential. Equipment effectiveness is the product of three ratios, operating rate (availability), performance rate, and quality rate. These three rates are expressed as:

$$\text{Operating rate} = \frac{\text{operation time}}{\text{loading time}}$$

$$= \frac{\text{loading time} - \text{downtime}}{\text{loading time}}$$

Performance rate = net operating rate × operating speed rate

where, net operating rate

$$= \frac{\text{processed amount time} \times \text{actual cycle time}}{\text{operation time}}$$

and, operating speed rate

$$= \frac{\text{ideal cycle time}}{\text{actual cycle time}}$$

Thus, performance rate

$$= \frac{\text{ideal cycle time} \times \text{processed amount}}{\text{operation time}}$$

$$\text{Quality rate} = \frac{\text{acceptable amount}}{\text{processed amount}}$$

$$= \frac{\text{processed amount} - \text{defective amount}}{\text{processed amount}}$$

Equipment effectiveness = operating rate × performance rate × quality rate

Loading time is derived by subtracting planned downtime from the total time. Operation time is the loading time less various unplanned downtimes, viz. breakdowns, setup and adjustments etc. Often, the design cycle time is used as ideal cycle time. However, in some cases the operating speed must be lower than the design speed for reasons of quality, or operating at design speed results in quality problems — a typical case machines. In such ceses, the ideal cycle time should be for old machines. In some cases, the ideal cycle time should be determined for the purpose of calculating performance rate on a case-to-case basis depending on equipment condition using one of the following methods:

- Ideal cycle time determined by design speed
- Ideal cycle time based on current optimal conditions
- Ideal cycle time being the best cycle time achieved in recent period or the cycle time estimated for similar equipment.

Let us consider a refrigerator polyurethane foaming machine required to work for three shifts a day. Let us also consider the following information.

Planned downtime per day = 50 minutes

Average unplanned downtime per day:-

due to breakdowns – 25 minutes

due to product changes = 75 minutes

Output per day = 560 refrigerators

Defect rate = 5% = 28 refrigerators / day

Ideal cycle time = 1.5 min / refrigerators

Therefore, Loading time = 24 × 60 – 50 minutes
= 1390 minutes

Operation time = 1390 – (25 + 75) minutes
= 1290 minutes

$$\text{Availability (operating rate)} = \frac{1290}{1390} \times 100\% = 92.8\%$$

$$\text{Performance rate} = \frac{1.5 \times 560}{1290} \times 100\% = 65.1\%$$

$$\text{Quality rate} = \frac{560 - 28}{560} \times 100\% = 95\%$$

Thus, equipment effectiveness
= 0.928 × 0.651 × 0.95 × 100% = 57.4%

Looking at the availability (92.8%), apparently the machine seems to be in healthy condition. But, the equipment effectiveness is only 57.4% signifying that although the equipment is available for production 92.8% of time, there remains some problem, either in its speed of running compared to what it should be or the acceptability of the products it is producing or both.

Although, the pursuit of TPM is to achieve 100% equipment effectiveness, approaching this figure is difficult. However, believing that this can be achieved is an important prerequisite for the success of TPM (Nakajima, 1989). Ideally speaking, after successfully implementing TPM, one should achieve availability of more than 90%, performance rate of more than 95% and quality rate of more than 99%. Equipment effectiveness of over 85% is considered to be a significant achievement (Nakajima, 1988).

6 Big Losses

It has been said that TPM is aimed at maximising equipment effectiveness by aiming for zero breakdowns and zero defects. The three categories of losses which determine the three components of equipment effectiveness, are the main obstacles in improving equipment effectiveness. The pictorial representation of these losses are presented in Fig. 1.

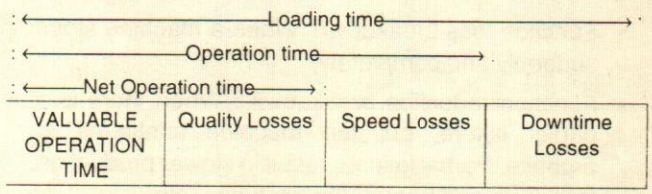

Fig. 1. Three categories of losses

Loading time and operation time have been explained earlier. Net operation time is the time the equipment effectively operates at its ideal speed. Time losses due to minor stoppages and operating at reduced speed are deducted from operation time to determine the net operation time. The valuable operation time is the effective time spent by the equipment to produce the acceptable products.

There are two components in each of these three categories of losses. They are

Downtime losses — breakdowns
— setup and adjustments

Speed losses — idling and minor stoppages
— reduced speed

Quality losses — process defects
— reduced yield.

Breakdowns

In Japanese, *kosho* (breakdown) means 'to deliberately destroy something old'. In other words, the Japanese believe that breakdowns are caused by deliberate acts of human beings. This is because breakdowns are taken so lightly by some people that they are considered a part of equipment life and that since all breakdowns can be repaired, they need not worry about it; also, the operators do not normally bother to notice any indication of breakdown. TPM tries to change this attitude.

In Japanese, *Kosho* (breakdown) means to deliberately destroy, the Japanese believe that breakdowns are caused by deliberate acts of human beings.

Normally, we think that breakdown means when an equipment totally stops functioning. As per Japanese Industrial Standards (JIS), breakdown or failure means 'loss of a standard function'. This loss can be complete or partial. Accordingly, breakdowns can be of two types.

- Function loss breakdown: When a machine stops suddenly and completely.
- Function reduction breakdown : When there is a partial failure, but the machine continues to produce. Partial failures result in slower production rate, high and frequent setup times, etc.

It is quite obvious that both these types of breakdowns cause production loss. It is the function reduction breakdown that we generally tend to overlook. Even if the function loss breakdown is totally eliminated, we can not say that a zero breakdown state has been achieved, Frequently, function reduction breakdowns contribute more towards production loss. Breakdowns can also be called as sporadic or chronic. Sporadic breakdowns happen suddenly or unexpectedly which cause the equipment to come to a grinding halt. In other words, sporadic breakdowns lead to function loss for the machine. Sporadic breakdowns mostly prove costly. But the reasons for this can be easily detected because there are one or few obvious causes which lead to sporadic breakdowns. The remedy for this is restoration. Chronic breakdowns are frequent and normally minor in nature. They are of function reduction type and hence generally not taken seriously. Chronic breakdowns occur due to a combination of unclear causes. These problems can only be detected when the performance is compared with optimum operating condition of the machine. Nakajima (1989) suggests five measures to uncover the hidden defects and eliminate chronic losses.

- Maintain basic equipment conditions: There are three factors involved in the basic equipment conditions. They are
  - Cleaning: It means removing dust and contamination that cause friction, clogging, leaking, defective running, defective contacts in electrical switches, reduction in precision, etc. Cleaning means more than superficial cleaning. In the process of doing this, every nook and corner of the machine should be reached. There are possibilities of discovering many hidden defects such as cracks, loose nuts, loose connections, wear, etc. in doing so.
  - Lubrication: Equipment require proper lubrication for efficient functioning. Checking of proper oil level in oil tank, checking oil supply pipelines for clogging and connections for leaking, are the basic lubricating requirements.
  - Bolting: Loose bolting is a major cause of breakdowns. Besides, loose bolts lead to vibration which in turn makes the products defective apart from damaging other parts of the equipment.
- Adhere to operating conditions: Running equipment at the prescribed operating conditions ensures optimum functioning. When operating

conditions are ignored, it results in hidden defects. Therefore, having standard operating conditions specified and adhering to the same go a long way in eliminating breakdowns.

- Restore deterioration: Apart from restoring the parts directly involved in breakdown, it calls for restoration of deterioration inn all other parts indirectly involved in the breakdown. This will ensure proper restoration of the equipment to its original operating performance. Otherwise, hidden defects may remain in these indirectly affected parts which will prevent elimination of breakdowns.
- Correct design weaknesses : Often, elimination of breakdowns is not possible because of problems caused by design weaknesses. These situations call for changes in equipment design.
- Improve operating and maintenance skills: Many breakdowns are caused by human errors. Non-adherence to the operating conditions and poor maintenance workmanship are often results of lack of operating and maintenance skills. Extensive training and education in these aspects not only raises the skill level, but also enhances the capability to analyse the causes of breakdowns and defects.

Setup and Adjustments

Time loss due to setup and adjustments becomes considerable because of the fact that whenever there is a requirement to change the product, the time loss starts from the end of the production of the earlier product to achieving stabilised production of the new product. This involves clean up, changing die, jigs, tools, adjusting the equipment, etc. Reducing the downtime loss requires quick and efficient setup and adjustments.

Setup improvements can be achieved by distinguishing between internal setup and external setup. Internal setup is that which is required to be performed after stopping the machine. On the contrary, external setup can be carried out without stopping production. The objective should be to minimise internal setup time by converting it to external setup. The external setup then can be meticulously planned. Pre-assemblying is a useful method which can be carried out while the machine is in running condition. The other effective way to convert internal setup to external is by using intermediary jigs.

Improvements in adjustments can be accomplished by adopting an industrial engineering approach. Only unavoidable and essential adjustments should remain. The purpose, causes, actual methods applied and their effectiveness should be analysed, questioned and better alternatives should be considered. To minimise unavoidable adjustment time standards and procedures must be established and followed by skilled workers.

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Idling and Minor Stoppages

Idling occurs when the equipment runs without producing, for some reasons. Minor stoppages occur as a result of a small problem which can be identified quickly and normal operation can be restored easily. However, frequent idling and minor stoppages result in considerable loss of production time. There can be a wide range of causes for which idling and minor stoppages take place. But, individually each cause is very simple in nature. The locations of the causes also differ greatly. In one instance, it may be due to choking of the inlet air pipe and the next time it may be due to snapping of an electric connection. On the top of these, the accumulated loss due to idling and minor stoppages is not easily appreciated by people. These characteristics make the losses difficult to be tackled.

The TPM way of reducing idling and minor stoppages (Nakajima, 1989) can be summarised in the following steps.

- Correct slight defects in parts and jigs: The smallest defects in parts and jigs are to be unearthed. These defects, although very minute, shall require adjustments at a later stage, thus consuming up part of production time. Understandably, they are difficult to be found out. For this a comparison with the ideal state often helps.
- Ensure that basic equipment conditions are maintained: Non-adherence to basic condition often causes idling and minor stoppages since, the small problems can not he detected without maintaining the basic conditions.
- Review basic operations: Sometimes it is possible that even though the operating conditions are adhered to, minor problems keep occurring. There may be problems with the operating standards, setup and adjustment procedures, or they may not be carried out correctly. Therefore, it is advisable

to periodically review the standards, procedures and performances.

- Conduct physical analysis of Phenomena: The phenomena of idling and minor stoppages ought to be analysed with a view to minimising their effects.
- Adopt an analytical approach: The analysis of the phenomena results in determination of the cause of idling or minor stoppage. for example, an equipment was idling because a part failed to reach from the previous equipment in line. But, adopting an analytical approach, the root cause of such a phenomenon should be found out and adequate measures should be taken to prevent recurrence of the same. The success of eliminating idling and minor stoppages largely depends on the effectiveness of these two steps.
- Determine optimum conditions: This step addresses the optimization of the installation and processing conditions of all parts and units considering the existing equipment, jigs and tools. The installation conditions refer to the way the equipment is installed and processing conditions refer to the various inputs and their conditions for processing.
- Eliminate design weaknesses: In spite of following the previous approaches, it idling and minor stoppages do not reduce, there is some problem with the design of the equipment. Hence, the actual weakness in mechanism, parts, materials, etc. is to be established before proceeding to modify them.

Reduced Speed

Loss due to reduced speed is the loss due to the difference between the design speed and the actual speed of operation. Obviously, the objective should be to reduce this gap and aiming to surpass the design speed. Often at design stage, the equipment specifications are vaguely set. As a result, the attainable speed can never reach the design speed. Sometimes, people do not attempt to increase the speed. Because of some old history of machine problems or quality problems. Some minor defects might have occurred in the equipment which was never attended to. Then, there are problems observed with the machine when it reaches a certain speed. So, the equipment is run at a lower speed for fear of complications. One must realise the this ultimately contributes to reduced equipment effectiveness and efforts should be made to attain the design speed or the standard speed. Thus, as the very first step, one should replace design speed with a standard speed taking into consideration the problems associated with the speed set at the design stage. The unattended defects in the equipment need to be resolved. Investigation into the cause of the machine giving problems on reaching a particular speed has to be carried out and proper action to be taken thereafter. To avoid recurrence of such problems, the basic equipment conditions also have to be met.

Quality Losses

Process defects and reduced yield are the two kinds of quality defects. Process defects are the losses in quality caused by an equipment while producing on a regular basis. This can occur under two circumstances. If the equipment fails suddenly and unexpectedly, there is a sudden increase in the rate of defects. The equipment should be promptly brought to normal condition to correct this sporadic process defects. Chronic defects, on the other hand, are difficult to be identified. As in the case of chronic breakdowns, chronic quality defects also should be tackled through investigation and innovative actions.

Reduced yield is the quality loss during the stages of start up and stabilization of an equipment. The level of reduced yield varies with the degree of ability of the equipment to stabilize, the skill level of operators, etc. Such losses are normally taken for granted. Minimisation of reduced yield can not be achieved unless their inevitability is critically examined.

Six Big Losses — A Case Study

A brain storming session involving engineers from both production and maintenance departments was conducted in a professionally managed pharmaceutical company. The objective was to identify the six big losses covering breakdown, speed, and defects, and to demonstrate the potential of savings. Through detailed analysis of past data and brain storming, the nature, description and extent of losses were identified. Percentage improvement and savings through various possible preventive measures were estimated (table 4). Total estimated annual savings are to the tune of Rs 1.4 millions. Category of losses viz, breakdown, speed and defect, and corresponding potential of savings are given in table 5. Six loss elimination programme not only provides tangible savings but also fosters teamwork, improves the morale of the people working in the organisation and increases safety of both plant and personnel.

Table 4: Preventive maintenance and potential savings for various losses

Nature of Losses	Description of Losses	Extent of Losses (Rs.)	Preventive Measure	Impact/Improvement (%)	Savings (Rs.)	Remarks
Down Time Lossess						
Failures	1. Thermopac pump breakdown	13,000	1. Keep pump always ready 2. Preventive maintenance through bearing analysis.	100	13,000	NDX-II spoiled
	2. Roll compactor shaft broken	1,11,000	1. Routine predictive inspection through vibration analyser. 2. Avoid overload.	100	88,800	Iron in material. Shift and reprocess.
	3. Bottom flush valve failed	7,500	1. Routine check. 2. Correct maintenance	100	7,500	Batch got drained.
	4. Agitator loosened	3,00,000	Routine check.	100	3,00,000	Batch spoiled.
	5. Condenser leak	6,00,000	Routine check.	100	6,00,000	
Set up and adjustment	1. Time loss in NDXIII batch changeover to Ofloxa reactor	Business loss (200 kgs.)	Routine check and planning.	100	—	
	2. Changeover of ANF	30,000	Initial inspection through vibration analyser.	100	30,000	
Speed Losses						
Idling and minor stoppages	RCI Gas limit	30,000 per for 3 months	Correct design	100	30,000	Preventive maintenance to be done
	Pump gland leaks					
	1. Solvent loss 2. Product loss 3. Time loss		Correct design.			Loss difficult to estimate
Reduced speed	1. Brine temperature not proper; number of batches reduced by 5 in June in Ampicillin	Business loss	Correct operation and maintenance.			
Defect Losses						
Defects in process	1. Nuts of agitator loose	30,000	Inspect through vibration analyser.	100	30,000	Batch quality poor
	2. Centrifuge breakdown. Less centrifuges used.	90,000	1. Vibration analyser 2. Checklist 3. Bearing analyser 4. Preventive maintenance	100	90,000	
	3. Centrifuge failure and Product mix-up	20,000	-do- Predictive maintenance through partial charge detector	100	20,000	
	4. Main power panel fault					
Reduced yields						
	1. Storage temperature high due to utility	2,00,000	Routine check.	80	1,60,000	
	2. Tripping of agitator	60,000	-do-	100	60,000	

Loss elimination programme not only provides tangible savings but also fosters teamwork, improves the morale of the people and increases safety of both plant and personnel.

Table 5: Category of Losses and Potential Savings.

Category of loss	Estimated savings
Downtime losses	Rs. 10,39,300
Speed losses	30,000
Defect losses	3,60,000
Total direct savings	Rs. 14,29,300

Discussion

Equipment effectiveness seems to be a comprehensive yardstick to measure and monitor the capability of machines to produce. However, there remains one drawback. While distinguishing between total time and operation time, the latter is obtained by subtracting planned downtime form total time. However, in some cases, the planned downtime itself may be questionable. An inflated planned downtime will result in a high equipment effectiveness. Similarly, if the planned maintenance programme itself is too tight or too loose, equipment effectiveness will not be representative of machine health. Therefore, even though the measure of equipment effectiveness appears to be comprehensive, it may not be a foolproof one. This is because, equipment effectiveness still offers a scope to play with its measurement and hence being misused or abused.

Conclusion

Total productive maintenance (TPM) is the latest stage of maintenance management after breakdown maintenance, preventive maintenance and productive maintenance in that order. Remarkable progress has been achieved mainly by Japanese companies after adopting TPM. Overall equipment effectiveness, the true index of equipment management, can be minimised by incorporating the culture of TPM. The expression of equipment effectiveness takes into consideration the breakdown or downtime losses, speed losses and defect losses. Therefore, to maximise equipment effectiveness, one has to aim for eliminating equipment downtime, match the standard or design speed of operation and minimise process defects. In spite of being a very comprehensive index, care should be taken during the measurement of equipment effectiveness against possible misuses.

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Participation in Problem Solving Groups: A Role Efficacy Approach

Omer Bin Sayeed

The operating conditions of groups make a definite impact on the success of problem solving activities. Using problem solving groups an attempt was made to explore the extent to which structural conditions and binding constraints of groups (with and without hierarchy) could influence the involvement and role effectiveness of participating members. It was found that organic groups have a definite edge over mechanistic and authoritarian groups. The role empowerment assessed through role efficacy dimensions largely contributed to participativeness and effective problem solving in the groups.

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Groups function in a variety of settings. Some groups operate with informality and ease and others function with typical structures imposing on individuals a form of hierarchy, role relationships and a particular communication pattern (Baron & Byrne, 1987). Although hierarchy and roles presuppose some type of communication network, nevertheless, informality tends to develop with the structured groups, facilitating extra-role relationships and enhancing problem solving ability of the members (Kelley & Thibaut, 1975, Collins & Raven, 1975).

Formal & Informal Groups

In problem solving groups with rigid hierarchical position, task execution being interdependent and role interactions generally restricted, information processing, if any, takes place at the top level following one way communication down the line, leaving various levels with less information than required. In such groups the time taken for solving a given problem will be more than those groups which are more interactive, informal and can define the norms of their own behaviour. It is also possible that rigidly structured groups perhaps may not solve the problem due to imposing conditions; the group as a whole may get frequently distracted and give up the task in despair. However, one possibility of success cannot be ruled out in such groups. It comes from the top level roles, who, by design, forcefully initiate certain actions with

In groups with rigid hierarchical position, task execution being interdependent and role interactions generally restricted, information processing, takes place at the top level leaving various levels with less information than required.

regard to the problem at hand and monitor rapid communication among the members positioned in the lower part of the hierarchy.

In the conventional organizational structure where roles are defined and related to each other as primary, secondary and tertiary groups, the task itself turns into a completely interdependent activity; the group members can enjoy better role interactions and show deep interest in problem solving. The capability of such groups in creases largely due to enabling leadership at various levels and members of the group reportedly enjoying greater self esteem.

The completely unstructured group is a reality in a specially designed training system known as T-group, but the committees and task forces created by the organization for a purpose do not let the group be completely unstructured. The underlying assumption is that totally undefined relationships among members could erode authority and degenerate the organizational system. Moreover, this kind of autonomous groups seem to block and frustrate senior managers, who have a tendency of not sharing organizational powers with others. In the wake of interactionist perspective (Schneider 1985) and participative approaches generally accepted by the management, group work has been regarded as an effective method of organizational problem solving (Hackman, 1976). However, depending on the nature of work, the scope of subordinate interactions can be defined. In unstructured groups free interaction is facilitated by lateral linkages and open communication among the non-hierarchical positions of the group.

Between authoritarian and totally unstructured groups, team oriented groups can be placed on the midpoint of the continuum. On the one extreme of the continuum can be placed the authoritarian types of groups which are tall in structure, authority relationship is from boss to subordinates, and communication mostly top-down related to the task only. The team-oriented groups essentially reflect a dyadic pattern of relationship in a relatively flat structure with fewer hierarchical levels. The authority relationship is such that it reinforces information processing involving subordinate roles with linking pin functions assumed by managers (Likert, 1961). The group members of the team at a given level of the hierarchical structure, consisting of 3 or more persons including a leader, share information for solving a variety of organizational problems together. (Fig. 1).

On the other extreme of the continuum, multi-linkage groups depict a multi-channel open communication net-

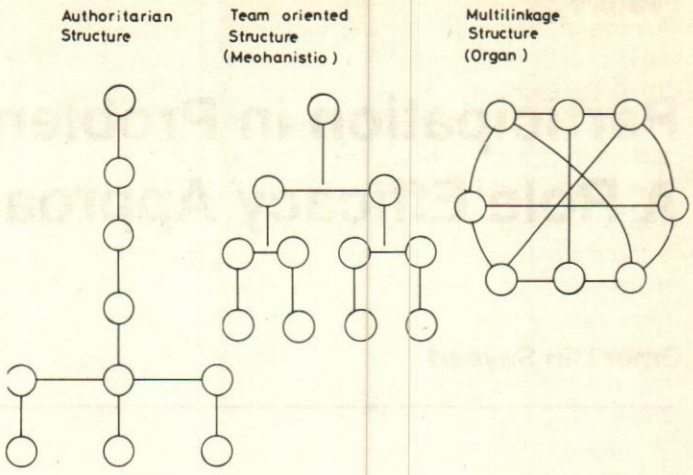

Fig. 1 Pattern of Groups

work among members and tend to demonstrate equal status for all the members in processing information through the role-related interactions. There is no formal authority; leadership can emerge among members who willingly give and seek information and thus coordinate members efforts to be directed to a common goal. Due to equal status role interaction is expected to increase, but at the same time, the group may bog down with the seething conflict or pointless interaction while attempts are made by the members to coordinate information and efforts totally dependent on the types of roles assumed by the group members.

Multi-linkage groups depict a multi-channel open communication network among members and demonstrate equal status for all the members in processing information.

Role Efficacy

The concept of role efficacy has its roots in the role theory, enunciating the idea that people do have multiple roles to play and in an organization they relate through a role specific activity, expectations and goal attainment (Sarbin & Allen, 1975; Pareek, 1987). Focussing their attention on role-related processes, Kahn et al. (1964) evaluated the negative aspects of role behaviour and emphasized that role and/or job related tensions if managed well, could prove as significant determinants of managerial performance (Pestonjee, 1991). In a similar

line of thinking, several researchers advocated the usefulness of the role concept in explaining managerial behaviour and organizational processes alike (Rizz et al. 1970; Bedeian, et al. 1981; Beehr et al. 1976; Hamner & Tosi, 1974). Recently, role researchers made a paradigm shift in their approach by way of evaluating role perception from a positive standpoint (Graen, 1976, Pareek, 1987). It is argued that role perception must be viewed in a transformational framework, recording the changes a managerial role undergoes. In this transition, managerial roles can be viewed as undergoing a change from a passive role-taking to active role-making bahaviour. If the role making behaviour is well indoctrinated it would increase role routinization at the individual level (Graen, 1976).

In essence, role making behaviour emphasizes amiable the supervisory quality of interaction; such role perceptions which are characteristic of entrepreneurship, enabling leadership that create a climate of facilitating forces. Thus, the impact of role behaviour is seen in the light of genuine appeal for development and growth. Kozolowski and Doherty (1989) empirically corroborated the aforenoted characterization applied to superior-subordinate role context. By and large, it can be suggested that role making bahaviour is a consequence of the problem solving taking place in a particular setting. There are several factors that contribute to the role making bahaviour of people in a hierarchical set up. Primarily, the role interaction and exchanges in a vertical dyad linkage (Graen & Schiemann, 1978) might be significant antecedents. In fact, role making behaviour is likely to be seen in the light of the demands people make on each other and how these demands are handled. The attempts at problem solving generally provide a stage for role making behaviour to take place. Thus, the role perceptions at the end of the problem solving activity would suggest whether or not the role incumbent showed confrontation, influence, integration and helping relationships (Pareek, 1993). The greater the perception of such characteristics by the incumbents, the stronger the role making behaviour. This approach was regarded as more useful due to the inherent difficulties of the longitudinal analysis of role transformation characterizing the role making bahaviour of managers (Graen, 1976).

In view of the nature of groups described, the present study was designed to test the assumption if role efficacy (which infers role making behaviour) has any relationship with group characteristics which have been controlled in terms of hierarchical relationships, information processing, suggestive of the characteristics of the group being more structured to completely unstructured. Hence the following hypothesis were spelt out:

Hypothesis 1: The multi-linkage (organic) and team-oriented (mechanistic) groups will differ significantly in their overall role efficacy scores.

Hypothesis 2: The multi-linkage and team-oriented groups will significantly differ from authoritarian group on several role efficacy variables.

In addition, an attempt was also made to explore as to how many role efficacy dimensions would maximally discriminate amongst 2 or more distinct groups across 4 sub-samples of the study.

Method

The sub-samples of the study comprised 12, 15 and 19 trainee participants, drawn from various Executive Development Programme (EDPs) of NITIE, Bombay, and the 4th sample comprised 25 Post Graduate students of NITIE who were at the verge of beginning their career. Taking all the 4 sub-samples together, 10 independent groups were formed. The first three samples of participants represented a wide range of industrial experiences and they had come from both public and private enterprises. The average age of the participants was approximately 44 years, while students' average age was 24 years. All the participants of the study were males.

The members of managerial and student groups were randomly assigned to three sub-groups labelled multi-linkage (organic), team-oriented (mechanistic) and authoritarian groups as described earlier. Each of the sub-groups within the samples had varying number of subjects who were assigned specific roles within the hierarchical structure. The assignment of roles to the subjects followed a truly random pattern, as no specific criteria of age, experience, status of the individual in organization was considered for this purpose. However, it was assumed that depending on the hierarchical level of the subject in the simulated groups, he will express his role behaviour and participate in the problem solving activity. The conditions which a group is supposed to follow and reinforce were brought to the notice of the group members.

It was made clear to the role incumbents that the correct solution of the problem depends on better information processing within the group enhancing their interaction and relating with others. Those who were assuming various roles in the Authoritarian Group (see Fig.1), were supposed to exchange information with

higher hierarchical levels when asked for and the main information processing was to take place at the top hierarchical positions. The top-down communication was to take place through the chain of command. In the team-oriented group, lower and upper level teams independently processed the information with coordination assumed by the linking pin roles of the lower level leaders (Likert, 1961). The final solution of the problem was however expected from the top team consisting of two/three associates, whose roles were linked to the lower roles in the capacity of team leaders of second level (see Fig.1.). Open communication within the team was allowed, but a lower level team member can not communicate with the top team leader. Even though a good amount of interaction and information processing was allowed to take place at the team level, the problem was expected to be solved in a coordinated manner.

The multi-linkage group was designed in the form of an unstructured and leaderless group, with a typical committee arrangement without a chairman. The group members were expected to assume roles of equal status. Communication was to take place on multi-channel basis. The group was prohibited from nominating a leader to coordinate the information, but depending on the interaction and role acceptability of a person, it was expected that some coordinators might emerge. Although the roles were designed with a view to have equal status, a person on his own initiative can gain importance for his role if his attempts were clearly seen as contributing to the group goal. Conversely, a role may be perceived to be of lesser worth if he does little to enhance group productivity, which is ultimately finding the correct solution.

The task consisted of 26 pieces of information separately typed out on twenty six 3" x 4" cards. The information from these cards were required to be verbally exchanged in the simulated groups in such a way that the process should lead to the solution of the problem as posed in the instruction sheet distributed among the various roles assumed by the incumbents. The task for all the sub-groups of various structures were exactly identical with instructions as follows:

> "Pretend that lutts and mipps represent a new way of measuring distance and that dars, wors, and mirs represent a new may of measuring time. A man drives from town A, through town B and town C to town D. The task of your group is to determine how many wors the entire trip took. You have twenty minutes for this task. You will be given cards containing information related to the task. You may share this information orally following the structural pattern of your group and must keep your cards in your hand throughout the task".

After solving the problem, each role incumbent in all the three groups was separately requested to rate the perception of their own roles on a short form of Role Perception Inventory (RPI), which is a modified version of Pareek's (1987) Role Efficacy Scale. The RPI consisted of 10 dimensions such as centrality, proactivity, creativity, inter-role linkage, superordination, integration, helping relations, influence and growth. These dimensions orginally consisting of 2 items each were assessed in the present study with single items characteristing the dimensions mentioned.

The data were collected from the members of all the three structures (See Fig.1), using the role perception inventory detailed above, immediately after completing the group problem solving activity. The participants were specifically requested to evaluate their role performance in the group only. the data obtained from members of various groups were separately coded for the purpose of comparison across varying groups and under a variety of role conditions as demanded by the nature of group.

Results

Table 1 reports the means and t-ratios between the overall role efficacy scores of multi-linkage, team oriented and authoritarian groups, taking each groups mean at a time and comparing it with the means of other groups. In the first two samples consisting of 12 and 14 subjects, team-oriented vs authoritarian and multi-linkage vs authoritarian groups were formed with respective samples and comparisons between the respective groups were made. With regard to 3rd and 4th samples, which consisted of 19 and 25 subjects, 3 group comparisons amongst multi-linkage team-oriented and authoritarian groups were made.

The reported mean values and the direction of t-tests amongst the aforementioned groups, regardless of their significance, have clearly indicated that multi-linkage and team-oriented roles perceived higher role efficacy during the problem solving phase, while authoritarian group roles tended to show very low mean values consistently across the four sub-samples. Multi-linkage group roles showed consistently higher overall role efficacy than the team-oriented group role. One tailed t-comparisons between multi-linkage and team-oriented groups (3rd and 4th sub-samples) consistently showed significant t-ratios ($p < .05$). Out of three comparisons between multilinkage and authoritarian groups, two showed highly significant

Table 1: t-ratios between the means of overall Role Efficacy scores obtained by Multi-linkage (M), Team-oriented (T) and Authoritarian (A), groups.

(Study – I)

		Group Means			t comparison		
		M	T	A	M vs T	M vs A	T vs A
I	(N = 12)	6.67	—	1.00	—	1.75*	—
II	(N = 14)	—	0.52	0.26	—	—	0.92
III	(N = 19)	1.13	0.72	0.42	1.83**	4.08***	1.28
IV	(N = 25)	7.50	4.57	–0.37	1.38	3.55	1.49*

*** p < .01; one tailed test
** p < .05; one tailed test
* p < .010; one tailed test

t-ratios (p < .01), while one t-ratio was marginally significant (p < .10). Out of 3 comparisons between team-oriented and authoritarian groups, two groups failed to show statistically significant t-ratios, and only one t-ratio was significant. In all the three comparisons, team-oriented (mechanistic) groups showed consistently higher mean values on the role efficacy scale than the authoritarian groups.

Table 2 reports the mean scores of the 10 role efficacy dimensions obtained by the multi-linkage, team-oriented and authoritarian groups. Multiple t-comparisons among the groups were made to identify those role efficacy dimensions which are differently perceived across the groups. In the first sub-samples, team-oriented group showed higher mean scores for role efficacy on all the dimensions with the exception of superordination (t = –1.27 ns). Team-oriented groups had low score on proactivity, which was very close to the scores of authoritarian group. Out of 10 t-ratios, the dimension of influence alone showed significant difference between the team-oriented and authoritarian group (t = 3.11, p<.01) favouring team-oriented or machanistic structure. Creativity and confrontation showed marginally significant difference between the two groups under study.

The multi-linkage and authoritarian groups that were compared in the second sample for significant differences between the mean values of role efficacy dimensions showed consistently higher mean values for multi-linkage group than the authoritarian group. Out of 10 t-ratios, integration (t = 2.24, p < .05) and superordination (t = 1.86, p < .05) indicated that the multi-linkage group tended to perceive better role efficacy on the above mentioned dimensions. The direction of mean values for the multi-linkage group tended to be consistently positive on all the role efficacy dimensions.

The third sub-samples comparison amongst multilinkage, team-oriented and authoritarian groups also consistently showed higher mean values for multi-linkage

Table 2: t-ratios comparing mean differences of Multilinkage, Team-oriented and Authoritarian structures on Role Efficacy dimensions.

Role Efficacy Dimension	Sample I	Sample II		Sample III			Sample IV	
	T vs A	M vs A	M vs T	M vs A	T vs A	M vs T	M vs A	T vs A
Centrality	0.00	0.62	0.49	2.12**	1.73	2.29**	2.66***	0.20
Proactivity	–0.15	0.54	1.46	1.63	0.23	1.44	3.35***	1.30
Creativity	1.59	0.54	0.31	0.63	0.64	1.60	3.54***	1.25
Inter role linkage	0.90	1.20	–1.39	1.13	2.27**	0.00	2.17**	1.80**
Superordination	–1.27	1.86	0.73	0.00	–0.73	1.21	2.98**	1.47*
Confrontation	1.71*	1.00	–0.68	–2.12**	–0.99	–1.42	–4.23***	–1.21
Integration	0.32	2.24**	1.85**	2.45**	0.52	0.96	3.54**	1.89**
Helping Relations	0.90	1.00	1.46*	2.36**	1.40*	1.21	–1.61*	0.23
Influence	3.11***	1.12	2.37	3.54***	0.23	1.88***	3.85***	1.30
Growth	0.15	1.20	0.81	1.62	1.25	0.27	1.80**	1.89**

*** p < .01; one tailed test
** p < .05; one tailed test
* p < .10; one tailed test

and team-oriented groups than authoritarian groups. This was, however, not true with respect to confrontation. Authoritarian groups had higher confrontation score in two subsamples of the study. The t-comparison between multilinkage and team oriented groups and between multi-linkage and authoritarian groups showed significant mean differences on Influence and Integration. Multilinkage group perceived greater influence and integration during the problem solving phase than the team-oriented/authoritarian groups. Significant differences between multilinkage and authoritarian groups were also noted with respect to centrality and helping relationships.

The mean difference between team-oriented and authoritarian groups was evident for inter-role linkage only. In almost all comparisons, team-oriented structure (mechanistic group) group tended to show higher mean values than the authoritarian groups.

The fourth sub-samples which had three groups for comparison, viz., multi-linkage, team-oriented and authoritarian, again showed a similar trend as that of the 3rd sub-sample. It is interesting to note that multilinkage group comparison with team oriented and authoritarian groups showed more number of significant t-ratios than the t-ratios between team-oriented and authoritarian groups. The t-ratios between multi-linkage and team oriented groups were significant for centrality and influence ($p < .05$) and marginally significant for proactivity, creativity, confrontation and influence.

The comparison between multi-linkage and authoritarian groups showed significant t-ratios for all the role efficacy dimensions with the exception of confrontation (-4.23, $p < .01$) and helping relationship (-1.61, $p < .10$). In both the cases the authoritarian group tended to perceive higher confrontation and better helping relationships. The analysis of team-oriented and authoritarian group showed significant mean differences on inter-role linkage, integration and growth.

Table 3 reports stepwise the multiple discriminant function analysis that selected a subset of role efficacy variables maximally discriminating amongst the groups, as the case may be. The reported statistics included the number of discriminant functions, significance test, standardized discriminant function coefficients for the selected variables, group centroid (means for the group) and prediction results in terms of percentage of correct classifications.

A close examination of the results indicated that for each of the four groups, varying number of role efficacy variables were identified, which maximized the difference between the groups under study. The discriminant function for the first sample was marginally significant ($X^2 = 5.04$, $p < .08$) and the stepwise discriminant function analysis selected the two best role efficacy dimensions of

Table 3: Stepwise Multiple Discriminant Function Analysis for 4 Sub-samples of the study

	Sub-sample	Discriminant Function	Canonical R	Wilk's Lambda	X^2	p	Selection of respective standardized coefficients: Role Efficacy Variables	Variables and Discriminant: Standardized discriminant function coefficient	Groups Centroids for Multi-linkage, Team-oriented & Authoritarian Groups: Group	Group Centroides	Classification Accuracy (in percentages)
I	(N = 12)	I	.65	.57	5.04	.08	1. Creativity	−.65	M	.63	75.0
							2. Integration	1.32	A	−.63	
II	(N = 14)	II	.79	.37	10.48	.01	1. Superordination	.28	T	−.66	85.7
							2. Influence	−1.07	A	.88	
							3. Growth	0.45			
III	(N = 19)	I	.66	.41	13.48	.04	1. Centrality	.41	M	.69	63.2
							2. Interrole linkage	.62	T	.18	
							3. Influence		A	−1.02	
								.48			
IV	(N = 25)	I	.76	.33	22.00	.01	1. Centrality	.27	M	−.71	80.0
							2. Superordination	−.47			
							3. Confrontation	.57	T	−.16	
							4. Influence	−.42	A	1.04	
							5. Growth	−.18			

M = Multi-linkages T = Team-oriented, and A = Authoritarian.

creativity and integration. Group centroid which reflected average discriminant function scores for multi-linkage and authoritarian groups showed quite a large difference between the two. The classification accuracy between the two groups was quite high (75%). The second sample consisting of team and authoritarian groups tended to maximise the difference between the groups by selecting superordination, influence and growth dimensions of role efficacy. The discriminant function yielded a canonical correlation of .79 significant well beyond .02 level. Group centroid indicated a large difference between the team oriented and authoritarian groups. Prediction results showed classification accuracy as high as 85.7 percent, The third sample which consisted of multi-linkage team oriented and authoritarian group yielded two discriminant functions of which one was significant ($X^2 = 13.48$, $p < .05$) and the other was marginally significant ($x^2 = 4.85$, $p < 10$; not reported in the table). The second function which was specifically added due to the higher discriminating power of role efficacy variables was selected through a stepwise procedure. The three selected variables of the study included centrality, inter-role linkage, and influence. The group centroids for multi-linkage and authoritarian group were placed far apart, whereas multi-linkage and team-oriented groups yielded group centroids relatively close to each other (Multi-linkage = .69; team-oriented = .18). The prediction accuracy in term of correct classification of subjects in the three groups was 63.2 percent. The 4th sample, which consisted of multi-linkage and team-oriented groups yielded two discriminant functions, of which the first function was significant ($X^2 = 22.0$, $p < .02$). As many as five highly discriminating role efficacy dimensions were identified that included centrality, superordination, confrontation, influence and growth. The group centroids for the first function between multi-linkage (–.71) and authoritarian (1.04) groups showed large difference, but the difference between the centrioids of multi-linkage (–.71) and team-oriented group (–.16) was relatively small. The prediction results indicating correct classification was as high as 80 percent.

Discussion

The hypothesis that there will be significant differences between multi-linkage and authoritarian groups was upheld in two out of the three groups. Even in the case of the third subsample, the difference between the multi-linkage and authoritarian groups was in the predicted direction with the t-ratio marginally significant ($p < .10$, one tailed test). Similarly, the hypothesis that team-oriented and authoritarian groups will also differ significantly in terms of the perception of role effectiveness was also upheld in two of the three sub-samples. It was also observed that multi-linkage and team-oriented groups had higher mean values consistently on the role efficacy dimensions reflecting features that contribute to personal efficacy and account for participative orientation of the respondents as compared to the role characteristics ascribed by the authoritarian group. It could also be seen that the multi-linkage group tended to yield higher mean scores than the team-oriented groups across all the subsamples of the study.

Multi-linkage and team-oriented groups had higher mean values consistently on the role efficacy dimensions reflecting features that contribute to personal efficacy and account for participative orientation of the respondents as compared to the role characteristics ascribed by the authoritatarian group.

It is significant that the overall role efficacy appeared to be a function of the interaction facilitation resulting from non-constrained all channel communication in the multi-linkage group structure. On the contrary, team-oriented and authoritarian groups which were structured through hierarchical role relationships tended to perceive their roles negatively. This was much more true of the roles which were functioning at the bottom of the hierarchy and experienced a sense of inadequacy in contributing to the problem solving activity of the group. The very high score of multi-linkage structure pointedly suggested that the roles arranged in a multi-linkage and open communication design perceived themselves to be incharge of the situation, initiated the problem solving activity, helped each other, reciprocated information and thus resorted to a faster information processing. As observed separately, out of the three multi-linkage structures, two were found to be successful in a short time but another similar group failed to do so within the allotted time, though there was adequate amount of interaction. We can, therefore, surmise that the group which was bogged down in the problem solving process due to lack of efforts perhaps aimed at systematic coordination among the members who were interdependent and had difficulty in coordinating and collating the information necessary for problem solving. It needs to be emphasized that goal directed behaviour on the part of most of the members might allow

their contribution to be accepted by others, but the interaction devoid of goal direction does not guarantee that the groups placed under multi-linkage or team-oriented or authoritarian structures will ever be successful within the time limit. Unless some amount of coordinated functions are carried out by the members themselves within certain boundary conditions, the groups are not likely to be productive. Thus, the burgeoning role constraints experienced in team and authoritarian structures resulted in general frustration which induced in most of the members negative feelings and, therefore, group members tended to evaluate their own role perceptions on the lower side of the role efficacy scale.

The burgeoning role constraints experienced in team and authoritarian structures resulted in general frustration and, group members tended to evaluate their own role perceptions on the lower side of the role efficacy scale.

Another important point that needs further discussion is the team-oriented group's specialized functions which bear similarity to organizational teams composed of members from various levels of hierarchy and specialized functions. The top team leader, as the leaders of organizational groups, tends to draw on the resources of the group members, plans the activity, encourages participation of the members and through them attempts to solve the problems. In this process, individual members tend to interact with each other in a goal directed manner and derive greater satisfaction. If the leader fails in seeking collaboration, the group tends to develop negative perception of their own roles, with the result that even members of team-oriented groups may experience role inadequacy. By and large, the results have confirmed that members of multi-linkage (or organic) structures had better role perception than the team-oriented (or machanistic) structure and team-oriented structure had relatively positive role perceptions than the authoritarian structure.

More specifically, support for hypothesis 2 is further received by the trend of findings on each of the 10 role efficacy variables. More number of significant t-ratios (13 out of 30 t-ratios) were obtained between the means of multi-linkage and authoritarian groups. Thus, these findings have not only positively substantiated the earlier arguments but also suggested that structural arrangements with imposing role constraints reduce the level of members participation and give way to negative perception of the role being performed by the members.

An interesting sidelight on the findings showed that all the role efficacy variables do not seem to have equally contributed in discriminating the multi-linkage, team-oriented and authoritarian groups. A small subset of role efficacy variables such as centrality, influence, growth and superordination have maximally discriminated with the accuracy of classification of cases ranging from 63.2 percents to 85.7 percents. As shown in the group centroids the multi-linkage group remained on one side of the continuum with the authoritarian group on the other side and the team-oriented group fell on the middle part thereby suggesting that such groups maintain distinctive structural qualities, significant for enhancing the participation of constituent members.

Role management by self as well as the management of roles as a network created by the organization, both contribute to participative culture, provided the organization is able to visualize the constraining factors of such networks, and consciously makes an effort for facilitating role performance. The individual on, his part has to evolve a common perspective of which he is a part and look toward to reach-in the supergoal of the society (Super-ordination); believing and exercising his option from this belief system that he has an important role to play in the organization; he does nurture the feelings that he can influence the existing mode of conduct and the resulting processes of the organization. The sense of empowerment at the level of role performance is so strong that a conducive atmosphere created by a given structure (for example, a committee structure, or a project situation performing certain focal activities) impels him to be participative and thus inculcate a participative culture in the organization. At the same time the organization also owes the responsibility of empowering people through role development and arranging a network of relationships that helps toward maximizing organizational gains through transparent individual-organization interaction.

The organization also owes the responsibility of empowering people through role development and arranging a network of relationships that helps toward maximizing organizational gains through transparent individual-organization interaction.

Implications

The present research focussing on the type of structure, problem solving behaviour and increased role effectiveness of individuals in groups emphasized that a change in hierarchical structure would precipitate greater participation amongst role occupants. The emphasis is therefore placed more on the members as problem solvers rather than the leaders of the group. This being a shift towards role empowerment would create opportunities for imbibing a participative culture in the organization. In this process the organization has a role to play i.e., reexamining the structural conditions and associated processes and making attempts to flatten the structures in a manner that enables the existing groups to be participative. It is interesting to note that while evaluating benchmarking criteria for Top Performing Companies (TPCs), Eicher Consultancy Services (1994) laid emphasis on the flattening of organization structure corroborating our point of view that relatively flattened structures enhance problem solving and thereby participativeness. However, an abrupt change could also be harmful. A sudden empowerment of role incumbents to participate and seek responsibility without adequate readiness in the network of role relationships would be a shocking experience and, therefore, injurious to healthy organizational norms. A slow and evolutionary process of rebuilding the organization would make individuals more adaptable.

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Feature

Safety Net Mechanism

Rameshwar Dubey

In the transitional period of industrial re-structuring workers groups are particularly vulnerable to the adverse impact of change. In some advanced countries, workers safety nets of complexity and comprehensiveness have been designed to absorb this painful process. In developing countries, the task is harder because of the sheer magnitude of the numbers involved, lack of prior experience and pressure from other disadvantaged groups. These obstacles will have to be overcome since success in building up workers safety nets is crucial to the future of the economic reforms programmes in these countries, opines the author.

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Globalisation impinges on industrial relations because it contributes to structural changes resulting from new forms of organisation of work and production within and between firms and also because it subjects national labour markets to increased pressure from foreign economic influences. The advent of liberalised, free market economic imperatives has had a great impact on workers worldwide. Industrial restructuring is the order of the day involving downsizing, closures and loss of employment. To cope with this upheaval, workers safety net mechanisms are being established or strengthened throughout the world, be it first world (developed capitalist countries), second world (communist countries) or third world (developing and under developed countries). The concept is simple: workers should be protected from the adverse effects of industrial restructuring, which is not of their making.

Industrial restructuring is the order of the day involving downsizing, closures and loss of employment. To cope with this workers safety net mechanisms are being established

In the above scenario the statement on the New Industrial Policy (NIP) declared by government of India in 1991 is worth quoting here:

> "Government will fully protect the interest of labour, enhance their welfare and equip them in all respects to deal with the inevitability of technological change. Government believes that no small section of society can corner the gains of growth, leaving workers to bear its pain. Labour will be made an equal partner in progress and prosperity. Workers' participation in management will be promoted. Workers' cooperatives will be encouraged to participate in the packages designed to turn around sick companies.

Intensive training, skill development and upgradation programmes will be launched".

Developed as well as developing countries are using different combinations of various components of workers safety net mechanism in widely varying degrees. These combinations are chosen depending upon the country's background and local conditions. Typically workers safety net mechanisms have the following features (Kush Varma, 1993).

- Income-support payments
- Counselling arrangements
- Retraining programmes
- Wage-employment assistance
- Self-employment assistance
- Area-regeneration approaches
- Institutional support structures.

Safety Net Mechanisms Abroad

Income-Support

Income support for rationalised workers is designed with the objective of easing the financial pangs of job-loss. Typically, it assumes the form of severance payments, incentives for voluntary retirement, and unemployment insurance benefits.

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Severance pay-outs are generally lump-sum payments that are required to be given to workers becoming redundant. They are calculated in terms of the years of employment put in by the worker. The rates of payment vary, as table 1 shows:

Table 1: An international comparison of compensation.

Country	Amount Payable
Australia	2 weeks, pay/per year of service (March of 46 weeks)
Argentina	1 month's wages/per year of service
Bahrain	3 weeks' wages/per year of service
Colombia	1 month's wages (with 12% interest)/per year of service
Libya	6 month's wages
Mexico	3 month's wages+(20 days/per year of service)
Pakistan	3 weeks' wages/per year of service
Turkey	1 month's wages/per year of service

Source: Kush Varma, 1993

Inspite of these payment being mandated by law, there are instances of workers being denied their just dues. This takes place since firms go bankrupt, there is no money to pay legal dues and workers' benefits are tied up in lengthy liquidation proceedings. In voluntary severance being a choice of the last resort, many countries are resorting to incentive-linked retirement schemes. The case of Sri Lanka is illustrative. The compensation package worked out for public sector employees is quite generous:

Year of Service	Monthly Salaries Payable (Months)
1-4	10
5-9	25
10-14	35
15-20	45
20+	50

In the private sector, the terms offered were even more attractive:

Ceylon Oxygen Limited

Rs. 85,000 + one month's salary per year of service

Nestle Lanka Limited

Rs. 30,000 + one month's salary per year of service.

This method of pruning the labour force has its own problems. For one, it is a high-cost option, frequently requiring a large influx of funds. Further, because firms often replace the retired one by a fresh recruit, a one-to-one job trade off does not take place.

In case of Pakistan, the government of Pakistan and all Pakistan State Enterprises Workers' Action Committee (APSEWAC) representing the employees of the state-owned industrial units and corporations being privatised entered into an agreement on the 15th October, 1991 providing for three options to be chosen by the affected employees (Fredrich Ebert Stiffung, 1994)

Option 1: Job security for one year and other benefits

Option 2: Golden Handshake

Option 3: Employee Buyout

The most widespread system in use, especially in advanced, industrialized countries, is unemployment insurance programmes. Currently some 44 countries round the world have such programmes in place. It is instructive to focus on the type of systems involved, the eligibility criteria, and the range of benefits delivered.

The type of system most prevalent is one of compulsory social insurance (30 countries). Under this system, the employer, employee and Government either singly or jointly contribute towards the costs of the Fund. These rates vary widely from country to country (Table 2).

Table 2: An inter-country profile on contributions.

Country	Employer Contribution	Employee Contribution	Government Contribution
Germany	2.15%	2.15%	Any deficit
Egypt	2%	None	Any deficit
Japan	9%	55%	25% of cost
New Zealand	None	None	Entire cost
Switzerland	2%	2%	Any deficit
Bulgaria	5%	None	Any deficit
Czechoslvakia	None	None	Entire cost (1991)
Hungary	None	0.5%	Any deficit (1991)
Romania	—	—	Entire cost (1991)
Argentina	2.5%	2.5%	Any deficit (1992)

Source: 1. Kush Varma, 1993
2. The Economic Times, 26th Dec. 1993

The eligibility criteria for those entitled to receive benefits also vary. Most countries restrict coverage to workers in commerce and industry, that is, to organised labour. Unemployment must not be due to misconduct, voluntary resignation or participation in labour disputes. Nearly all unemployment insurance programmes require that the applicant must be capable of, and available for work. To this end, the unemployed worker is required to report to an employment office, where he is assessed against these criteria before benefits are paid.

As may be expected, the amount and duration of unemployment benefits also vary greatly, depending on the rates of contribution. The basic, flat-rate for an unemployed worker is usually between 40-75 percent of the last earnings. In some countries, such as UK, South Africa, Spain and Iceland, additional supplements for the spouse and dependents are given. The duration of payouts also ranges from as little as 13 weeks (Bulgaria) to as long as unemployment lasts (Australia).

The amount and duration of unemployment benefits also very greatly, depending on the rates of contribution.

It can be seen from the following examples that workers are ensured from zero percent (no protection) to 100 percent (full protection) from one country to an other. In case of Malaysia, Privatisation Guidelines guarantee that no employee would lose a job as a result of privatisation and none would suffer deterioration in conditions of employment. In fact, the employee is given the option to remain in public employment or join the new employers. In Singapore, the transfer of business does not affect the continuity of service of an employee. In Japan, the government engages surplus staff temporarily or provides assistance for preferential employment and retraining for alternative jobs or self employment for those laid off.

In Philippines, there is automatic termination of employer-employee relations upon privatisation. Normal termination benefits will accrue to the laid off employee. Ghana lays off surplus employees, but since costs of meeting compensation are high, payments are deferred over three years or more. The worker in Togo seems to be the worst off, a job lost is without any compensation or relocation (Economic times, 1993).

A recent case of new package designed for Australian workers is worth mentioning. Recently Western Australian public servants have a new workers safety net arrangement to cover them if their jobs become redundant or their departments functions are privatised (Dept, of Productivity & Labour Relations, 1994).

A key component is a new severance package for people whose job are abolished and who are not able to be transferred to another position within the public sector. The package includes two weeks pay for each year of service to a maximum of 46 weeks and payment for all accumulated, pro-rata annual and long service leave. Applicants for severance will also be paid relevant allowances.

People who are transferred to the private sector will receive a transition payment of between four and 12 weeks pay, cash in lieu of all pro-rata accrued annual and long service leave and any allowances which have been paid for the previous 12 months. The workforce Management and Development Office has predicted private sector rates will be similar to those in the public sector in most cases, but is not in a position to give guarantees.

Employees who are transferred to other Government agencies will not be placed in jobs paying less than 80% or more than 110% of their previous salary. Those accepting lower rates will have their pay topped up by the Government for the first six months. Employees can not reject a job which they are capable of performing, which does not require a move of residence, matches their

experience and qualifications, has a rate of pay similar to that of their old job and is the best available option.

Counselling

Apart from financial considerations, the rationalised worker requires counselling in three areas: psychological, financial and awareness-building. Psychological counselling attempts to treat the trauma of job loss. It recognizes five stages in coping with redundancy — Penial, Bargaining. Anger, Depression and Acceptance. Once the rationalized worker has lived through each process, he is better equipped to face life in a productive manner. Such counselling is provided on-site in the UK and through local employment offices in Germany.

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Financial counselling aims at achieving optimal deployment of financial resources. Some of the items covered include:

— Investment counselling

— Family expenditure budget

— Debts and other liabilities

— Stock-taking of financial assets

— Investment in business or self-employment

— Risks/Benefits of different investment options.

A relatively recent addition is awareness-counselling of rationalized workers. Through psychometric tests and standardised aptitude questionnaires, an attempt is made to gauge a person's life-orientation. Issues relating to inter-personal skills, preferred work environment, or putting a hidden talent to use are thrashed out. Obstacles that have a negative influence on career decisions are sought to be isolated and rectified.

Retraining

To enable the rationalized worker to re-enter the productive mainstream, retraining programmes have been initiated in many countries. These may be Government sponsored, employer-driven or enterprise oriented. In Sweden, a National Employment Training Board (AMU) has been set up by the Government consisting of a Central Board as well as 25 Regional Boards across the country. Another example of institutional retraining support is Skills Development Fund (SDF) of Singapore. The Skills Development Fund (SDF) was set up way back in October 1979. Its objective is to promote skills upgrading persons in employment. It provides financial incentives through training grants to companies who send their workers for training (NRF Workshop, 1994).

A different approach is seen in Canada and the USA, where retraining programmes are employer-driven. The Canadian Job Development programme provides for 60 percent wage subsidies to cover the costs of on-the-job training (OJT). Even more direct in its focus is the California Employment Training Panel (ETP). In this system, the employer proposes individual projects, selects trainees, sets standards, approves curricula and hires successful trainees.

In Japan, retraining is enterprise oriented. Training procedures and job rotation schemes are formulated within the firm. Thus, workers made redundant by a demand shock are not typically laid off from their jobs. Rather, they are absorbed within the firm, or in a subsidiary, or affiliated company, by a process of 'outplacement'. The Government provides training cost subsidies directly to enterprises.

Wage Employment

For successful redeployment in the job-market, wage-employment assistance is often provided to rationalized workers. This takes the shape of comprehensive job-search facilities, enhancement of job acquisition skills and employee-hiring incentives. In some countries, notably Australia and New Zealand, assistance is graded and linked to the duration of unemployment.

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Job-search facilities are linked to comprehensive vacancy information. In New Zealand, job vacancies are fed into a nation-wide computer system called Fast Match and details displayed in minutes on local area networks. In Germany, the Vacancies Information Service displays

the full name, address and telephone number of the Company involved. The job-seekers can look for vacancies under occupational groups and dial the employer immediately. To support the worker in this activity, a Job-Search Allowance is paid in some countries, e.g. Australia.

Several European Countries — UK, Belgium, France, Ireland and Netherlands, as well as New Zealand and Australia focus on job acquisition skills through Job Clubs,. These offer a range of activities telephone/letter writing skills, interview practice, and resume' presentation. Members have free use of typewriters, paper, photocopies, stamps and telephones, and find support in an atmosphere of teamwork. From a totally opposite standpoint, the employer is some times offered incentives for hiring rationalized workers. One such scheme is operative in New Zealand, termed 'Job Plus'. Here employers are subsidized for six months or longer, if they enroll job-seekers who are without work for over six months. However, to qualify for benefits, the job must be of a permanent nature, involving a minimum of 30 hours work-week, and paying at least the minimum wage.

Self-Employment

Since employment in an over-crowded job-market is difficult at best, *self-employment assistance* is provided to rationalized workers. This takes different forms:

— Financial support for small business start-ups

— 'Managed Workspaces'

— Business advice and guidance.

Recognizing that small businesses need continuing support, the Training and Enterprise Councils (TECs) in UK have initiated an Enterprise Support Programme (ESP). This provides financial support of $50 per week for 26 weeks and then 25 per week for 16 weeks to the rationalised worker turned small entrepreneur. Besides, a telephone response termed 'Tecline' has been established to deal with business queries between 8AM and 7PM. Experienced counsellors are available to advise on matters relating to finance, insurance, personnel administration, taxation, production and marketing. Expert advice is also provided, free of cost, on environment, health, exports, standards and quality management.

Area Regeneration

While measures detailed so far have the rationalised worker as their focus, a broader perspective treats industrial decay as a problem of *area regeneration.* Accordingly, strategies have been evolved to seek urban renewal from a holistic standpoint. A package of measures, mainly economic, is sought to be implemented for this purpose. This approach is best exemplified in the programmes currently in operation in New Zealand, UK and Egypt, in increasing order of complexity.

In New Zealand, with its relatively small size and homogeneous social groups, the focus is on the community. Community Employment Groups have been formed to help communities, using local skills and resources. Job-seekers, who have been unemployed for more than three months can be referred to a voluntary, work experience option called Community Taskforce. Projects can last upto six months, with volunteers working three days a week. An allowance of $5 per day is given in addition to the unemployment benefit to volunteers.

In the UK the focus of area regeneration is the city. The Government's Action for cities initiative was launched in March 1988 with a comprehensive range of programmes like city challenge, City grant, Derelict land grant, Urban Regeneration Agency, Urban Development Corporation, Urban Programme, Land Regsisters and Enterprise Zones.

In Egypt, the concept has been taken a step further by the establishment of a Social Development Fund (SDF). This operates throughout the country and targets vulnerable groups, especially workers displaced from public enterprises. It consists of programmes like provision of Essential Municipal Services programme, entailing numerous small, labour-intensive public works, such as construction of roads, water supply, and sewage systems, improvements to essential Public Transport Services Programme, Community Development Programmes and Labour Mobility programme to facilitate worker redeployment.

Institutional Support

At all levels of intervention, be it plant, community or State institutional support structures have been set up to provide administrative underpinning to activities related to worker rehabilitation. The Canadian Industrial Adjustment Services (IAS) provides advisors at the plant level, during periods of lay-off. Essentially, IAS encourages local area employers and community involvement to open up the informal job network to displaced workers. From 1971 to 1981, the labour management committees set up with IAS assistance found 66 jobs per 100 displaced workers, at a unit cost of just $171 per worker.

At all levels of intervention, be it plant, community or state, institutional support structures have been set up to provide administrative underpinning to activities related to worker rehabilitation.

At the community level, a body like the Training and Enterprise Council in the UK can be extremely effective. The range of services offered by a TEC is indeed comprehensive:

- — Financial assistance for business start-ups
- — Training through customised packages
- — Business counselling
- — Employment action
- — Management development
- — Access to information data-bases
- — Market research for businesses
- — Aid for meeting NVWs (National Vocational qualifications).

At the State-level, a centralised institution that handles all labour and employment-related matters is best placed to render services to the rationalised worker. The Federal Institute of Labour in Germany is one such model which undertakes the following functions:

- — Labour market research
- — Career counselling
- — Vocational training
- — Job placement
- — Unemployment benefit payments.

Status & Magnitude of Indian Operations

In India, on 31.3.1990 there were 244 CPSUs with a total investment of Rs. 99315 crores and providing employment to 23 lakhs. The disagreggated analysis reveals that 131 of these enterprises earned profits of Rs. 5741 crores and 98 suffered net losses of Rs. 1959 crores. 85 percent (Rs. 72130 crores) of the total capital employed in the 131 profit making PSEs gave a fairly reasonable rate of return. The main reason for the poor performance of the public enterprises generally can be traced to the 98 loss making PSEs which accounted for 14.5 percent (Rs. 12211 crores) of the capital employed and about 35.6 percent (790500) of the total employees in CPSUs. Out of the 98 loss making units, 58 were chronically sick mainly in the industry groups of Engineering, Textiles, consumer goods, chemicals and pharmaceuticals, transport equipment, fertilizers, steel and mines. The annual loss per employee in the 58 chronically sick enterprises was of the order of Rs. 38714 in 1989-90, the capital employed per employee was of the order of Rs. 13093 and the accumulated loss per employee as on 31.3.1990 was per 2.09 lakhs. Realising the fact that any policy for reorganization and restructuring of PSEs has to be directed first towards finding solutions for the loss making public enterprises in the competitive sectors, Government amended the Sick Industrial Companies (Special Provisions) Act, 1985 (SICA) in 1991 to bring PSUs within the purview of the Board for Industrial & Financial Reconstruction (BIFR).

Position of Cases Referred to BIFR

The available information with regard to cases referred to BIFR as on 30.9.1994 is given in table 3

Table 3: BIFR referred cases as on 30.9.1994
(Figures for PSUs given in Brackets)

S.No.	Particulars	Total	Centre	State
1.	No. of Units referred to BIFR	2207	(62	+ 95 = 157)
2.	No. of Units registered with BIFR	1602	(54	+ 66 = 120)
3.	No. of units registration declined	603	(8	+ 29 = 37)
	a) Under Scrutiny	2	Nil	
4.	No. of Ist Hearings	1564	(53	+ 64 = 117)
5.	No. of units where DA appointed	967	(46	+ 35 = 81)
	a) DA report received	851		
6.	Disposal			
	a) Not Maintainable	334	(2	+ 20 = 22)
	b) Revival Schemes drawn up	463	(4	+ 7 = 11)
	c) Winding up Recommended	343	(2	+ 5 = 7)
	d) Others	11		
	Disposal Total	1151	(8	+ 32 = 40)
	e) Winding up Notice/ Draft Scheme published	106	(6	+ 11 = 17)
	f) Failed & Reopened/ Remanded/stayed by High Courts	84	(5	+ 0 = 5)
7.	Under Process	261	(35	+ 23 = 58)
8.	No. of workers involved	988951	244747	+197681)*

Source: Indian Labour Conference, 1995
(*Excluding 364 cases where details are not available. These include 245 declared non-maintainable. The figures were taken from the references filed and show only the order of magnitude.)

In the light of the above background the National Renewal Fund was established in February 1992 through a resolution issued by the Department of Industrial Development. After consultations/discussions with all concerned including State Governments, public sector enterprises, trade unions, financial institutions, etc. on the issues concerning funding of Schemes for retraining and redeployment of workers, guidelines for operationalising the NRF were finalised and the Cabinet Committee on Economic Affairs (CCEA) approved the guidelines on 28th October, 1992. The guidelines, which were notified on 21st December, 1992, contained the following objectives:

- To provide funds, where necessary, for compensation to employees affected by restructuring or closure of industrial units, both in public and private sectors.
- To provide assistance to cover the costs of retraining and redeployment of employees arising as a result of modernisation, technological upgradation and industrial restructuring.
- To provide funds for employment generation schemes, both in the organised and unorganised sectors in order to provide a social safety net for labour needs arising from the consequences of industrial restructuring.

NRF guidelines provide a wide scope for workers' compensation payment under different circumstances. However, the major problem before the NRF has been financial constraints. Table 4 gives an idea of the progress of various components of the NRF:

Table 4: Progress of National Renewal Fund in India.

a) Budgetary allocation and disbursement (Rs. in crores)		
Year	Allocation	Disbursement
1992-93	829.66	650.24
1993-94	1020.00	548.75
1994-95	700.00	—
b) Progress of VRS in CPSUs as on 30.6.94		
Year	No. of workers covered under VRS.	
1992-93	38531	
1993-94	30935	
1994-95	820	
Total	70286	

Source: Indian Labour Conference, 1995

Total No. of CPSUs where VRS was introduced with NRF assistance is — 60. Almost all these CPSU implemented VRS scheme mainly based on guidelines provided by the Bureau of Public Enterprises.

Voluntary Retirement Scheme

A model scheme of VRS was formulated by the Bureau of Public Enterprises (BPE) in 1985 for the Central PSUs with the objective of rationalising surplus manpower. The scheme came into operation in 1987. The guidelines issued by the BPE (1988) reads as follows.

- An employee who has completed 10 years of service or completed 40 years of age may seek voluntary retirement by a written request.
- The management of the enterprises will have the right not to grant voluntary retirement for reasons to be recorded in writing.
- The terminal payments available to an employee who seeks voluntary retirement would be:
  - i) the balance in his Provident Fund Account payable as per CPF regulation.
  - ii) cash equivalent of accumulated earned leave as per the rules of the enterprises.
  - iii) gratuity as per Gratuity Act or the gratuity scheme applicable to the employee.
  - iv) one month's/three months' notice pay (as per the conditions of service applicable to him.)
- In addition, an employee whose request for Voluntary Retirement is accepted would also be entitled to an ex-gratia payment equivalent to 1/2 months emoluments (pay+DA) for completed year of service or the monthly emoluments at the time of retirement multiplied by the balance months of service left before normal date of retirement, whichever is less. For example, an employee who has put in 24 years of service and has got only one year of service for normal retirement, will get ex-gratia payment of only 12 months emoluments and not 36 months emoluments.
- In addition, the employee and his family would also be entitled to travel by the entitled class to the place where he intends settling down.
- The Voluntary Retirement Scheme would be applicable to all employees, workers and executives. Where there is a surplus manpower, the vacancy caused by Voluntary Retirement Scheme would not be filled up. Voluntary Retirement Scheme on the above parameters cab be introduced by the public Enterprises with the approval of he Administrative Ministries.
- If in exceptional cases where a higher ex-gratia payment is proposed to be made, the approval of

the Bureau of Public Enterprises must be obtained by the Administrative Ministries.

The ex-gratia payments under the BPE model would be exempted from the payment of income tax. The exemption from the Income-Tax Act has also been extended to the private sector. According to the available information, 98513 number of workers have so far opted for voluntary retirement in 131 Central Public Sector enterprises since the introduction of the model schemes in CPSUs. In addition, there are many more workers who have opted for VRS in the private sector.

The Case of Indian Oxygen

The details of VRS Scheme of a company (Indian Oxygen Ltd.) under the Private sector is as follows. It has helped the company in turning around along with other measures adopted. The company's manpower strength which was 5894 in 1989 came down to 1886 in the year 1993 (Fig. 1) and the manpower cost as the percentage of sales came down from 18.9 in 1989 to 15.2 in 1993 (Fig. 2) which resulted in the company's profit spurt from a meagre 0.25 crore in 1990 to Rs. 7.05 crore in 1993 (Fig. 3) (Seventh Industrial Relations Conference, 1994).

A. Initially in August, 1987 when the scheme of Voluntary Separation was first introduced, it was applicable only to the employees belonging to the company's non-management staff in respect of whom the following conditions were required to be fulfilled:

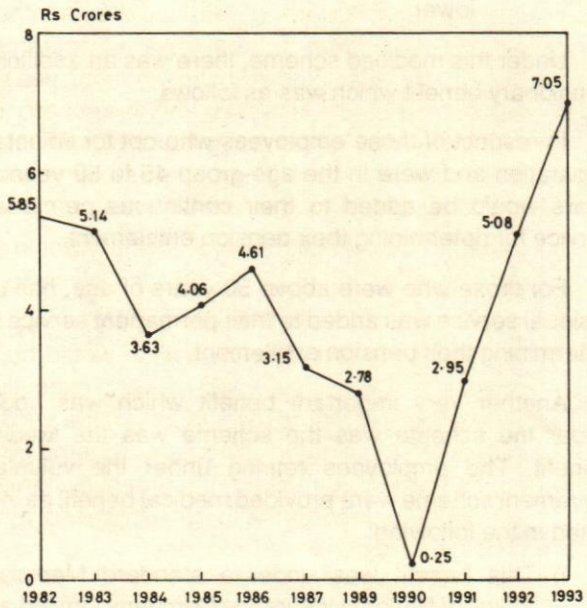

Fig. 1 Profit after Tax

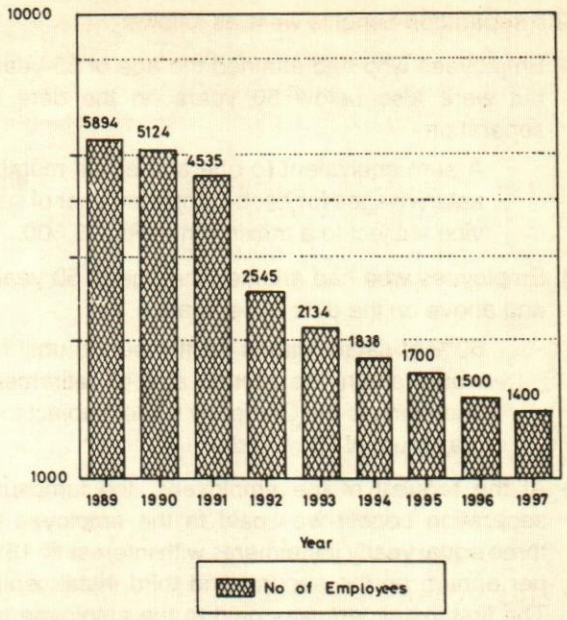

Fig. 2 Manpower — Year-end Position

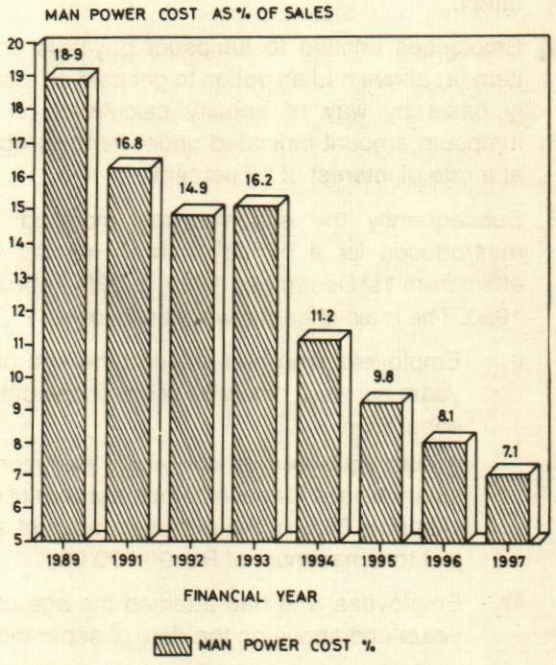

Fig. 3 Manpower Cost as % of Sales

a) Employees must have been in the permanent service of the company continuously for not less than 10 years.

b) No. charges/charge sheets for misconduct or misdemeanour should be pending against him.

c) The employees should apply in writing for the Voluntary Separation under this scheme.

The separation benefits were as follows:

i) Employees who had attained the age of 35 years but were also below 50 years on the date of separation

A sum equivalent to one and a half months salary/wages for each completed year of service subject to a maximum of Rs. 75,000.

ii) Employees who had attained the age of 50 years and above on the date of separation

50% of salary/wages for the period until he would attain the normal age of retirement according to the Company's rule, subject to a maximum of Rs. 1 lakhs.

iii) At the request of the employees, the lumpsum separation benefit was paid to the employee in three equal yearly instalments with interest @ 15% per annum on the second and third instalments. The first instalment was paid to the employee on the date from which Voluntary Separation took affect.

iv) Employees entitled to lumpsum payment under item (a) above had an option to get paid on monthly basis by way of annuity calculated on the lumpsum amount indicated under item (a) above at a rate of interest of 16 percent,.

B. Subsequently the scheme was modified and reintroduced for a period of three months with effect from 1st December, 1989, to 28th February, 1990. The main changes were as follows:

i) Employees who had attained the age of 35 years but were below 50 years on the date of separation:

A sum equivalent to one and a half months salary/wages for each completed year of service plus 25% of the aforesaid amount subject to a maximum of Rs. 90,000.00.

ii) Employees who had attained the age of 50 years and above on the date of separation:

50% of salary/wages for the period until he attained the age of retirement according to the company's rules, plus 25 percent of the aforesaid amount subject to a maximum of Rs. 1.25 lakhs.

C. The company reintroduced the Voluntary Separation Scheme with effect from 1.11.1990 and it was in operation till 31.1.1991.

In this scheme, the eligibility criterion was modified to minimum 5 years of service instead of earlier 10 years. The separation benefits were also improved and were as follows:

i) Employees below 50 years of age on the date of separation:

A sum equivalent to one and a half months salary/wages for each completed year of service plus 25 percent of the aforesaid amount, subject to a maximum of 45 month's salary/wages;

Or

Rupees two lakhs, which ever was lower.

ii) Employees above 50 years for age on the date of separation:

50% of the salary/wages for the period till the age of normal retirement according to the Company's rules plus 25 percent of the aforesaid amount, subject to a maximum of 45 month's salary/wages;

Or

Rupees two lakhs, whichever was lower.

Employees opting for voluntary retirement and falling either under (i) or (ii) above, were entitled to a minimum separation benefit, the quantum of which would be equal to 30 month's salary/wages:

Or

Salary/wages for the remaining months of his service in the company, whichever was lower.

Under this modified scheme, there was an additional pensionary benefit which was as follows:

In respect of those employees who opt for voluntary separation and were in the age-group 45 to 50 years, 5 years would be added to their continuous permanent service for determining their pension entitlement.

For those who were above 50 years of age, half the residual service was added to their permanent service for determining their pension entitlement.

Another very important benefit which was added under the scheme was the scheme was the Medical Benefit. The employees retiring under the voluntary retirement scheme were provided medical benefit as indicated in the following:

i) This benefit was under a standard Mediclaim Policy of National Insurance Company Limited and was as per the terms and conditions laid down for

such policies by National Insurance Company Limited.

ii) The provisions of medical benefit covered hospitalisation for the employee concerned and his spouse for a period of 5 years upto the date of his normal retirement, whichever was earlier.

D. As the above scheme was continuing., the company further modified the Scheme and made it available from 1.1.1992 to 29.2.1992. According to the modified scheme the only change that was effected was that the maximum of rupees two lakhs was enhanced to rupees two lakhs and twenty five thousand only. Further, employees of 50 years of age and above seeking voluntary separation could alternatively accept separation benefit which was equivalent to full salary/wages last drawn (basic and DA) payable on monthly basis for the remaining months of service, subject to a maximum of 60 months salary/wages (basic and DA).

E. The company reintroduced the scheme for graded staff with effect from 1.1.1993 for a period of two months only i.e., upto 28.2.1993. Under this scheme, it was stipulated that employees seeking voluntary separation should have completed ten years of service and attained 40 years of age (earlier it was 35 years of age). The compensation which was payable on account of voluntary retirement of the employee should not exceed the amount equivalent to one and half's month's salary-basic+DA+ Personnel Pay (wherever applicable) for each completed year of service or monthly emoluments as above at the time of retirement multiplied by the balance months of service left before the date of voluntary retirement, subject to the maximum of Rs. 2.50 lakhs. In respect of employees at Bombay and Delhi, the maximum monetary limit was Rs. 3.0 lakhs. The additional pensionary benefit and medical benefit however, remained the same.

F. Finally, the company has borne out with a Voluntary Retirement Scheme which was in force from 1.10.1993 to 31.3.1994.

This scheme has been drawn to result in overall reduction in the existing strength of the employees of the company. The scheme covers all the permanent employees of the company including workers and executives excepting the Directors of the company.

One of the salient features of the VRS Scheme of IOL and cause for success is the continuous improvement, additions and changes in the scheme as time passes. This feature is worth emulating to gain success in thinking the organisation and making more efficient and profitable.

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There has been no authoriative study on the whereabouts of workers after accepting VRS. In a study on VRS in India conducted by the Shri Ram Centre of Industrial Relations and also a study conducted by NPC at Bangalore it is revealed that managements by and large do not keep any record of employees who have accepted VRS and left the enterprise. A large number of VRS beneficiaries were reported to have left for their native places or to other parts of the country. Discussions with some beneficiaries revealed that most of them found the scheme fairly beneficial (which is why they opted for the scheme,) to obtain lumpsum assistance which helped them in the construction of their houses, payment of past loans, etc.

Retraining & Counselling of Workers

To protect the employees from the possible adverse consequences of industrial restructuring, the social safety net needs to provide a range of services and evolve clear cut organisational centres where responsibility can lest. The employees who is rationalised needs counselling to recover from the trauma of job loss. The severance payments of rationalised workers through the Voluntary Retirement Scheme (VRS) are quite substantial. It is imperative that these are channelised productively. Towards this the financial institutions/banks have developed a variety of investment options. On the basis of the data on skill/educational qualification, age, etc. of the rationalised workers, the Employee Resource Centres (ERC) located within the industrial units would identify the employees desirous of entering the labour market as wage earners as well as potential entrepreneurs. The role of the ERC is to provide psychological and financial counselling, informative materials, identification documents, etc. and direct the job seekers to the local Employee Assistance Centre (EAC).

Those interested in self-employment ventures would be directed to the Business Development Cell within EAC. An amount of Rs. 50 crores bas been earmarked in 1994-95 for counselling and execution of training and redeployment schemes out of the NRF funds and five Employees Assistance Centres have been sanctioned as pilot projects at the following locations (table 5).

Table 5: Employees Assistance Centres with Agencies

Agency	Location
Confederation of Indian Industry	Bombay
SISI	Indore
Gandhi Labour Institute	Ahmedabad
ASSOCHAM	Kanpur
National Small Industries Corporation	Calcutta
National Productivity Council	Bangalore

These centres would broadly cover a range of activities including labour market surveys to gather information about potential marketable skills, job counselling, retraining, self-employment and redeployment/placement. In addition to these, a special training scheme has also been sanctioned under the NRF for implementation through the Directorate General of Employment and training under the Ministry of Labour for workers who have been rendered surplus or taken voluntary retirement. The scheme envisages training of such workers through part-time evening classes in 15 selected Industrial Training Institutes which are under the administrative control of the respective state governments. This schedule is also to be implemented in five Advanced Training Institutes located at Bombay, Calcutta, Kanpur, Ludhiana, Hyderabad and one Central Training Institute for Instructors located at Madras. As on 30.9.1994, 540 workers had received retraining in the above mentioned five Employee Assistance Centres and 6096 rationalised workers have been provided services by ERCs set up in 20 Central Public Sector Undertakings (CPSUs). The Government is actively considering conversion of the pilot retraining scheme into a country-wide programme.

The details of the EAC at Bangalore where NPC has already completed its 1st phase of survey are in table 6.

Company wise rationalised workers are given in Annexure I.

Age wise rationalised workers are as follows:

Below 40 years = 9
41-49 = 90
50-54 = 159
Above 55 = 217

Table 6: Results of NPC Survey at Bangalore

Total No. of organisation contacted	=	350
No Response	=	287
Response	=	63
Organisations which operated VRS	=	12
No. of workers rationalised	=	2522
No. of rationalised employees from SPSU	=	267
No. of rationalised employees from CPSU	=	2255
No. of employees not traceable	=	400
No. of employees yet to respond	=	1560
No. of employees responded	=	511
No. of employees needing Assistance	=	475
Not interested	=	36
Wage employment Assistance	=	175
Self employment Assistance	=	183
Group employment Assistance	=	13
Wage or self employment Assistance	=	55
Wage or group employment Assistance	=	21
Self or group employment Assistance	=	(10)
Wage or self or group employment Assistance	=	18

Source: NPC Survey Report, 1994

On all India basis, if we look at the age profile of workers who availed of VRS (66030 out of 70286 workers who exited under VRS with NRF assistance and whose age profile is available) 34161 or 51.73 percent were in the age group of 35-50 years and 3108 or 4.71 percent were below 35 years.

Introduction of VRS in CPSUs with assistance from the NRF is a recent development. while compilation of information of the employees retired under VRS has become necessary, no detailed information on the age profile was collected earlier. In the study on VRS conducted by the Shri Ram Centre, it is mentioned that the majority of retired employees were above 50 years of age and they had accepted the VRS as they found that their retirement would not put them in any financial loss with substantial ex-gratia payments available to them. However, the middle aged employees took voluntary retirement not because the ex-gratia payments were attractive, but because of other reasons like securing alternative and better employment elsewhere, family circumstances, perennial ill health, etc.

Structural changes affect not only the formal sector but also the informal sector. NRF has so far concentrated only on the formal sector, particularly the Central Public Sector. Modest provisions are being made for State PSUs and the intention eventually is to extend the coverage of NRF to the private sector units referred to the

BIFR, as envisaged in the original NRF guidelines. While it is appropriate that the NRF should eventually cover all sectors, for the present, in view of the limitation of resources, the coverage of NRF may remain restricted to the formal sector. Various special schemes for poverty alleviation, employment generation etc. should focus more clearly on the informal sector.

NRF should not be confined to merely funding voluntary separation of redundant employees. The problem of redundancy is faced not only by sick industries but also by other functioning industries. Greater emphasis should be given to retraining so that the employability potential of redundant workers can be raised. The task of retraining for continuous skill upgradation of employees should basically be the interest and responsibility of the management. In fact, the management should not depend on the Government for financing retraining schemes. Wherever large scale retirement is contemplated, the concerned management may be charged with the responsibility of providing counselling, training and re-training. The retrained workers can then be absorbed either in the same enterprise in different activities or in sister organisations. It is the management which can properly assess the skill requirements of industry and impart training for acquisition of the necessary skills.

Greater emphasis should be given to retraining so that the employability potential of redundant workers can be raised.

Mobilisation of resources for retraining and deployment scheme is another important matter for the success of the structural adjustment programme. The Government should try to seek internal as well as external funding for the non-VRS components of the NRF, only then the process of restructuring would be completed with human face.

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Annexure 1: Organisation in Bangalore which operated VRS

Name of the Organisation	No. of Employees Retired through VRS
Bharat Earth Movers Limited	447
Karnataka Silk Industries Corporation Limited	19
ITI Limited	760
Bharat Electronics Limited	687
New Government Electric Factory	64
Hindustan Aeronautics Limited Engine Division	119
Hindustan Aeronautics Limited Overhaul Division	31
Karnataka State Electronics Development Corp. Limited	34
Hindustan Aeronautics Limited Foundry & Forge Division	30
HMT Limited Precision Machinery Division	4
Hindustan Aeronautics Limited Aircraf Division	177
Karnataka Agro Industries Corporation Limited	150

Feature

Rural Development: Role of the Higher Technical Institutions

Jagpal Singh

In order to improve the productivity in the rural sector, there is the need to qualitatively and quantitatively change the contents of the programmes of higher technical institutions. What are these programmes? What are requirements of rural development? What type of changes in the programmes of technical institutions are needed? The paper tries to answer these questions

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The rural sector provides livelihood to around three-fourth of the total population and offers employment to about two-thirds of the labour force. While it supplies raw-materials to many industries, it also offers market to many others and earns a substantial amount of foreign exchange. Yet, its shares in capital stock and output declined from 33.5 percent and 55 percent in 1951 to 18 percent and 32 percent in 1991 respectively. The educational programmes of the higher technical institutions raised skills of the human resources in the industrial sector. There was also appreciable rise in the intensity of capital, energy and infrastructure resources in the secondary sector. The consequent increase in labour productivity in this sector has further widened the disparity in the distribution of GDP between rural and urban areas. In order to reverse this trend, there is the need to quantitatively and quantitatively change the contents of the programmes of the higher technical institutions. What are the requirements of rural development? What type of changes in the programmes of the technical institutions are needed? These constitute the subject matter of the present paper.

Requirement of Rural Development

The activities of a a technical institution can be classified broadly under four heads: (i) academic; (ii) research and development (R & D); (iii) publication and documentation and (iv) transfer of technologies from laboratory to the users.

Here, we assume that socially and culturally the rural people are better off. Therefore, rural development stands for economic development in the rural areas. As a process, it stands for organizing the rural people for undertaking the activities which help in raising the income of every worker living in rural areas to at least equivalent to the national average per member of the labour force

irrespective of whether he is underemployed or unemployed. Real income of a worker depends upon his/her productivity, which in turns is directly dependant upon the per worker intensity of skills, capital, energy, and infrastructural resources. Experience of the last forty years indicates that India has designed its programmes for resource allocation, research and development (R&D) and human resources development for encouraging the use of skill, capital, energy and infrastructure intensive production processes largely in the industrial sector of the economy. This has created scarcity of these resources in the rural sector of the economy. The concept of appropriate technology had been introduced in order to limit the requirement of these resources in the rural sector. In terms of labour productivity, the appropriate technologies are, however, inferior to the modern technologies.

Solution of the Problems

The solutions to the problem of low rural labour productivity thus, are in terms of the following:

1. To influence the research and development programmes of higher technical institutions, so that the appropriate technologies can be improved to suit the requirements of advanced technologies.
2. To influence the academic programmes of the higher technical institutions for meeting the requirements for skilled human resources suitable to Indian conditions.
3. To evolve appropriate policies for allocating the skills, capital, energy and infrastructure resources among different sectors of the economy and different areas of the country, which ensures the rural sector its due share.

The academic and R & D programmes of higher technical institutions can be influenced effectively by supplying them properly developed course materials adequately trained human resources and an analytical framework which should help in identifying the R & D issues for improvement of so called appropriate technologies alongwith the outcome to their applications. Similarly the policies of the state regarding allocation of resources among different sectors of the economy can be influenced by evolving a planning framework by keeping the average worker at the centre stage.

Qualitative Change in the Programmes

The higher technical institutions are expected to design their R & D, publication and documentation, transfer of technologies and academic programmes to perform the functions mentioned against each of them in Table 1. Information given in the last column of the table indicates the probable outcome which can be used either as an input to other programmes or as a tool for influencing the academic and R & D programmes of higher technical institutions and resource allocation policies of the state.

Concept of PTS Centre

In order to influence the policies of the state regarding the allocation of skills and resources among different sectors of the economy, there is a need to evolve and test a methodology for implementing the development plan at a cluster level. We thus evolve, the concept of a PTS Centre here. Organisational structure, cellular structure and economic activities based on the philosophy of production and processing of renewable raw materials are the main components of the concept of PTS Centre.

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Organisational Structure

1. The state government may issue the guidelines for demarcating a cluster and may empower a committee consisting of: Chairman of the Block Samiti, Block Development Officer and the Manager of the Lead Bank of the concerned block/district respectively to demarcate different clusters within a block.
2. The state government may appoint one of the technical institutions working in the area such as a Polytechnic, Engineering Institution, Agricultural University, Research Laboratory etc., as a mother institution for the cluster. The institution may ensure full-time service of one of its senior faculty, who may work as Chief Coordinator for the cluster. The mother institution may constitute a Research Group of faculty members under the chairmanship of the Chief Coordinator for taking care of the R&D needs of the cluster of villages.
3. For a group of about 800 families one Rural Manager of the rank of Junior Engineer, Project Officer, Assistant Project Officer may by deputed

Table 1: Programmewise Functions and Probable Outcomes

Programme	Function involved	Probable outcome
R&D	1. Define the concept of appropriate technology in terms of the objective of raising income of every worker to national average.	1. Adequate materials for publication
	2. Based on the new concept of appropriate technology, to evolve a mechanism, covering all the parameters divisible upto worker level for analysing every production process or technology available related to a product. Initially, the mechanism so evolved is to be used for analysing the production processes related to those products which are produced in the area which have been taken for transfer of technology. In later stages, it can be used for other products.	2. Adequate materials for developing basic and specialised course for B.Tech students and integrated M.Tech course on Appropriate Technologies. 3. An analytical framework for: a) Identifying the R&D issues involved in the improvement of appropriate technologies. b) Developing a planning framework applicable to a micro unit and economy as a whole and preparing a development plan for the cluster of villages.
	3. Involve and coordinate the expertise available in different R&D and higher technical institutions for (a) identifying R&D issues involved in the improvement of appropriate technologies, (b) taking up research work for improving the appropriate technologies or developing new technologies; (c) testing the improved and developed technologies in the field conditions and if need arises, getting technologies modified.	4. Tested technologies for transfer.
Publication and Documentation	1. Publish a journal covering outcomes of R&D programmes and detailed operational information about improved/new technologies in terms of their use and values of different parameters.	1. Materials for involving expertise available in the country.
	2. Publish text books on basic and specialised courses for B.E./B.tech. students and an integrated course on appropriate technologies for M.E./M. Tech. students.	2. Materials for organising training programmes at grass-root level
		3. Teaching materials for B.E./B. Tech. and M. Tech. students.
Academic	1. introduce basic and specialised course for B. Tech. students.	1. Properly trained human resources for
	2. introduce integrated M. Tech. course on Appropriate Technology.	a) Policy making
		b) Execution of different programmes and schemes
		c) R&D activities
		d) Academic programmes
Transfer of Technology	Based on the concept of Production-Training Service (PTS) Centre to develop (i) organisational structure, (ii) cellular structure and (iii) approach activities.	1. Tested bottom-up approach to planned economic development. 2. Field Laboratory to B.Tech./M. Tech./Ph/D. students. 3. Field conditions for testing of improved technologies

from the existing extension agencies working at district/block levels or should be appointed.

4. The Rural Manager should organise the villagers according to their activities. The villagers engaged in one activity may form an Activity Group (AG). The members of the AGs would choose their representatives through selection-cum-election procedure. In this procedure, every member of an AG irrespective of their sex would cast his/her vote in favour of any other member of the AG. The member who gets highest votes would be elected as their Representative of the AG. The representative of the concerned AG would act as the Chairman of the Group. The representatives of different AGs at village level would constitute the Village Panchayat (VP) and at cluster level they would form Cluster Level Activity Committee (CLAC).

The members of different CLACs would choose their representatives again through the same selection-cum-election procedure. These representatives of the CLAC would, act as the chairman of the concerned CLAC and at cluster level would constitute a Cluster Level Administrative Body (CLAB). The members of CLAB would elect their chairman again through selection-cum-election procedure. In case, the representative of a particular AG and CLAC is chosen as Chairman of the Village Panchayat and CLAB respectively, the member who stood second in the selection in the selection-cum-election would represent the concerned AG/CLAC. The proposed organisational structure is given in table 2.

Table 2: Organisational Structure of PTS Centre

Activity	Villages				CLACs		
	1	2	3	4	..N		
1	AG 11	AG 12	AG13	AG14	AG1N	CLAC1	
2	AG21	AG22	AG23	AG24	AG2N	CLAC2	
3	AG31	AG32	AG33	AG34	AG3N	CLAC3	CLAB
4	AG41	AG42	AG43	AG44	AG4N	CLAC4	
5	AG51	AG52	AG53	AG54	AG5N	CLAC5	
.							
.							
N	AGN1	AGN2	AG N3	AG N4	AG NN	CLACN	
	VP 1	VP2	VP3	VP4	VPN		

5. Chief Coordinator and one of the Rural Mangers would act as Secretary and Treasurer respectively on the CKAB. The CLAB would have the powers to recommend transfer, suspension, termination as well as promotion of any of the Rural Managers and Chief Coordinator to the parent department concerned. The PTS thus would be administered by CLAB having representatives of different CLACs. The concerned Rural Manager would act as a Secretary-cum-Treasurer for the AG and the Village Panchayat. The emphasis is on to ensure the visible participation of the local people in planning, organisation and controlling their own activities. The initial functions of the organisation structure can be summarised as follows:

The emphasis is on to ensure the visible participation of the local people in planning, organisation and controlling their won activities.

(a) The Cluster Demarcation Committee in consultation with the local community may demarcate different clusters within the block and on the basis of the information available with Block Development Organisation and District Statistical Office. This committee may prepare a detailed report in respect of the socio-economic aspects of the cluster.

(b) On the basis of the reports submitted by the Cluster Demarcation Committee, the mother institution may organise training programmes for the Chief-Coordinator and for the Rural Manager separately.

Cellular Structure

The proposed organisational structure is expected to initiate, coordinate and run the multi-dimensional activities. Therefore, it is desirable to have a team of experts coming almost from every field of specialization. For this purpose a cellular structure is to be established at the Centre village of the cluster. It is to be ensured that 100-200 acres of land and a Branch of a Bank and Judiciary are the parts of the Cellular Structure. It may have four cells:

(i) *Information-cum-Planning Cell* : For identifying the production, training and technological needs of each family of the cluster and formulating the action plan for the cluster.

(ii) *Production-cum-Training Cell*: For initiating and running the economic activities listed in the action plan and supervising the production activities of the cluster.

(iii) *Godown-cum-Distribution Cell* : For managing the storage facilities for the marketable surplus and with the help of Fair Price Shops would organise the distribution activities. Each village having a minimum number of families would have a Fair Price Shop.

(iv) *Service-cum-Maintenance Cell*: For providing engineering and other services to artisans on a commercial basis.

The functions of the cellular structure can be summarized as under.

a) The Chief Coordinator alongwith his team may involve villagers in conducting a survey of individual families as well as of villages of the cluster. They may estimate the quantity and quality of utilized/underutilized human and natural resources available with each family. Based on the available resources, the Cellular Structure in consultation with individual family may prepare investment plans for every family and finally may estimate the quantity of different inputs required for implementing the investment plans.

b) Based on the investment-plans the Village Panchayat may guide the Rural Manager to prepare the area development plans for the village.

c) All the investment plans of different families and different villages will then be put up to the cluster level administrative body for approval. The approved family plans may be submitted to the bank branch for ascertaining their economic viability and to sanction loans for those which are economically viable. The families securing loans may have to pledge their assets to the bank.

d) The Cellular Structure may receive assistance from the state and may create and maintain the desired facilities and services in the villages of the cluster.

e) On the basis of the development plans, the Bank Branch may make the required amount of financial resources available to individual families. The Cellular Structure may manage the necessary material inputs required by the individual families of the cluster and will organise the production and training activities at the Centre and in different villages for imparting training an demonstrating the benefits of the use of improved technologies. In the case of agricultural and animal husbandry activities, the Cellular Structure will produce and distribute highbrid varieties of seed, cattle and birds. The experts of the Cellular Structure may supervise and guide the producers at the village level to get the quality products.

f) The Cellular Structure may collect/receive the marketable surplus from individual families or economic units and may maintain the godown for them. All the producers including large/medium/small/cottage scale industrial units working in the cluster area may be directed by he State to bring their surplus production at the Cellular Structure Centre for their quality test and further for distribution through Fair Price Shops. Thus, it may become easy for the Cellular Structure to realise the loan and its service charges from individual families.

g) The Cellular Structure may identify the field in which new or improved technologies are needed.

h) The Cellular Structure may advise the mother institute for evolving the technologies and after field trials, may transfer the technology from laboratory to the users.

Approach Activities

Besides demarcating of clusters within a block, appointment of a technical institution working in the area as a mother institution of the clusters; selection of site for cellular structure etc., implementation of the concept of PTS Centre involves development of an organisation for cellular structure and initiation of approach activities. In order to ensure active and effective participation of the people of the area in preparing, executing, monitoring and evaluating the development plans of their area, the approach activities are expected to ensure right to work to every worker to the area so that they may be relieved from the worry of physical survival. Production and processing of renewable raw-material seems to be the most suited activities for the purpose.

Implementation of the concept of PTS Centre involves development of an organisation for cellular structure and initiation of approach activities.

The concept of PTS Centre aims at making every family and the cluster self-sufficient units in terms of balance of trade and payment. The concept assumes that local people are to be organised initially to start activities related to the production and processing of renewable materials to generate surplus for further investment in the activities related to infrastructure, human resources development and R & D. Therefore, activities are the important aspects of PTS Centre on which all rural

workers will engage themselves in the process of development. The approach activities can be grouped in four categories (1) Energy: (2) Agriculture; (3) Industries; (4) Animal Husbandry.

1. *Energy*: Energy is the basic requirement to run any activities in rural parts of our country. One cannot rely on the utilities because usually it is short in supply, interrupted, and uncertain. Therefor, a supply system independent of the utilities is investigated and biogas is found to be reliable and economically viable in most of the cases. It will not only supply power but also manure for crop related activities. Big size biogas plants of 85/120 Cubic Metre could be installed at every industrial complex of the Cellular Structure near the dairy and breeding centre. Also, wherever feasible and favourable, energy from biomass and solar energy could be used as viable sources for running rural industries uninterruptedly as dairying is a component of the whole production system.

2. *Agriculture*: Efforts should be made to make agriculture more profitable by adopting appropriate and improved technologies. Different agriculture and allied activities will also be included in it like, nursery raising, sericulture, mushroom production, horticulture and vegetable & fruits production.

3. *Village Industries*: Village industries are the base of all the activities of PTS Centre. Based on the local raw-materials and inputs industries would be taken up which can supply the finished material to the local people based on their demand. These industries will be competitive with other big industries due to saving on transportation, cheap raw-material supply and minimum labour cost and overhead expenses. But there should be no compromise with the quality of any product.

4. *Animal Husbandry:* Animal husbandry is multifaceted in the PTS system. A large dairy and breeding Centre will serve the purpose of milk and its products but their dung will be used to produce biogas energy. Also biogas slurry produced from the biogas plants will increase the agricultural production.

All these activities are linked together and they can utilize available raw-materials effectively which would fulfil the demand of the rural sector. There are no limitations for the activities. The interlinkage of all these activities has been shown in figure 1.

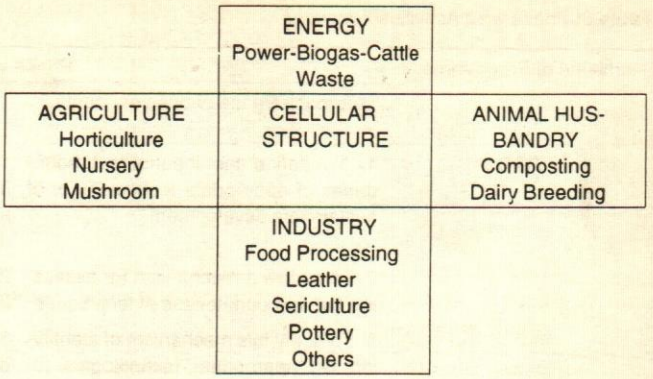

Fig 1: Inter-linkages among Approach Activities:

Plan of Action

Standardisation of the proposed changes involves implementation of a number of activities related to R and D, academics, documentation and transfer of technology programmes of higher technical institutions in the country. Demand from the local people for the changed politio-economic system to Bottom Top Approach to Planned Economic Development would ensure the success of the proposed changes in the programmes of the higher technical institutions. Implementation of the activities related to all the four programmes can be phased out in three stages of a total duration of five years. The first phase of one year duration can be termed as **"Approach Phase"**. The second phase of three years being the **Activity Phase**. The third phase of one year becomes the **"Standardisation Phase"**. Table 3 gives brief descriptions about programme-wise and phase-wise activities that need to be undertake.

Conclusions

This policies and programmes which India tried during the last forty five years have encouraged the use of skill, capital, energy, and infrastructure intensive production processes or technologies in urban oriented industrial sector. This has further widened the income disparities between the rural and urban areas. Solution of the problems of rural development demands a qualitative change in the policies towards allocation of men and material resources in different sectors of the economy and in different areas of the country alongwith changes in the R & D and HRD programmes of the higher technical institutions of the country. Changes in the policies, in their turn, demand altogether a new politio-economic system which, in turn, requires mobilisation of the opinion of masses for the required change. Implementation of the concepts of PTS Centre under the Transfer of Technology programme would provide an opportunity to the

Table 3: Phase wise Activities/Functions

Name of Programme	Phase-wise activities/functions to be undertaken		
	Approach Phase of one year duration	Activities phase of three years duration	Standardisation Phase of one year duration
R&D	1. To define the input-output boundaries of appropriate technology or of sustainable development.	1. To carry out research on improvement in the appropriate technologies and using unutilised men and material resources.	Repetition of Approach Phase.
	2. To evolve a mechanism for assessing the appropriateness of techniques.	2. To test the improved/developed techniques in the real field conditions.	
	3. To apply this mechanism of identifying (a) appropriate technologies (b) R&D issues involved in the improvement of appropriate and modern technologies.	3. If need arises to modify the improved/developed technologies.	
	4. To estimate the quantity and quality of unutilised and underutilised men and material resources in a particular geographical area.		
	5. To formulate project proposals for research activities for 3(b) and 4 above.		
Publication & Documentation	1. To publish an yearly journal covering outcomes of the R&D activities and the detailed operational information about the improved/developed techniques.	To publish text books on basic and specialised courses for B. Tech. students and an integrated M.Tech, course on appropriate technologies for M.Tech. students.	
Academic	1. To introduce basic and specialised courses for B.Tech. students and an integrated course on appropriate technologies for M.Tech. students.	Same as during the approach phase	
Transfer of technology			
a) Organisational structure	1. Demarcation of cluster	1. Formation of AGs	
	2. Selection of mother institute.	2. Formation of VPs	
	3. Selection of site for cellular structure	3. Formation of CLACs	
	4. Posting staff including chief coordinator	4. Formation of CLAB	
b) Cellular Structure	1. Land development	1. Establishment of:	
	2. Drinking water supply	a) Information-cum-planning cell	
	3. Power supply	b) Production-cum-training cell	
	4. Transportation system	c) Godown-cum-distribution cell	
	5. Irrigation system	d) Maintenance-cum-service cell	
		2. Establishment of a branch of bank	
		3. Establishment of a judiciary unit	
c) Approach activities	1. Breeding-cum-dairy development centre	1. Land based activities	
	2. Big size bio-gas plants	2. Agro-based industries	
	3. Nursery raising	3. Artisans based industries	
	4. Pigs, sheeps, goats, and birds breeding centre	4. Diversification of economic activities	
		5. Human resources development activities	
		6. Infrastructural development activities.	

Science and Technology (S & T) community to interact directly with the people of rural India. Interaction between S & T community with rural people would generate an environment favourable for the required change in the politio-economic system suitable to the Bottom-Top Approach to Planned Economic Development.

The proposed changes in the programmes of the higher technical institutions of the country may help in solving a number of problems, such as widespread unemployment, poverty and income disparity, imbalances among different sectors of the economy and different areas of the country and at the same time involving the people in formulation, execution, monitoring and evaluation of development plans of their areas and in making each and every family. village and cluster of villages self-sufficient units in terms of balance of trade and payment. The proposed changes may also help in reforming the present system of technical eduction, R and D efforts and the policies of the Central and State Governments regarding allocation of resources.

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To measure is to understand, to understand is to gain knowledge, to have knowledge is to have power. Since the beginning of time, the thing that sets humans apart from the other animals is our ability to observe, measure, analyze, and use this information to bring about change.

DR. H. JAMES HARRINGTON

Feature

Potential & Competitiveness of Indian Rice in Asia

K.K. Jain & B.R. Garg

How far the Indian agriculture has been able to exploit its resource base and attain Competitiveness in rice production, especially in the wake of modern agriculture, demands an indepth study. The present paper veers around analysing the growth performance of rice in Asian countries specifically that of India with particular emphasis on competitiveness in rice production over space and time.

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India, well known for its diversity in culture and food habits, is basically a rice fed economy. Demand for rice, the staple food, is growing geometrically with rapid growth in population over time. To cope with its consumption requirements, more than twenty five percent of the net sown area in the major rice growing states of India, has been put under this crop. Moreover, in some parts of the country, this crop is grown even more than once in a year. Importance of this crop in India could be ascertained from the fact that it accounted for 40.53 percent of the total cereal area and shared 68.14 percent of the total cereal production in India in 1990-91.

The questions that boggle the mind of the researchers at present, are whether more area could be brought under rice in future, whether India has realised its potential in rice production and what are the areas which could be exploited to raise rice production in India. As land productivity of rice in India differs widely over space and time, it was hypothesized that solutions to the above mentioned queries may be sought out within the wide ranging agro-climatic conditions and the variable resource endowments of different states of India.

Methodology

To achieve the objectives of the present study, information on time-series data on area, production and yield of rice for Asian countries pertaining to years 1972 through 1990 were obtained from Bansil's agricultural compendium (1990). Data on area, production and yield for the years 1971 to 1990 for the major rice producing states of India were procured from different issues of Statistical Abstracts of India. Time-series data on cost of cultivation of rice, which was based upon the micro level

data[1] collected under the "Comprehensive Scheme to Study the Cost of Cultivation of Principal Crops," for different states of India, was collected from the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. Data on demonstration plots was taken from Annual Reports of National Demonstration Project[2].

Growth performance of rice in Asia and in India over two decades i.e. the seventies and the eighties was studied through the computation of compound growth rate of area, yield and production of rice crop using the form:

$$Y = \alpha \cdot \beta^t \cdot e^u$$

where

$$\beta = (1 + r)$$

or $r = (\beta - 1)$ is the compound growth rate

Factor response to productivity in case of paddy in different states of India, was estimated by fitting the yield function of the following type:

$$\text{Ln } Y = a + b_1 \text{Ln} X_1 + b_2 \text{Ln} X_2 + b_3 \text{Ln} X_3 + b_4 \text{Ln} X_4 + e$$

where

- Y = productivity of rice (quintals/hectare)
- X_1 = Percent area under irrigation
- X_2 = percent area under H.Y.V.
- X_3 = human labour used (man-hours/hectare)
- X_4 = fertilizer nutrients used (kg of NPK/hectare)
- a = parameter of technical efficiency
- $b_1,..b_4$ = elasticities of production w.r.t $X_i,..X_4$

Competitiveness in rice production in different states of India was analysed by comparing partial productivity for land, human labour and fertilizer input over time. Also the comparison was made of their per hectare cost of paddy production. Cost A1 included all cash and kind expenses incurred by the cultivator whereas cost C included all variable and fixed costs. Also, an attempt was made to identify the factors which could contribute towards cost efficiency in production of rice by estimating the cost function of the following type:

$$\text{Ln } c = a + b_1 \text{Ln} X_1 + b_2 \text{Ln} X_2 + b_3 \text{Ln} X_3 + b_4 \text{Ln} X_4 + b_5 \text{Ln} X_5 + e$$

where

- c = per quintal cost of production of rice,
- X_5 = interest on fixed capital (Rs./hectare)

$X_1,... X_4$ are the same factors which were included in yield function. Data on c and X_5 were taken at constant prices using Index for agricultural inputs with 1971 as the base year.

Results & Discussion

Results of the present study were analysed in three parts. In the first part growth performance of rice was examined for Asia and India. Then the potentials of rice production in India were studied. And lastly competitiveness in rice production was computed both over space and time.

Area & Production

Eleven countries were found to cover 95 percent of the total area under paddy and produced about 95 percent of the total rice in Asia both in 1972 and 1990. China and India together covered 60 and 57 percent of the total area under paddy in 1972 and 1990 respectively and produced about 62 percent of the total paddy in Asia at both points of time. (Table 1)

While there has been a decline in area under paddy in China (by 8.26 percent) and Japan (by 21.59 percent) over time, area under paddy increased in other Asian countries. India alone accounted for almost half of the total increase. However, in relative terms the increase was more in Pakistan and Thailand where it was 44 and 43 percent, respectively. Change in total production over time was negative only in Japan. In all other countries, there was a magnificent positive change in production ranging form an increase of 41.82 percent in case of Korea Rep. to 129.38 percent for Indonesia between 1972 to 1990.

Growth Trends

In the seventies there was an alround significant growth in area under paddy in all the countries except China, Japan, Myanmar and Phillipines(Table 2). Produc-

1. The present study was based on the data pertaining to the years 1971-72 through 1989-90. However, data were not available for few years viz., 1985-86, 1988-89 and 1989-90 for Andhra Pradesh, 1987-88 to 1989-90 for Assam, 1978-79, 1984-85 to 1989-90 for Bihar, 1971-72, 1978-79 to 1980-81, 1987-88 to 1989-90 for Madhya Pradesh, 1986-87 to 1989-90 for Orissa, 1979-80 1980-81 for Punjab, 1982-83 to 1989-90 for Tamil Nadu, 1971-72 to 1974-75, 1978-79, 1979-80 for Uttar Pradesh, 1985-86 to 1988-89 for West Bengal.

2. Yield of paddy on demonstration plots in some of the states were not available. On the basis of contiguity and similarity in the area, it was therefore assumed that yield levels for Madhya Pradesh would hold as that for Uttar Pradesh. For Uttar Pradesh unirrigated land, yield levels for Bihar were taken. On similar ground, yield level for Assam were taken for West Bengal on unirrigated land.

Table 1 : Area and production of paddy in major rice producing countries of Asia in 1972 and 1990.

Country	Area (million hectares)				Production (million metric tons)			
	1972	1990	change	%change	1972	1990	change	%change
Bangladesh	9.63 (7.98)	10.6 (8.06)	0.97 (9.00)	10.07	15.1 (5.35)	29.5 (6.14)	14.4 (7.28)	95.36
China	35.85 (79.70)	32.89 (25.02)	–2.96 (–27.46)	–8.26	116.6 (41.29)	188.6 (39.28)	72.0 (36.42)	61.75
India	36.69 (30.40)	41.80 (31.79)	5.11 (47.40)	13.93	58.9 (20.86)	110.5 (23.02)	51.6 (26.10)	97.61
Indonesia	7.98 (6.61)	10.30 (7.83)	2.32 (21.52)	29.07	19.4 (6.87)	44.5 (9.27)	25.1 (12.70)	129.38
Japan	2.64 (2.19)	2.07 (1.57)	–0.57 (–5.29)	–21.59	15.5 (5.49)	12.9 (2.68)	–2.60 (–1.32)	–16.78
Korea Rep.	1.19 (0.98)	1.24 (0.94)	0.05 (0.46)	4.20	5.5	7.8 (1.61)	2.3 (1.61)	41.82
Myanmar	4.53 (3.75)	4.80 (3.65)	0.27 (2.50)	5.96	7.4 (2.62)	14.0 (2.92)	6.6 (3.34)	89.19
Pakistan	1.48 (1.23)	2.13 (1.62)	0.65 (6.03)	43.92	3.5 (1.24)	5.2 (1.08)	1.7 (0.86)	48.57
Phillipines	3.11 (2.58)	3.32 (2.53)	0.21 (1.95)	6.75	4.4 (1.56)	9.2 (1.92)	4.8 (2.43)	109.09
Thailand	6.78 (5.62)	9.70 (7.38)	2.92 (27.09)	43.07	12.4 (4.39)	20.0 (4.17)	7.6 (3.84)	68.29
Vietnam	4.90 (4.06)	5.90 (4.49)	1.00 (9.28)	20.41	10.7 (3.79)	18.0 (3.75)	7.3 (3.69)	68.22
Total	114.78 (95.10)	124.75 (94.89)			269.4 (95.40)	460.2 (95.85)		
Asia total	120.69 (100.00)	131.47 (100.00)	10.78 (100.00)	8.93	282.4 (100.00)	480.1 (100.00)	197.70 (100.00)	70.01

Note: Figures in parenthesis represent percent to total in Asia.

tion of paddy recorded non-significant growth in India, Japan, Vietnam and Korea which was largely due to the non-significant growth in the yield levels in these countries. Non-significant change in yield in Japan may be attributed to the fact that its yields had already reached a high plateau before the seventies due to the institutional and social reforms of the Meiji era (Kaneda, 1981).

Non-significant change in yield in Japan may be attributed to the fact that its yields had already reached a high plateau due to the institutional and social reforms.

In the eighties, area under paddy grew significantly only in Indonesia and Korea while it declined significantly in China and Japan. Non-significant growth in area in most of the countries in the eighties indicated that it had reached a level from where consistent increase was not possible. On the other hand the yield recorded significant growth in almost all the Asian countries except Japan, Myanmar, Pakistan and Thailand. However countries like Bangladesh, China, Indonesia and Phillipines recorded consistent growth in yield in both the decades. The significant declining trend in yield in Pakistan may be attributed to growing of more of paddy Basmati, a low yielding but high priced and export oriented crop.

Production of paddy showed a significant growth in all the countries except Japan, Myanmar and Pakistan in the eighties. In Myanmar it was due to non-significant changes in yield levels which had already experienced magnificent growth in the seventies.

In nutshell, rice production in Asia had slowed down in the eighties compared to the seventies. This was attributable to a sharp growth in productivity in the seventies in the major areas covering. China, Indonesia, Myanmar and Phillipines. However, diffusion of technology was evident during the eighties in the form of growth

Table 2: Compound growth rate for area, production and yield for rice during the two decades in major rice producing countries of Asia, 1972 and 1981-90

Country	Growth rate during 1972-80 for			Growth rate during 1981-90 for		
	Area	Production	Yield	Area	Production	Yield
Bangladesh	0.66*	7.97**	2.31**	$-0.28^{n\ s}$	3.47**	3.75**
China	-0.53^{ns}	2.58**	3.11**	-0.41**	1.82**	2.23**
India	1.01**	3.03^{ns}	2.02^{ns}	0.49^{ns}	3.98**	3.49**
Indonesia	1.17**	4.47**	3.30**	1.12**	3.54**	2.43**
Japan	-1.11^{ns}	-1.94^{ns}	-0.83^{ns}	-1.19**	-0.30^{ns}	0.89^{ns}
Korea Rep.	0.53**	2.71^{ns}	2.18^{ns}	0.45*	1.42**	0.93*
Myanmar	0.06^{ns}	5.74**	5.68**	-0.22^{ns}	-0.58^{ns}	-0.36^{ns}
Pakistan	4.31**	4.70**	0.39*	0.82^{ns}	-0.53^{ns}	-1.35*
Phillipines	0.89^{ns}	6.77**	5.88**	0.39^{ns}	1.98**	1.59**
Thailand	3.38**	3.34**	-0.04^{ns}	0.80^{ns}	1.61*	0.81^{ns}
Vietnam	1.44**	0.59^{ns}	-0.85^{ns}	0.28^{ns}	2.91**	2.63**
Asia	0.67*	2.83**	2.16**	0.62*	2.38**	1.76**

Note: ns, *, **, indicate non-significant, significant at 5 and 1 percent respectively.

in productivity in more of the countries though at a steady lower rate.

Diffusion of technology was evident during the eighties in the form of growth in productivity though at a steady lower rate.

Growth Trends in India

Table 3 depicts the compound growth rate for area, yield and production during the two decades in major rice producing states of India. It was found that in the seventies, production of paddy increased significantly in Punjab and Andhra Pradesh only. Punjab showed a magnificent growth of 17.48 per cent annum in production which could be attributed to a highly significant growth in area (at the rate of 12.73 per cent per annum) coupled with the significant increases in its yield (4.22 percent per annum). So also the case with Andhra Pradesh. No other state of India witnessed significant growth in yield. This indicated that inspite of the evolution of high yielding varieties of rice in the early seventies, its impact could not be felt in most of the states. However, significant growth in area (though of low order) under the crop was observed for Uttar Pradesh, Madhya Pradesh and Assam in the seventies.

In the eighties, production of paddy increased significantly in almost all the states with the exception of Orissa, Andhra Pradesh and Tamil Nadu. In Tamil Nadu,

Table 3: Compound growth rate for area, production and yield for rice during the two decades in major rice producing states of India

State	Growth rate during 1971-80 for			Growth rate during 1981-90 for		
	Area	Production	Yield	Area	Production	Yield
Andhra Pradesh	2.16*	4.55*	2.39*	0.66^{ns}	2.93^{ns}	2.26*
Assam	1.33*	1.30^{ns}	-0.30^{ns}	0.73*	2.44**	1.70*
Bihar	0.82^{ns}	0.62^{ns}	-0.20^{ns}	0.99**	6.02*	5.01**
Madhya Pradesh	0.83**	-0.89^{ns}	-1.70^{ns}	0.42**	3.88*	3.45*
Orissa	-1.20**	-0.02^{ns}	1.19^{ns}	0.49^{ns}	4.67^{ns}	4.18^{ns}
Punjab	12.73**	17.08**	4.22**	4.91**	5.67**	0.76^{ns}
Tamil Nadu	-0.09^{ns}	-0.44^{ns}	-0.35^{ns}	-2.35^{ns}	3.40^{ns}	5.75**
Uttar Pradesh	1.81**	3.14^{ns}	1.32^{ns}	0.30^{ns}	6.13**	5.82**
West Bengal	-0.24^{ns}	1.47^{ns}	1.71^{ns}	1.48**	7.90*	6.40**

Note: ns *, ** indicated non-significant, significant at 5,1 percent respectively.

it was primarily due to the decline in area under rice which may he attributed to the increase in area under the relatively more profitable commercial crops like sugarcane (Rajapopalan, 1983). However, the growth in paddy productivity was significant in all the states except Orissa and Punjab. On the other hand, significant growth in area under rice was observed only in the case the of West Bengal, Madhya Pradesh, Assam and Punjab. Productivity of rice in Punjab had already reached a plateau by the end of seventies which could not be crossed in the eighties. A further fillip in paddy production demanded a fervent extension and breakthrough in production technology. Orissa, one of the most backward states of India, registered insignificant growth in paddy production on account of lack of appropriate agricultural infrastructure in the state. There is a need to provide incentives in terms of investment on land and development of location specific technology (Singh, 1981) so as to harvest the fruits of modern technology in Orissa.

There is a need to provide incentives in terms of investment on land and development of location specific technology so as to harvest the fruits of modern technology in Orissa.

Potential of Rice Production in India

From table 3 it was found that four states namely Assam, Madhya Pradesh, Punjab and West Bengal recorded significant growth in area under rice in the eighties whereas for India as a whole growth in area was non-significant during this period. Thus it could be safely inferred that under the present production technology the area under the crop had almost stagnated; barriers of productivity varied widely accross space in India. To study the potential of rice production in India two approaches were followed: Regression analysis was carried out to identify the factors contributing significantly towards the productivity of the crop and the demonstration plot yields studied to examine the gap between the existing and the potential yield and thus the production in different areas on India.

Regression Analysis

Results of regression analysis for yield per hectare with factors like, per cent area under irrigation, per cent area under H.Y.V., fertilizer use and human labour use are given in table 4. Due to multi-collinearity of area under irrigation with area under H.Y.V. the former variable was dropped as the other factor were more policy relevant.

It is clear from the table that per cent area under H.Y.V. contributed significantly to the yield in Assam and Uttar Pradesh where its one per cent increase reflected 0.13 and 0.50 per cent increase in the yield of paddy, respectively. Similarly, fertilizer in the form of nutrients (N+P+K) was a significant yield increasing input in Andhra Pradesh, Punjab and Tamil Nadu where response to its one per cent increase was 0.55, 0.42 and 0.76 per cent increase in yield, respectively. Incidently, these states were already using more than 172 kg of nutrients per hectare in rice and its positive and significant elasticity indicated as further scope to increase the yield in these states through this input. Low level of fertilizer use and its non-significant effect on yield in other states could be attributed to varying resource endowments and non-harmonious use of the modern package of irrigation, fertilizer and H.Y.V.'s in these states. Human labour use was found to be contributing significantly towards yield only in the state of Orissa where its one per cent increase reflected 1.29 percent increase in the yield of paddy. This may be attributed to the stagnant level of mechanisation in agriculture and the direct association of labour use with output. The reason for non-adoption of HYV's and lower use of fertilizer (2.76 kg/ha for Assam to 96.40 kg/ha for Uttar Pradesh (Appendix)) could be attributed to the lower area under irrigated rice which ranged from a minimum of 17.90 percent for Madhya Pradesh to a maximum of 35.80 per cent for Bihar.

Human labour use was found to be contributing significantly towards yield only in the state of Orissa. This may be attributed to the stagnant level of mechanisation to agriculture.

Potential on the Basis of Demonstration Plots

The potential of rice production in India was worked out on the basis of demonstration plot yields in irrigated and unirrigated areas of major rice producing states of India. Latest data on demonstration plot yields were available for 1987-88. However, the yields of 1986-87 and 1987-88 were averaged to have unbiased estimates. Potential of paddy production in India was worked out keeping in view the mean yield observed on all the demonstration plots in the state and the highest yield observed on any of the demonstration plots in the state.

Table 4: Yield Function for different states of India, 1972-89

State	Intercept	% area H.Y.V.	fertilizer use	human labour use	R^2
Andhra Pradesh	1.21^{ns}	0.06^{ns}	0.55^{***}	0.03^{ns}	0.8929
	(0.12)	(0.86)	(3.96)	(0.10)	
Assam	88.69^{ns}	0.13^{**}	-0.02^{ns}	-0.31^{ns}	0.3264
	(1.36)	(2.03)	(0.32)	(0.62)	
Bihar	43.24^{ns}	0.06^{ns}	0.11^{ns}	-0.21^{ns}	0.1850
	(1.22)	(0.62)	(0.59)	(0.42)	
Madhya Paradesh	0.01^{ns}	0.12^{ns}	0.012^{ns}	0.97^{ns}	0.4274
	(0.99)	(0.46)	(0.68)	(1.51)	
Orissa	0.01^{ns}	-0.05^{ns}	0.11^{ns}	1.29^{**}	0.4909
	(1.78)	(0.70)	(0.87)	(2.48)	
Punjab	6.19^{ns}	0.01^{ns}	0.42^{**}	-0.02^{ns}	0.7137
	(0.95)	(0.01)	(3.04)	(0.10)	
Tamil Nadu	0.33^{ns}	-0.35^{ns}	0.76^{***}	0.34^{ns}	0.8838
	(0.48)	(0.97)	(6.01)	(1.38)	
Uttar Pradesh	8.06^{ns}	0.50^{*}	-0.11^{ns}	-0.69^{ns}	0.7462
	(0.79)	(2.08)	(0.48)	(0.20)	
West Bengal	1.16^{ns}	0.16^{ns}	0.07^{ns}	0.30^{ns}	0.5270
	(0.05)	(1.06)	(0.39)	(0.62)	

Note: Figures in parenthesis indicate calculated t-values.
ns,* ,**, *** indicate non-significant significant at 10,5,1 percent respectively.

The average yield recorded for both irrigated and unirrigated crop conditions on the demonstration plots was observed to be higher than the average yield actually observed during the triennium ending 1990-91 in all the states (table 5).

Under the assumption that the mean yield of demonstration plots is actually realised on each farmer's field in each state, the production of paddy was estimated to increase by 13 percent in Tamil Nadu against a maximum of, 164 percent in Madhya Pradesh. However lower increases were estimated for the developed states like Andhra Pradesh, Tamil Nadu and Punjab as there was a lesser gap between the yield on the farm and the average yield recorded on all the demonstration plots. On the basis of the highest yield recorded on the demonstration plots in the state, the potential to raise the rice production was estimated to increase at a minimum of 32 percent in Tamil Nadu and to a maximum of 203 percent in Madhya Pradesh. Again, it was found that if the gap between the

Table 5: Yield levels on the demonstration plots on irrigated and unirrigated land and potential of rice production in major rice producing states.

State	Paddy Area		Actual existing yield	Yield on demonstration plot				Production of rice existing	Rice production potential at		Percent Increase over existing at	
	Irr.	Unirr.		Irrigated		Unirrigated						
	(1000 ha)			Mean	High	Mean	High		Mean	High	Mean	High
Andhra Pradesh	3793	212	2478	3196	4571	—	—	9926	12650	17867	27.44	79.98
Assam	538	1952	1174	3265	3397	2500	2733	2923	6636	7126	127.02	145.01
Bihar	1931	3462	1188	2720	3520	2573	2767	6407	14160	16376	121.01	155.60
Madhya Pradesh	906	4156	1023	3306	4600	2573	2767	5178	13689	15667	164.34	202.55
Orissa	1435	2968	1286	2095	3091	2183	2622	5662	9485	12218	67.51	115.77
Punjab	2000	24	3169	4738	5648	—	—	6414	9552	11371	48.92	77.28
Tamil Nadu	1721	152	3043	3484	4100	—	—	5699	6458	7519	13.31	31.92
Uttar Pradesh	1502	4082	1767	3306	4600	2573	2767	9868	15470	18206	56.77	84.50
West Bengal	1430	4383	1873	2725	4900	2500	2733	10888	14854	18985	36.43	74.37
India	—	—	—	—	—	—	—	62966	102955	125371	63.51	99.11

Note: Production is in thousand metric tons and yield in kg. per hectare. Mean and high implies mean and highest yield obtained on the demonstration plots. Sum total of these states (covering 95 percent area) represent the estimate for India.

average yield on demonstration plots and the average yield actually realised in each state were to be fully plugged, there existed a potential to increase the rice production in India by 64 percent. And, if all the efforts on the part of research production, marketing and agricultural extension eduction are co-ordinated and geared up simultaneously to realise the highest yield of the best demonstration plot on the farmer's fields, then, there exists a potential to double the rice production in India.

If efforts on the part of research, production, marketing and agricultural extension eduction are co-ordinated, there exists a potential to double the rice production in India.

Competetiveness in Rice Production

Competitiveness in rice production was judged from three angles i.e., by comparing the cost of cultivation comparing the partial productivities of the crucial resources and by identifying the factors affecting the cost efficiency in rice production in the major rice producing states of India. However, due to paucity of data, competetiveness in rice production for Asian countries was judged through crop productivity only.

Comparative Economics of Paddy Cultivation in India

On the basis of productivity per hectare, Punjab stands first followed by, Andhra Pradesh and Tamil Nadu (table 6). West Bengal and Uttar Pradesh can be grouped in the third category followed by Orissa, Bihar, Assam and Madhya Pradesh in the fourth group.

A critical examination revealed that per hectare cost A1 in Punjab was lower than that in Andhra Pradesh and Tamil Nadu while on the contrary, cost C less cost A1, a sort of fixed cost, was higher in Punjab than in other states. This indicated that higher fixed costs, which represented fixed investment on the farm, may be contributing to the higher yields in Punjab as compared to these two states. Higher per quintal cost of production in Andhra Pradesh and Tamil Nadu could be attributed to higher cost A1 and lower productivity of paddy. This inconsistency reflected the non-harmonious use of modern input package especially lower use of fertilizer, insecticide/weedicide, machine and irrigation and relatively higher use of human and bullock labour.

Table 6: Comparative cost of cultivation of paddy and use level of different components in major rice producing states of India, 1986-87

State	Yield per hectare (Qtl)	Cost of cultivation per hectare (Rs)		Cost of production per quintal (Rs)		Percent share of interest on fixed capital in cost C	Percent share of traditional input in cost A1	Percent share of modern inputs in cost A1
		Cost A1	Cost C	Cost A1	Cost C			
Punjab	56.71	3989.55	7390.21	69.78	129.23	7.82 (578)	34.56	59.92
Andhra Pradesh	40.15	4071.88	6681.70	90.19	148.44	2.02 (135)	55.62	39.83
Tamil Nadu	39.17	4372.81	7042.65	99.38	160.96	5.76 (406)	49.31	42.56
West Bengal	27.15	3206.12	4687.98	68.52	139.45	4.52 (212)	76.62	17.85
Uttar Pradesh	74.68	1734.38	3557.40	63.53	122.51	5.45 (183)	49.74	43.50
Orissa	19.77	1770.16	3169.16	74.69	131.85	3.28 (104)	71.06	22.42
Bihar	18.63	1381.38	3332.72	65.68	157.48	4.62 (154)	66.40	25.90
Assam	16.45	1066.53	2511.57	61.27	144.08	3.50 (88)	71.70	17.53
Madhya Pradesh	13.36	1375.25	2565.83	87.14	162.02	6.00 (154)	63.93	28.61

Note: Estimates for Tamil Nadu, West Bengal and Bihar were developed from their latest available estimates using agricultural inputs price index. Figures in parenthesis indicate absolute expenditure. Traditional inputs include human labour, farm yard manure and bullock labour Modern inputs include machine cost, fertilizer, seed, insecticide and irrigation cost.

Per hectare cost A1, cost C and yield levels of Uttar Pradesh were lower than that for West Bengal. Thus both the variable and fixed costs representing infrastructure may be yield increasing factors in West Bengal. Per hectare cost A1 and cost C of this group were much less than the first and second indicating efforts needed to be made to increase both the variable inputs and creating suitable infrastructure on the farm.

The states of Assam, Bihar, Madhya Pradesh and Orissa, which had less than one-third productivity of Punjab incurred much lower costs on per hectare of paddy cultivation. The reason for this may he traced to the poor economic condition of the farmers and low level of investments on the farm. However these states had higher cost C and cost A1 (except Bihar and Assam) on per quintal basis. All these results confirmed that Punjab was technically as well as economically the most efficient producer of paddy as compared to other states of India.

All these results confirmed that Punjab was technically as well as economically the most efficient producer of paddy as compared to other states of India.

A close scrutiny of the fixed and variable costs further indicated that interest on fixed capital, representing investment on infrastructure was highest (7.82 percent) in Punjab. The relative higher share of interest on fixed capital in case of Madhya Pradesh (6.00 percent). and Uttar Pradesh (5.45 percent) as compared to other states in the group could be attributed to higher investment on traditional and short lived fixed inputs which may not be as much productivity related. This was evident from the productivity differentials obtained for Punjab and these states.

The analysis further indicated that the share of traditional agricultural inputs in cost A1 was minimum in the case of Punjab relative to other states of India. The percent share ranged from a minimum of 34.56 percent for Punjab to a maximum of 76.62 percent for West Bengal. Punjab followed by Tamil Nadu and Andhra Pradesh with the exception of Uttar Pradesh.

On the other hand, the percent share of modern inputs in cost A1 was maximum for Punjab (59 percent) followed by Uttar Pradesh (43.5 percent), Tamil Nadu (43 percent) and Andhra Pradesh (39 percent). The minimum expenditure on modern inputs was estimated for Assam (17.53 percent). These results showed that productivity of paddy was directly related to the use of modern inputs of seed, fertilizer, insecticide, irrigation and machine labour. The only exception of Uttar Pradesh where productivity of paddy was lower than that for Andhra Pradesh and Tamil Nadu could be explained by the lower use of fertilizer and lower level of irrigation (Appendix).

Productivity of paddy was directly related to the use of modern inputs of seed, fertilizer, insecticide, irrigation and machine labour.

Partial Productivities in Rice Production in India

Partial productivities estimated for land, labour and fertilizer for different states are presented in table 7.

Labour productivity for three sets of periods as mentioned in the table worked out to be revolving around two kg. of paddy per man-hour in most of the states. Punjab led other states in labour productivity during the three periods. It was estimated at a maximum of 6.81 kg. of paddy per man-hour during 1984-89 followed by Tamil Nadu (3.20 kg), Uttar Pradesh (3.15 kg) and Andhra Pradesh (2.89 kg) etc. Growth in labour productivity turned out to be significant only for Andhra Pradesh, Punjab, Tamil Nadu and Uttar Pradesh. The significant increase in labour productivity in Andhra Pradesh and Tamil Nadu was made possible by the higher growth in productivity of rice as compared to that in the use of labour per hectare. However in case of Punjab, it was due to the decrease in human labour use (due to increase in machine use) alongwith the significant growth in rice productivity over time (Sidhu, 1992).Orissa and West Bengal experiencing significant growth in productivity of rice during 1972-89 could not contribute significantly towards growth in labour productivity due to significant growth in per hectare human labour use over time. On the other hand, nonsignificant growth in productivity of labour in Bihar and Madhya Pradesh could be attributed to nonsignificant growth in productivity of rice during the same period. Thus, it was the judicious use of human labour and high growth in rice productivity that was responsible for growth in labour productivity.

Judicious use of human labour and high growth in rice productivity was responsible for growth in labour productivity.

Table 7: Trend in partial productivity for labour, fertilizer and land in major rice producing states of India

State	Partial Productivity for											
	Labour (kg paddy/Man hr)			Growth rate	Fertilizer (kg paddy/kg nut)			Growth rate	Land (kg/hectare)			Growth rate
	1972-77	1978-83	1984-89		1972-77	1978-83	1984-89		1972-77	1978-83	1984-89	
Andhra Pradesh	2.55 (953)	2.67 (1152)	2.89 (1260)	1.04* (2.65**)	24.31 (99.51)	19.88 (156.52)	19.38 (192.13)	−1.91** (5.74**)	2408	3039	3631	3.72**
Assam	2.56 (644)	2.90 (645)	2.89 (641)	1.08^{ns} (0.02^{ns})	3210.03 (0.83)	1774.17 (1.31)	1002.5 (1.96)	−8.25* (10.68*)	1644	1863	1855	1.10*
Bihar	2.12 (783)	1.68 (862)	2.15 (867)	−0.48^{ns} (1.25^{ns})	80.90 (22.87)	58.70 (31.48)	55.79 (33.39)	−3.27^{ns} (4.17^{ns})	1657	1803	1863	0.76^{ns}
Madhya Pradesh	2.14 (653)	2.61 (637)	2.51 (562)	1.11^{ns} (−1.08*)	71.31 (21.69)	69.96 (25.26)	48.54 (31.35)	−4.30* (4.52*)	1354	1721.	1356	0.02^{ns}
Orissa	1.79 (868)	1.68 (992)	2.00 (1022)	0.11^{ns} (1.63**)	47.45 (34.46)	59.65 (28.76)	46.23 (46.25)	−0.72^{ns} (2.48*)	1549	1663	2049	1.74*
Punjab	4.29 (931)	6.55 (819)	6.81 (817)	3.62** (−1.16*)	35.37 (111.85)	27.18 (194.59)	22.95 (234.04)	−2.97** (5.56**)	3934	5281	5305	2.42**
Tamil Nadu	2.27 (1111)	2.91 (1199)	3.20 (1222)	3.94* (0.97^{ns})	24.29 (103.94)	23.31 (149.78)	23.43 (172.39)	−0.01^{ns} (4.96*)	2487	3489	3917	4.95**
Uttar Pradesh	2.24 (932)	2.24 (930)	3.15 (821)	3.18** (−1.24*)	49.63 (42.17)	36.35 (58.14)	35.99 (69.89)	−2.81* (5.48**)	2088	2063	2602	2.52**
West Bengal	2.05 (908)	1.94 (1094)	2.44 (1157)	0.68^{ns} (1.96*)	68.97 (29.18)	46.34 (46.53)	47.50 (58.05)	−3.76* (6.67**)	1840	2134	2810	2.66**

Note: 1971-77 has been stated as 1972. Figures in parenthesis under year head represent absolute level and under growth rate head represent growth rate of resource use.
ns, *, ** indicate non-significant, significant at 5, 1 percent respectively.

Again, during the period 1972 to 1989, growth rate in fertilizer productivity was estimated at not only negative but was also significant for all states of India with the exception of Bihar, Orissa and Tamil Nadu where growth in fertilizer use was more than the growth in land productivity. The negative and significant growth rate for the states indicated a decline in fertilizer productivity over time. This reflected that the growth in the productivity of the crop had not matched the growth in fertilizer use in all the states i.e, productivity was increasing at a decreasing rate with the increase in fertiliser use. It was well supported by Desai's (1991) contention that with yield based technology, efficiency of fertilizer use has declined over time.

Growth rate for land productivity of rice worked out to be significant for all states of India (except Bihar and Madhya Pradesh where most of land under rice was rainfed) indicating that productivity of rice did increase from 1972 to 1989 in India inspite of variable resource endowment in different states.

Factors Affecting Cost Efficiency

Total cost of production per quintal of paddy was regressed for all states of India with factors like per cent area under HYV, fertilizer, human labour and interest on fixed capital. The results are given in table 8.

The results indicated that human labour resource contributed significantly towards increasing the cost of production in Uttar Pradesh only. Interest on fixed capital which was a proxy for fixed investment on farm was found to be significant in all states except Assam, Madhya Pradesh and Tamil Nadu. Negative but significant coefficient for Punjab indicated that one per cent increase in fixed capital decreases the cost per quintal by 0.35 per cent. It reflected that there was a need to increase the fixed capital in Punjab which of late has been declining. Positive and significant coefficient for this variable in other states indicated that there was a mis-match between the investments and productivity, investments in these states were proving to be cost pushing rather than cost-saving as in Punjab.

Rice Productivity in Asia

The level of land productivity for rice at three points of time, i.e. 1972, 1981 and 1990 for the major rice producing countries of Asia has been given in table 9. There is a great differential in yield level across different countries of Asia. Japan, with highest productivity of 5864 Kg/ha in 1972, did not make much progress on the productivity plane over time, whereas countries like Phillipines, Myanmar, Indonesia, Bangladesh, India and China having a low yield base made much progress and, were able to

Table 8: Cost function for different states India, 1972-89

State	Intercept	% area H.Y.V.	Fertilizer use	human labour	interest on fixed capital	R^2
Andhra Pradesh	11.98^{ns}	-0.06^{ns}	-0.01^{ns}	0.14^{ns}	0.16^{**}	0.4418
	(1.59)	(0.79)	(0.02)	(0.44)	(2.58)	
Assam	2427.69^{*}	-0.001^{ns}	0.05^{ns}	-0.69^{ns}	0.10^{ns}	0.1240
	(1.81)	(0.008)	(0.72)	(1.03)	(0.47)	
Bihar	0.54^{ns}	0.03^{ns}	0.04^{ns}	0.54^{ns}	0.16^{*}	0.7283
	(0.27)	(0.41)	(0.27)	(1.45)	(2.07)	
Madhya Pradesh	321.98^{ns}	0.15^{ns}	-0.06^{ns}	-0.35^{ns}	-0.02^{ns}	0.1278
	(1.17)	(0.39)	(0.24)	(0.47)	(0.06)	
Orissa	45.73^{ns}	-0.05^{ns}	0.04^{ns}	-0.29^{ns}	0.55^{*}	0.3196
	(1.00)	(0.49)	(0.28)	(0.51)	(2.16)	
Punjab	32.43^{ns}	0.32^{ns}	0.21^{ns}	0.36^{ns}	-0.35^{*}	0.6322
	(1.69)	(0.81)	(1.24)	(1.52)	(2.17)	
Tamil Nadu	0.81^{ns}	0.50^{ns}	-0.26^{ns}	0.31^{ns}	0.21^{ns}	0.5316
	(0.08)	(0.99)	(1.67)	(1.16)	(1.25)	
Uttar Pradesh	0.08^{ns}	0.10^{ns}	-0.22^{ns}	0.85^{**}	0.23^{*}	0.8250
	(1.05)	(0.50)	(1.16)	(2.51)	(2.18)	
West Bengal	644.96^{*}	-0.01^{ns}	0.11^{ns}	-0.66^{ns}	0.43^{ns}	0.3008
	(2.08)	(0.09)	(0.66)	(1.15)	(2.07)	

Note: Figures in parenthesis indicate calculated t-value.
ns, *, ** indicate non-significant, significant at 10, 5 percent respectively.

increase their land productivity of rice by 96, 79, 78, 77, 65 and 76 per cent from 1972 to 1990, respectively. Again, it was found that countries, like Japan, Korea Rep, and China whose average productivity differed much in 1972 narrowed down their yield gap over time. Among these three, China recorded the highest growth in productivity between 1972 and 1990. However Pakistan and Thailand did not make much progress in paddy productivity over time.

Relative variability in terms of coefficient of variation in productivity of rice among Asian countries declined steadily from 52 per cent in 1972 to 42 per cent in 1981 and further to 40 per cent in 1990. This indicated that there existed large diffentials in paddy productivity across different Asian countries which over time has declined and needs to be narrowed down further. Increasing the rice production in Asia was possible only if the production

Table 9: Paddy productivity in major rice producing countries of Asia

Country	Yield in (Kg./hectare)				
	1972	1981	% increase	1990	% Increase
Bangladesh	1568	1950	24.36	2783	77.49
China	3252	4328	33.09	5734	76.32
India	1605	1963	22.30	2644	64.74
Indonesia	2430	3439	43.87	4320	77.78
Japan	5864	5619	-4.18	6220	6.07
Korea Rep.	4618	5719	23.84	6270	35.77
Myanmar	1634	2848	74.30	2918	78.58
Pakistan	2365	2581	9.13	2445	3.38
Phillipines	1414	2353	66.41	2772	96.04
Thailand	1829	1955	6.89	2165	18.37
Vietnam	2184	2362	8.15	3051	39.70
Asia	2340	3117	33.20	3652	56.07
Coefficient of variation	52.07	42.30	—	40.31	—

Appendix: Important indicators for paddy in major rice producing states of India.

State	Percent HYV 1987-88	% Area under Irrigation 1987-88	Yield level for			Fertilizer (N+P+K) (kg/ha)	C.V of yield (1981-90)	Credit per crop hect. Rs (1988-89)	Yield of rice 1990-91	% share of rice in total cropped area (1986-87)			
			Irr. (kg/ha)	Unirr. 1985-86	HYV					Aut.	Winter	Summer	Total
A.P	80.7	94.1	2262	1193	2288	197.40	9.32	381.84	2448	—	22.4	7.1	29.5
Assam	41.2	21.6	1387	1047	1723	2.76	7.69	18.60	1313	—	61.4	1.3	62.7
Bihar	59.1	35.8	1382	918	1506	33.39	16.54	214.56	1215	6.8	44.1	0.5	51.4
M.P	37.9	17.9	1723	1120	1832	44.24	15.22	160.18	1176	22.0	—	0.5	22.5
Orissa	41.9	32.6	1677	775	1897	57.16	18.13	79.65	1198	10.9	34.4	2.1	47.4
Punjab	95.1	98.8	3070	1726	3165	222.97	6.06	596.54	3229	24.8	—	—	24.8
T.N	94.9	91.9	2688	1330	2706	172.39	17.78	421.20	3076	22.9	6.3	0.8	30.0
U.P	57.0	26.9	1581	1025	2143	96.40	17.39	235.91	1826	13.6	8.4	—	22.0
West Bengal	49.0	24.6	1996	1172	2182	76.81	18.49	118.49	1795	7.8	49.4	8.3	65.5
India	58.1	43.3	—	—	—	—	—	278.90	1763	9.1	12.6	1.5	23.2

technology of rice in Japan, Korea and China could be transferred to the other countries of the continent.

Increasing the rice production in Asia was possible only if the production technology of rice in Japan, Korea and China could be transferred to the other countries of the continent.

The upshot of the study is that India and China both share 62 percent of the total rice production in Asia. In India, though, the increase in area under rice was maximum between 1972 and 1990 (47 percent of Asia) but it was China which inspite of decline in area under the crop shared the maximum (36 percent) increase in rice production of Asia. Production in Asian countries in the seventies was the result of significant increases both in the area under the crop and yield per hectare. In the eighties, growth in production slowed down due to stagnancy in area inspite of significant increases in the productivity of paddy in most of the countries. Thus, rise in productivity over time contributed largely to increase in production in almost all the countries of Asia. Productivity of paddy grew magnificently in the eighties resulting in sharper growth in rice production in most of the states of India. Competetiveness in rice production over space and time in India exhibited that both technically and economically, Punjab is the most efficient producer of rice in India. This could be a result of judicious admixture of variable and fixed inputs being used in rice production. Resource use and output behaviour in other states indicated that modern technology has not made obvious dent in these states. There is a need to build up and strengthen an appropriate infrastructure, consistent with resource endowments for each state, to boost rice production in India. Again, it was found that under the present state of technology, there exists a vast scope to increase rice productivity even in the developed states of Punjab, Andhra Pradesh and Tamil Nadu through increasing the input of fertilizers. In Assam and Uttar Pradesh, there is the need to increase the area under H.Y.V'S. yield on demonstration plots further indicated that there was ample scope to increase the production of rice in all the states of India. Under the hypothesis of attaining the mean yield of demonstration plots in all the farms in the state, India could increase the production by 64 percent while under the hypothesis of attainment of the highest yield of demonstration plots in all the farms in each state, India has the potential to double its rice production. This would require further strengthening of the efforts on the part of agencies providing agricultural extension eduction, liberal credit, conducive market infrastructure and an appropriate agricultural policy.

India has the potential to double its rice production. This would require further strengthening of the efforts on the part of agencies providing agricultural extension eduction, liberal credit, conducive market infrastructure and an appropriate agricultural policy.

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Feature

Impact of Rural Housing on Health & Productivity

M. Ramanjaneyulu

World Health Organisation has given the highest priority for environment health with several socio-economic activities directly connected to rural housing and labour productivity. Healthy housing prevents the spread of diseases, encourages personal and community development and promotes mental health and labour productivity opines the author.

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The rural housing situation in India is appalling even by minimal standards of human health and hygiene. The magnitude of the housing requirement during 1991-2001 is estimated to be 79 million dwelling units to meet the back log and requirements of additions to population. The minimum standard in the rural housing stock is very low. The bulk of rural people comprising peasants, labourers, craftsmen etc. live in extremely bad conditions. About one fifth of humanity constituting the poorest among the poor of the world, live under leaky, makeshift roofs, huddle on small lots at the mercy of village chiefs and landlords and suffer from the absence of such elementary services as latrines, drainage, safe drinking water supply, approach roads etc.

Rural housing has a great impact on the health and productivity of the nation and hence there is an urgent need for improving the existing condition but paradoxically the demand for improvement is very muted. There are so many other necessities, such as food, cloth, work and health care etc., that the rural poor seldom voice a demand for housing. There is a need to examine the role of housing in a community's social and economic welfare.

Housing is an input in the production process. By promoting health, security and well being, housing contributes to efficiency and productivity of labour. As property and capital goods, housing has a significant role in the national economy. Housing investment is an income multiplier and it effects employment generation. It is

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estimated that housing constitutes additional capital formation of about 16 to 18 percent and a fixed investment of as little as 3 percent of GDP in India.

Role of WHO on Health Principles of Housing

World Health Organisation's Expert Committee on Housing and Health which met in 1972 described the quantitative criteria for healthy housing as follows:

- Healthy housing provides physical protection and shelter to the extent determined by local climatic conditions.
- It provides adequately for cooking, eating, washing and excretory functions.
- It is designed, constructed, maintained and used in a manner such as to prevent the spread of communicable disease by the respiratory route, by disease vectors harboured in housing and its environment or by faecal contamination.
- It provides for protection from the hazard of exposure to noise and pollution.
- It is free from unsafe physical arrangements due to construction or maintenance, and from toxic or harmful materials.
- It encourages personal and community development, promotes social relationships, reflects a regard for ecological principles and by these means promotes mental health.

Problem of Health Service in Rural India

Rural basic health services have not been quantified with much precision. For diseases that are widespread in rural areas such as Malaria, trypanosomiasis, diarrhoea, heart trouble, onchocerciasis are no satisfactory treatment exists. Since Vector breeds in the straw used for roofing and in the cracks of walls, environmental control of the diseases can be easily effected by plastering walls and changing roofing materials.

Ill health is inevitable for the people living below the poverty line. They do not consume even the minimum amount of food necessary for subsistence. Malnutrition and the absence of environmental sanitation facilities, such as pure drinking water and hygienic disposal of solid and liquid wastes, give rise to various communicable diseases which in turn take a heavy toll on life, especially among infants in rural as well as in slum areas.

Inspite of several spectacular discoveries and inventions in the field of medial science, health services have failed to reach the rural population to a degree that could produce a significant impact on the health status of the rural poor. Due to shortage of financial resources developing countries like India have not been able to invest adequate capital on health services.

Inspite of several spectacular discoveries and inventions in the field of medial science, health services have failed to reach the rural population to a degree that could produce a significant impact.

Economic opportunities, amenities for living, facilities for private and sophisticated health infrastructure found in towns and cities all exert a magnetic pull on doctors. This power of attraction is reinforced by the desire to be elite, politicians, civil servants and trade union leaders for a proper level of treatment for themselves and their families. The result is that in most developing countries, doctors stay almost exclusively in the main towns. The rural areas remain without doctors and the urban based health facilities provides insignificant coverage to the health problems of the rural poor.

India has set up for itself the goal of Health for all (HFA) by 2,000 A.D. through emphasis on primary health care. Accordingly, the National Health Policy was adopted by the Parliament in 1983. Over the years, there has been considerable expansion of infrastructure for health services. A three-tire system comprising community Health Centre (CHC), Primary Health Centre (PHC) and sub-centres has been established. The targets of one sub centre for the population of 5,000 and one PHC for the population of 30,000 in general and one sub-centre for the population of 3,000 and one PHC for the population of 20,000 in hilly and tribal areas, have already been achieved.

Between 1951 and 1992, life expectancy has increased from 32.1 years to 60.3 years, birth rate came down from 39.9 to 29 per thousand, death rate fell from 27.4 per thousand to about 10 per thousand and infant mortality rate declined from 133 per thousand live births in 1972 to 79 in 1992. Small-pox has been eradicated and plague is no longer problem. Morbidity due to malaria, cholera etc., has considerably declined. But much progress is still to be made to bring the health standards and medical facilities in the country on par with even many of the developing countries. In spite of special efforts and the perceptible progress made, incidence of

diseases like tuberculosis, malaria, leprosy and Kal-azar continues to be significant.

Health is determined not only by medical facilities but also by housing conditions, good hygienic environment and sanitary facilities. According to 1981 Census, about 61.3 percent of the total number of houses are made of poor materials. Thatching with grass, leaves, reeds, or bamboo, unburnt bricks, G.I. sheets etc, which lead to several health hazards.

Housing is intimately related to health. The structure, location, facilities, and environment of human shelters have a strong impact on the state of physical, mental and social well being. Adequate and appropriate housing conditions not only protect people against health hazards, but also help promote physical health, economic productivity, psychological well being and social vigour.

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Environmental Sanitation

The linkage effect between the fields of rural housing and health is most prominent and direct in the area of basic sanitary services. The term "basic sanitary services" encompasses the following functions in the community, water supply, excreta, sewage and solid waste disposal, drainage, food protection, control of insect and animal vectors of disease and other health aspects of housing.

In consideration of the incidence of water associated diseases throughout the world, many health experts believe that the provision of a safe, ample and convenient water supply is the most important single activity that can be undertaken to improve the health of people living in rural and slum areas. The "International Drinking Water Supply and Sanitation Decade" (1981-1990) programme envisages 100 percent coverage of rural population with basic minimum safe drinking water supply and 25 percent of rural population with sanitary facility. With this in view, as well as the urgent need of providing these minimum facilities in rural areas, plans have been drawn up with higher allocations and also with expectations of massive assistance from the centre. In view of the priority and importance for rural sanitation, the Government has to approve a scheme called 'Vimukthi Programme' for implementation in every village Panchayat and Weaker section housing colonies.

There is a direct relationship between water, sanitation and health. Inadequate provision of safe drinking water, improper disposal of the human excreta and unscientific disposal of sewer and solid waste lead to unfavourable environmental conditions. Several diseases are caused by negligent environmental sanitation habits. Sanitation has not been a perceived priority of the of the people and the progress on this front has not been at great pace. Government of India launched a decades programme with an objective of covering 25 percent of the population in 1981. In 1986, Ministry of Rural Development was made the nodal Department for carrying out the programmes for sanitary latrines. Accordingly, a scheme was launched to construct one million sanitary latrines to provide for the houses of Scheduled Caste and Scheduled Tribes under Indira Vikas Yojana and also to provide about 2,50,000 additional latrines to health subcentres, School Panchayat ghars, Anganawadi etc., under the schemes of NREP/RLEGP. In 1987, the rural sanitation programme was included in the state sector under minimum needs programme.

Studies of the existing situation and the immediate needs of the rural sector in relation to water and sanitation facilities as well as total rural development efforts are an important tool in planning. Such studies continue to serve as an important source of information for improving the ability of international organisations to assist developing countries in rural sanitation efforts. The studies are accompanied by pre investment studies for their environmental health improvements, such as those in housing projects and good hygiene control schemes, socio-economic and behavioral studies; and full utilisation of epidemiological and other resources for pinpointing high-risk rural areas, and situations and recommending priority investment schemes.

The two most striking features of poor housing are over crowding and lack of basic sanitation. The action required seems obvious, but the economic implications are such that no adequate solution has been found in any country to deal effectively and to eliminate these basic deficiencies of human settlements. Even when the occupants attempt within the limits of their meagre resources, to improve the hygienity of their dwellings, the results are seldom lasting. This is mainly because the physical condition of the house, with leaking roof, cracked walls, and earthern floors, facilititates the accumulation of dirt, dust and soot and gives rise to dampness. Fifth attracts lice, fleas, bugs and mites that may transmit disease.

Poor housing permits the harbouring of mice and rats which can also be carries and transmitters of disease, and the entrance of flies and mosquitos with the resultant spread of diseases such as trachoma, malaria, yellow fever, filariasis, and dengue.

It has been stated that bad housing produces mental unrest and thus, exacerbate mental disorder already afflicting the occupants, sensory annoyance and dissatisfaction make an important contribution to mental tension, noise and unpleasant smells lead to nervous irritability and bad temper and gloomy, bleak and unattractive rooms and surroundings accentuate mental depression. The effects of such adverse conditions are particularly serious where individuals are already exposed to other mental and pre-occupations in their work, and outside their homes. Lack of privacy and freedom of movement in the house as a consequence of overcrowding is also considered as cause of mental unrest. The relationship between the quality of housing and health show the inadequacy of available means of measurement and the need to develop standardised methods.

Health and Productivity

Poor living conditions of the rural people are associated with the low level of their income which in turn is linked to their low productivity. The housing package of land, shelter, utilities in combination with access to work and educational and social opportunities, markedly affects the productivity as well as the welfare of the poor. The absence of water, and sewerage facilities, or the lack of access to income earning opportunities lead to low income, poor health and little ability to absorb education (World Bank, 1975).

Poor living conditions of the rural people are associated with the low level of their income which in turn is linked to their low productivity.

Due to its contribution to better health, better housing has a positive effect on education and labour productivity. The provision of adequate light and privacy makes it more feasible for students to study at home in the evening and in bad weather. This contributes to better labour productivity not only through the long term effects of general education but also through study directly related to worker training programme. Better housing is also likely to improve labour productivity by increasing worker's motivation. There is evidence that workers who are moved from squalid to decent housing work harder as a result of both improved health and reduction in antipathy to their employment. Significant improvement in health and in labour productivity results from improvement in workers housing conditions. Improved quality of life in rural areas reduces rural to urban migration too.

Policy Options

In view of the magnitude of housing problems in the rural areas and in cognizance of the role that a rural housing system can play in integrated rural development the following are the policy recommendations:

- A rural housing system comprises all the rural buildings and infrastructure it should serve the rural population at the farm, community and regional levels and meet the need for clustered and dispersed rural settlements.
- The system of rural service centres should be strengthened so that there is complete coverage of services, particularly health and eduction, to all rural settlements.
- The National Research Institutes should be encouraged to undertake research and demonstration activities in various aspects of rural housing and sanitation including construction methods that are technically sound and at the same time simplified for the sake of indigenous workers.
- Rural housing system should be included in integrated rural development programme and assistance and activities should be expanded in order to improve conditions in rural areas and reduce immigration to cities.
- To ascertain the social and economic impact of rural housing system under IRDP (Integrated Rural Development Programme) reseach and evaluation.
- Studies should be undertaken to determine the impact of rural housing system with respect to workers training, employment generation, capital formation and strengthening of technical training centres. Courses relating to the rural housing system can be organised to train rural workers to increase their capability so that they can participate effectively in the development process.
- Under the Scheme of Programme, steps have to be taken to liberate the scavengers without economic dislocation and low cost pour flush water seal [LCPEWS] latrines should be provided

to improve the standards of sanitation in every village panchayat. Community LCPEWS latrines should be provided for women to ensure their dignity and privacy in villages. For increase of individual latrines, necessary subsidy and loans have to be provided to the beneficiaries by village Panchayats.

The relationship between low income and infectious disease is not coincidental. Overcrowded poor quality of housing and unsanitary living conditions that mark poverty provide a thriving environment for transmission of several diseases. Improved health due to better housing leads to better standard of living not only as an outcome of improved income level but also as an input to productivity of labour. Measures for, better housing and sanitation in rural areas will have to be supplemented as a matter of priority for achieving overall development.

Improved health due to better housing leads to better standard of living not only as an outcome of improved income level but also as an input to productivity of labour.

Reference

World Bank (1975) Housing Sector policy paper, Washington, D.C. □

For I dipped into the future, as far as human eye could see, saw the vision of the world, and all the wonders that would be.

LOCKSLEY HALL
ALFRED, LORD TENNYSON

Hazardous Waste Generation in India — Gujarat

Environment Division, NPC

The wastes are generated during the production of valuable products. Some of these wastes are toxic & hazardous in nature due to their inherent characteristics. Such type of wastes have been governed by the "Hazardous Waste (Management & Handling) Rules, 1989". The inappropriate and often careless handling of industrial hazardous wastes have created problems for human health and the environment throughout the world. Therefore, effective control of Hazardous Wastes is of paramount importance.

In the absence of any organised secured landfill facility in India, hazardous wastes are being dumped indiscriminately, resulting in the migration of toxic compounds to ground & surface waters thus, contaminating drinking water sources and affecting human health.

In order to implement the regulations on hazardous wastes, the basic information with respect to the quantity and characteristics of wastes is important. Gujarat is one of the most industrialised states in the country. With increased industrialisation, the problem of hazardous waste management has also increased. Keeping this in view, the Central Pollution Control Board (CPCB) entrusted the Environment Division of National Productivity Council (N.P.C.) to carry out a survey in fourteen industrial estates of five highly industrialised districts of Gujarat State viz Ahmedabad, Baroda, Bharuch, Surat and Valsad.

Hazardous Waste Generating Sectors

As per the information gathered from various agencies, it was observed that in most of the districts, the predominant industrial sectors are Engineering followed by Chemical & Textile. As per the discussions with various Industries Associations and Gujarat Industrial Development Corporation (GIDC) there are a total of 8157 operating units in these five districts. Out of these, about 1346 units generate hazardous wastes. The districtwise distribution of hazardous waste generating units in Gujarat is shown in Figure 1.

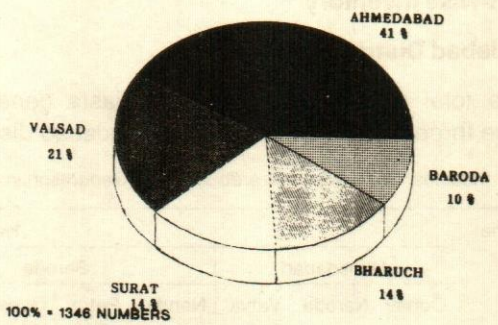

Fig. 1 Districtwise Contribution of Hazardous Waste Generating Units in Gujarat

Based on the type of raw material used, products manufactured & production technology, the following industrial sectors have been identified as hazardous waste generating sectors.

1. Textile Processing
2. Drugs & Pharmaceuticals
3. Pesticides (Bulk & Formulation)
4. Dyestuffs
5. Dye Intermediates
6. Pigments
7. Organic chemicals
8. Inorganic chemicals
9. Rolling mills
10. Petrochemicals

11. Refineries
12. Fertilizers
13. Resins & polymers

INVENTORIZATION OF HAZARDOUS WASTE GENERATION

Based on the survey conducted in the selected districts, as inventory of hazardous wastes generation has been prepared. It has been estimated that approximately 0.44 million tons per year of hazardous waste is generated in 14 industrial estates of Gujarat. The contribution of hazardous waste in Baroda, Ahmedabad and Valsad districts has been calculated to be about 38%, 22% and 17% respectively (Figure 2).

The industrial sectorwise hazardous waste generation in the surveyed districts is presented in Table 1.

District-wise Inventory

Ahmedabad District

The total quantity of hazardous waste generated in all the three industrial estates of Ahmedabad districts, from 554 hazardous waste generating units, has been computed to be about 96269 TPA. The contribution of Hazardous Waste generation in Odhav, Naroda & Vatva has been estimated to be 24%, 15.0% & 61% respectively. The major contribution, in this district, is from the dyes & intermediate units (64%) followed by rolling mills (15%) & textile processing (10%) units. The sizewise distribution of hazardous waste generation in three industrial estates of this district is presented in Table 2.

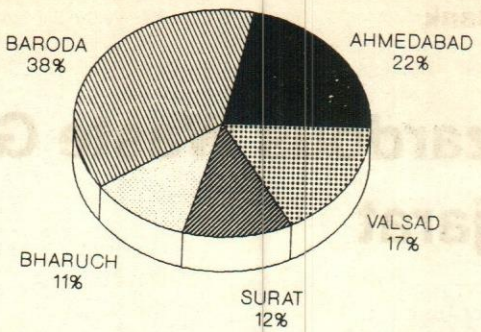

Fig. 2 Districtwise Contribution of Hazardous Waste Generation in Gujarat

Table 1. Industrial Sectorwise Hazardous Waste Generation in Gujarat.

Industrial sector	Hazardous Waste Generation (TPA)													
	Ahmedabad			Baroda				Bharuch			Surat			Valsad	
	Odhav	Naroda	Vatva	Nandesari	Petrofils	Gorwa Road	Makarpura	Ankleshwar	Panoli	Valia	Pandesar	Sachin	Hazira	Vapi	Sarigam
Textile Processing	1560	4368	3432	—	—	—	—	—	—	—	20448	20160	—	—	—
Drugs & Pharma	27.6	2148	2808	15120	24	612	12	8136	—	30	—	—	—	5676	60
Engineering	9240	1008	4200	—	—	—	50.4	—	—	—	—	—	—	—	—
Dyes & Intermediates	10296	5292	45480	96240	180	—	408	24816	1020	—	3624	9312	—	61200	1356
Pigments	1536	—	1968	—	—	—	—	1464	—	—	—	—	—	4800	—
Pesticide	300	900	600	72	—	—	1.2	1968	1464	—	—	—	—	336	—
Organic Chemicals	72	72	204	3192	—	—	—	4428	600	387.6	720	—	—	852	481.2
Inorganic Chemicals	181.8	360	216	24	1920	180	120	2076	12	—	—	—	—	26.4	696
Petro-chemicals	—	—	—	—	28452	—	—	—	—	—	—	—	192	—	—
Refinery	—	—	—	—	19200	—	—	—	—	—	—	—	—	—	—
Fertilizer	—	—	—	—	384	—	—	—	—	—	—	—	—	—	—
Miscell.	—	—	—	204	—	1.2	—	96	—	—	—	—	—	156	—
Total (TPA)	23213	14148	58908	114852	50610	793	592	42888	3096	418	24792	29472	192	73047	2594

Table 2. Size-wise Distribution of Haz-ardous Waste Generation in Ahmedabad

Industrial Estates	Expected Quantum (TPA)			Existing Quantum (TPA)			Total Quantum (TPA)		
Ahmedabad	SSI	MSI	LSI	SSI	MSI	LSI	SSI	MSI	LSI
Odhav	4375	6940	N.A	6882	3480	1536	11257	10420	1536
Naroda	5670	2628	N.A	5490	360	N.A	11160	2988	N.A
Vatva	7060	16984	N.A	10383	23714	767	17443	40698	767
Total (TPA)	17105	26552	N.A	22755	27554	2303	39860	54106	2303
		43657			52612			96269	

N.A. – Not Applicable

Baroda District

It has been estimated that about 166847 TPA of hazardous waste generated in all the four industrial estates of Baroda district. Nandesari and Petro-complex contribute around 69% and 30% respectively of the total waste. The major contribution is from the dyes & intermediates (58%), petrochemicals (17%) and refineries (12%). The sizewise distribution of hazardous waste generation in four industrial estates of this district is present in table 3.

Table 3. Size-wise Distribution of Hazardous Waste Generation in Baroda

Industrial Estates	Expected Quantum (TPA)			Existing Quantum (TPA)			Total Quantum (TPA)		
Baroda	SSI	MSI	LSI	SSI	MSI	LSI	SSI	MSI	LSI
Nandesari	10182	22164	N.A	40752	41754	50610	50933	63918	N.A
Petro-Complex	N.A	N.A	N.A	N.A	N.A	50170	N.A	N.A	51610
Gorwa Road	1	N.A	N.A	300	N.A	492	301	N.A	492
Makarpura	179	N.A	1	412	N.A	N.A	592	N.A	1
Total (TPA)	10362	22164	1	41464	41754	51102	51826	63918	51103
		32527			134320			166847	

N.A. – Not Applicable

Bharuch District

The total quantity of hazardous Waste generated in all the three Industrial Estates of Bharuch district has been computed to be about 46402 TPA. The major contribution is from Dyes & Intermediate units followed by Inorganic chemicals and Drugs & Pharma. The sizewise distribution of hazardous waste generation in three industrial estates of this district is presented in table 4.

Table 4. Size-wise Distribution of Hazardous Waste Generation in Bharuch

Industrial Estates	Expected Quantum (TPA)			Existing Quantum (TPA)			Total Quantum (TPA)		
Bharuch	SSI	MSI	LSI	SSI	MSI	LSI	SSI	MSI	LSI
Ankleshwar	8343	8616	360	3222	20207	2140	11565	28823	2500
Panoli	1506	1104	N.A	150	336	N.A	1656	1440	N.A
Valia	N.A	12	144	N.A	18	244	N.A	30	388
Total (TPA)	9849	9732	504	3372	20561	2384	13221	30293	2888
		20085			26317			46402	

Surat District

The quantity of hazardous waste generation in all the three industrial estates of Surat district has been computed to be amount 54456 TPA. The major contribution of waste has been observed to be from Textile Processing (74%) followed by Dyes & Intermediates (24%). The quantity of hazardous waste generated in Pandesara, Sachin and Hazira has been estimated to be 24,800 (45%), 29,480 (54%) & 432 (1%) TPA. The sizewise distribution of hazardous waste generation in three industrial estates of this district is presented in table 5.

Table 5. Size-wise Distribution of Hazardous Waste-Generation in Surat

Industrial Estates	Expected Quantum (TPA)			Existing Quantum (TPA)			Total Quantum (TPA)		
Surat	SSI	MSI	LSI	SSI	MSI	LSI	SSI	MSI	LSI
Pandesara	7872	15000	N.A	1200	720	N.A	9072	15720	N.A
Hazira	N.A	N.A	N.A	N.A	N.A	192	N.A	N.A	192
Sachin	5078	18160	N.A	6234	N.A	N.A	11312	18160	N.A
Total (TPA)	12950	33160	N.A	7434	720	192	20384	33880	192
		46110			8346			54456	

N.A – Not Applicable

Valsad District

The total quantity of Hazardous waste generated in two industrial estates of Valsad district has been estimated to be about 75641 TPA. The quantity of hazardous waste generated in Vapi and Sarigam has been computed to be about 73,043 TPA (97%) & 2593 (TPA) (3%) respectively. The major contribution is from Dyes & Intermediate (83%) and Pigment manufacturing (7%) units. The sizewise distribution of hazardous waste generation in two industrial estates of this district is present in table 6.

Table 6. Size-wise Distribution Hazardous Waste Generation in Valsad.

Industrial Estates	Expected Quantum (TPA)			Existing Quantum (TPA)			Total Quantum (TPA)		
Valsad	SSI	MSI	LSI	SSI	MSI	LSI	SSI	MSI	LSI
Vapi	43863	4800	N.A	23280	550	554	67143	5350	554
Sarigham	223	N.A	N.A	2371	N.A	N.A	2594	N.A	N.A
Total (TPA)	44086	4800	N.A.	25651	550	554	76387	5350	554
		48886			26755			75641	

N.A. – Not Applicable

Prepared by
A.K. Saxena & N. Venkatesan

Labour Productivity & Labour Intensity in Indian Manufacturing (1973-92)

NPC Research Division

In an earlier study (Productivity Vol. 34 (4), we presented the Labour Productivity & Labour Intensity in Indian Manufacturing Industries during the period 1973–1989. The present study updates the information upto the latest year for which data are available i.e. 1991–92. The methodology followed in computing the indices are the same as in the earlier study. Labour Productivity is defined as the net value added per employee per year. The net value added figures have been taken from the Annual Survey of Industries (ASI), which is being deflated to 1981–82 constant prices based on the relevant wholesale price indices. Labour intensity is defined as the share of 'emolument' in the value of 'total inputs', both being measured at current prices.

The present study covers 44 industry groups based on National Industrial Classification (NIC). These groups have been chosen, keeping in mind their significance in terms of contributions to the 'total values of output' generated in the manufacturing sector.

Table 1: Labour Intensity and Labour Productivity in Indian Manufacturing Industries

Years	Food Products 20-21			Refining of Sugar 206			Hydrogenated Vanaspati 210			Beverages, Tobacco Products 22		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	5.1	*	13509	9.3	3.36	261	2.0	*	65	9.4	*	2357
1974-75	4.6	7.53	13454	9.2	8.05	251	2.0	19.31	71	9.7	13.37	2080
1975-76	5.2	7.17	14126	9.7	8.86	243	1.9	21.76	75	10.3	8.70	2880
1976-77	5.1	7.74	15306	11.4	7.75	261	2.1	29.01	79	10.4	9.59	6398
1977-78	4.9	8.52	15783	10.8	7.85	288	1.6	38.14	69	10.3	6.17	7307
1978-79	5.1	10.58	16310	10.1	11.31	286	2.0	37.65	69	11.7	7.63	8204
1979-80	5.1	8.56	16840	12.2	8.42	293	2.0	40.96	83	13.8	6.52	9629
1980-81	5.4	*	17067	13.1	4.46	304	2.0	44.09	82	12.6	6.02	8901
1981-82	5.1	7.17	18351	9.9	8.42	296	1.7	35.74	76	11.3	5.85	9568
1982-83	5.3	9.88	17111	9.5	17.66	308	1.8	36.88	90	18.3	5.89	8486
1983-84	5.7	14.97	17523	11.2	31.69	318	2.1	26.22	109	13.5	11.39	8188
1984-85	5.8	14.50	17459	15.9	29.44	318	2.2	24.34	102	11.7	11.75	7093
1985-86	5.6	15.83	17725	13.0	28.96	323	2.2	53.52	88	12.8	10.36	8457
1986-87	5.4	16.21	17299	12.0	33.17	328	2.3	43.64	97	12.0	11.36	7163
1987-88	5.4	15.50	18333	12.0	25.11	349	2.1	34.34	99	12.9	10.07	7951
1988-89	5.2	19.46	18581	10.7	38.31	336	1.8	36.08	104	12.4	11.50	7723
1989-90	4.9	22.18	19342	11.5	36.02	361	2.1	37.15	123	12.6	9.68	9088
1990-91	4.9	19.44	19760	*	27.7	356	1.9	33.62	103	10.4	10.9	8448
1991-92	4.8	19.79	19721	10.8	30.41	352	1.8	29.61	119	10.9	11.9	8831

Years	Cotton Textiles 23			Wool, Silk, Synthetic Fibre Textiles 24			Jute, Heap & Mesta Textiles 25			Textiles Products 26		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	25.0	12.55	5719	13.9	11.88	2413	41.0	6.18	429	9.6	14.28	1642
1974-75	23.7	11.18	5560	13.4	15.14	2368	47.1	6.87	322	9.9	13.35	1652
1975-76	24.0	9.81	5968	12.0	14.20	2742	43.9	8.07	184	9.4	17.07	1979
1976-77	20.0	10.04	6213	11.6	12.81	3090	38.9	7.73	201	9.2	15.52	2192
1977-78	19.6	10.73	6508	13.1	14.20	3112	38.8	7.21	223	9.2	15.52	2347
1978-79	19.7	12.78	6701	10.8	16.30	3216	36.6	6.87	247	9.0	19.24	2577
1979-80	22.4	13.24	7207	11.3	16.07	3455	38.5	8.07	257	8.7	15.21	2907
1980-81	21.8	13.24	7189	11.6	17.46	3743	38.8	9.62	265	7.9	17.38	2889
1981-82	20.1	11.87	7141	10.6	19.79	4100	40.2	8.93	297	7.4	20.49	2943
1982-83	19.9	10.56	6569	10.9	18.87	3267	42.3	7.68	219	7.4	21.80	2491
1983-84	22.2	13.28	6781	12.3	22.16	3532	39.1	6.51	236	9.7	20.39	2621
1984-85	20.8	11.85	6760	11.9	24.18	2955	31.5	5.19	215	8.9	28.85	3063
1985-86	19.5	13.77	7073	10.3	28.43	3236	27.1	6.25	204	8.1	27.48	2835
1986-87	22.0	15.91	6981	10.6	32.27	2986	50.6	10.57	184	7.7	37.88	2821
1987-88	20.2	14.60	6844	11.2	25.75	3142	52.0	9.42	236	8.0	18.46	3141
1988-89	17.3	16.29	6801	10.6	28.79	3250	46.3	9.22	187	8.2	22.67	3159
1989-90	16.2	18.88	7021	8.8	40.86	3325	38.2	7.95	327	7.2	24.91	3186
1990-91	15.7	20.79	7218	8.5	41.41	3368	40.2	8.33	326	7.9	30.09	3537
1991-92	14.1	17.64	7252	7.8	36.43	3236	42.0	9.04	352	7.1	34.21	3772

Year	Wood & Wood Product Furniture & Fixtures 27			Paper, Paper Products & Printing 28			Pulp, Paper & Boards 280			Leather & Fur Products 29		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	17.4	10.19	2932	28.8	16.93	3779	20.2	27.38	560	11.4	12.51	594
1974-75	15.8	9.29	3158	24.9	18.91	3820	17.6	38.53	490	12.8	15.82	667
1975-76	16.1	9.29	3431	25.0	18.34	3936	18.9	33.12	424	7.4	13.62	670
1976-77	15.3	10.49	3573	23.2	17.78	4506	18.4	27.70	449	8.7	15.09	727
1977-78	14.8	10.79	3676	23.5	18.34	4439	18.9	26.75	538	9.7	14.72	762
1978-79	14.2	10.79	3788	23.1	17.78	4901	18.7	27.38	500	8.1	11.78	797
1979-80	14.1	10.19	3978	21.0	17.50	4743	16.8	25.47	587	7.1	12.51	862
1980-81	12.3	8.99	4033	19.4	17.21	4798	15.8	23.24	585	9.2	11.41	886
1981-82	13.0	9.59	4094	20.2	18.63	4890	14.6	24.52	672	8.5	12.14	899
1982-83	14.2	8.86	3618	19.7	14.92	4571	14.3	13.17	637	9.2	13.67	880
1983-84	15.2	11.37	3591	19.9	15.71	4710	13.6	14.86	734	10.8	16.75	942
1984-85	15.3	10.04	3847	17.9	19.09	4808	11.8	22.75	696	9.9	17.56	929
1985-86	14.1	9.21	3580	16.9	16.21	4870	11.5	16.49	802	9.1	14.20	999
1986-87	12.8	10.09	3873	16.1	18.83	4921	11.3	21.92	779	9.1	14.54	976
1987-88	13.1	11.16	3407	17.3	17.47	5096	12.0	19.70	899	8.2	17.27	1074
1988-89	11.6	12.64	3355	15.0	19.27	4960	10.2	27.64	808	7.4	12.90	1195
1989-90	11.5	11.98	3521	14.0	23.42	5098	10.2	35.79	842	7.6	16.20	1238
1990-91	11.1	18.37	3419	13.8	25.31	5299	9.8	35.45	895	6.9	18.8	1398
1991-92	11.4	18.83	3421	13.32	24.70	5222	9.7	31.55	839	7.6	21.7	1545

Years	Rubber & Plastics 30			Chemicals & Products 31			Basic & Industrial Gases 310			Fertiliser & Pesticides 311		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	**	**	**	12.7	38.77	3043	15.7	55.57	389	12.2	36.99	335
1974-75	4.9	42.62	1952	10.2	37.21	3221	11.8	49.76	543	9.3	38.67	344
1975-76	5.1	36.93	2496	10.3	33.05	3732	12.3	37.05	639	9.0	31.67	378
1976-77	4.4	50.57	2831	9.7	35.91	4152	12.8	38.50	701	7.8	36.43	440
1977-78	4.2	50.85	2881	9.4	36.69	4674	12.7	51.57	764	7.5	38.11	469
1978-79	4.0	40.91	2350	10.0	44.49	4881	13.5	52.30	874	7.8	59.41	493
1979-80	3.6	34.09	3302	9.4	36.69	5328	11.5	45.76	883	7.3	43.44	503
1980-81	3.2	35.23	3498	9.0	32.00	5479	10.2	34.50	917	7.0	32.51	447
1981-82	2.6	34.09	3864	8.2	35.91	6834	8.8	50.12	1223	5.4	51.28	618
1982-83	2.6	44.33	3514	8.5	39.79	5350	10.9	50.05	934	5.0	68.19	442
1983-84	2.9	30.88	3778	9.2	46.98	5824	11.3	43.52	978	6.1	64.04	495
1984-85	3.0	47.86	3900	9.1	44.60	6032	10.4	41.09	1320	6.0	100.86	469
1985-86	2.6	78.95	3958	8.8	45.73	6402	10.1	48.39	1040	6.6	75.97	546
1986-87	3.0	73.56	4097	*	47.00	6335	6.5	66.86	1017	5.7	75.54	474
1987-88	3.1	74.28	4412	8.9	51.54	6578	10.4	69.85	1049	6.6	79.46	515
1988-89	3.0	76.52	4660	8.3	57.50	6946	8.8	94.69	1119	6.5	101.37	594
1989-90	3.2	78.95	5047	7.7	66.43	6631	7.3	64.58	361	7.2	95.0	426
1990-91	7.6	67.44	6914	2.7	99.0	5289	7.6	*	374	4.5	119.1	513
1991-92	7.1	72.20	7251	3.1	77.4	5627	7.2	*	375	7.4	10.11	489

Years	Paints & Varnis 312			Drug & Medicine - 313			Non-metallic Mineral Products 32			Structural Clay Products 320		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	11.5	45.36	338	18.5	26.87	674	22.0	12.78	3757	41.7	6.67	1182
1974-75	9.8	42.49	372	16.0	27.79	682	20.8	11.48	3890	36.6	8.18	1223
1975-76	9.9	39.62	368	15.8	32.42	800	18.9	12.47	4820	36.1	8.93	1533
1976-77	8.8	41.63	403	14.9	38.29	865	17.3	13.40	5309	30.8	8.93	1641
1977-78	9.7	39.62	469	15.2	29.49	918	17.3	15.59	5558	29.8	10.04	1666
1978-79	8.7	44.21	489	15.5	31.81	958	17.9	12.78	5639	31.2	10.42	1727
1979-80	9.0	50.53	551	15.4	32.89	1070	17.1	12.47	6083	28.2	8.93	1899
1980-81	9.8	38.18	568	15.4	35.51	1121	17.5	13.09	6440	27.6	9.67	2159
1981-82	8.7	36.46	773	14.8	33.35	1434	15.7	13.09	7694	27.3	8.56	3048
1982-83	10.6	36.73	476	15.1	40.55	1131	16.5	15.67	6667	40.8	6.98	2495
1983-84	11.0	44.95	547	16.3	49.19	1187	15.7	15.20	7618	30.3	5.15	3117
1984-85	11.7	43.13	515	15.9	41.26	1265	14.1	17.40	7841	28.7	6.15	3146
1985-86	10.4	38.08	555	14.8	45.09	1358	13.5	18.53	8515	27.6	6.43	3421
1986-87	10.0	54.39	592	15.0	48.30	1374	13.2	16.97	8267	26.7	5.93	3247
1987-88	9.3	50.07	739	15.5	50.21	1497	13.5	17.81	8706	25.3	7.95	3445
1988-89	9.5	41.66	722	13.8	55.21	1554	12.0	19.69	9025	20.2	8.17	3486
1989-90	10.5	24.23	1121	5.8	33.90	2550	11.9	22.40	9038	22.0	7.44	3515
1990-91	9.2	24.56	1110	5.7	43.41	2694	11.1	28.08	9441	21.0	8.34	3674
1991-92	9.5	23.21	1214	5.4	44.89	2953	10.4	33.58	9919	18.4	8.59	3976

Years	Glass & Glass Products 321			Cement, Lime & Plaster Industry 324			Basic Metal & Alloy Industry 33			Iron & Steel Industry 330		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	28.5	11.71	391	14.7	16.98	126	19.8	22.50	4132	*	20.68	942
1974-75	24.8	9.70	392	14.4	17.52	126	18.4	28.70	4215	19.7	23.27	1114
1975-76	25.2	8.37	414	13.0	26.95	205	16.8	25.76	4562	18.7	20.31	1150
1976-77	23.6	9.37	448	11.7	26.95	226	15.7	28.37	4988	17.5	20.68	1143
1977-78	22.9	12.38	483	12.0	33.69	247	15.0	24.13	5054	17.1	19.57	1299
1978-79	23.1	11.38	560	12.2	27.49	232	13.2	26.74	5259	13.7	21.42	1332
1979-80	23.4	9.70	573	12.5	23.45	271	12.5	23.81	5538	13.0	19.57	1471
1980-81	20.6	9.37	590	12.2	20.48	261	11.5	25.44	5779	11.6	21.79	1549
1981-82	19.0	10.07	674	11.5	19.67	276	10.2	30.65	6013	10.2	22.53	1714
1982-83	19.0	10.43	607	10.3	44.97	276	10.0	29.42	5509	9.8	21.81	1474
1983-84	19.6	10.37	601	10.3	43.17	328	11.9	30.37	5888	12.1	42.49	1686
1984-85	19.4	13.59	567	9.2	48.34	366	12.3	23.73	5901	13.0	31.21	1657
1985-86	18.2	19.64	571	8.7	49.58	468	10.1	28.54	6077	7.1	36.72	1764
1986-87	16.7	16.37	556	8.7	42.49	448	9.7	25.85	6191	10.2	31.10	1822
1987-88	17.4	16.06	570	8.9	42.98	517	9.8	27.51	6184	10.4	29.78	1754
1988-89	17.8	18.03	594	7.4	48.00	558	8.7	38.18	6203	9.8	45.65	1829
1989-90	15.0	23.68	626	7.6	54.13	551	7.6	37.44	5853	8.8	39.81	1597
1990-91	15.1	23.63	598	6.8	83.44	612	7.3	40.96	6014	8.1	50.85	1674
1991-92	13.4	29.89	628	6.4	114.38	616	5.6	29.29	6097	5.3	35.73	1683

Years	Foundry for Casting 331			Ferrous Alloys 332			Copper Manufacturing 333			Aluminium Manufaacturing 335		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	18.9	18.22	2440	10.0	37.14	49	10.7	29.88	92	13.68	28.85	161
1974-75	18.6	20.50	2512	8.1	45.32	21	9.9	34.86	74	21.2	31.01	141
1975-76	17.3	17.90	2737	7.7	39.52	42	8.4	14.69	111	11.1	36.06	200
1976-77	16.9	18.22	3094	7.2	41.23	70	9.5	53.54	116	8.9	54.09	183
1977-78	15.5	17.24	2973	6.5	34.07	43	9.8	29.88	117	9.8	37.50	232
1978-79	14.9	18.87	3121	6.7	40.89	49	9.5	25.40	96	9.6	40.75	253
1979-80	13.8	17.24	3173	6.6	31.35	49	7.8	33.62	119	9.2	12.26	280
1980-81	12.8	19.20	3293	6.8	52.13	53	9.8	18.92	141	8.6	*	308
1981-82	11.6	19.85	3307	6.3	46.00	60	7.4	16.68	164	8.3	12.62	317
1982-83	11.7	17.65	3126	7.7	22.32	35	6.8	39.43	149	8.0	25.53	318
1983-84	13.4	18.80	3208	7.8	*	65	7.0	41.81	143	8.5	18.35	364
1984-85	13.3	14.71	3313	7.4	17.53	53	7.6	17.40	129	7.6	27.95	335
1985-86	11.2	18.89	3337	6.9	38.57	54	8.8	13.65	144	7.3	21.11	331
1986-87	9.9	18.62	3365	6.0	42.09	64	7.7	*	167	7.5	17.13	328
1987-88	9.6	20.21	3313	6.8	49.16	80	8.8	20.31	175	7.8	46.69	335
1988-89	8.1	21.54	3236	5.8	49.10	76	6.0	13.39	193	5.9	79.00	395
1989-90	4.1	27.01	1442	5.2	44.78	77	6.2	32.55	187	5.4	104.48	342
1990-91	4.1	33.10	1543	5.5	31.17	87	6.5	46.90	163	5.9	68.40	288
1991-92	3.5	4.03	1326	5.4	23.30	100	5.8	43.32	166	5.8	81.09	319

Years	Zinc Manufacturing 336			Metal Products & Parts 34			Machine tools & Parts 35			Agriculture Machinery 350		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	9.4	*	29	18.3	17.42	4434	24.4	21.18	4713	12.4	*	799
1974-75	9.3	149.08	11	17.2	16.56	4412	20.7	22.28	4808	10.5	21.18	704
1975-76	9.6	79.30	11	17.4	15.99	5260	19.8	21.73	5449	10.7	22.16	673
1976-77	9.8	76.13	12	16.2	17.42	5590	18.5	26.40	5881	11.4	28.02	621
1977-78	5.5	136.40	19	16.1	16.85	5657	19.5	25.03	6203	12.2	22.16	718
1978-79	7.7	57.73	20	15.4	17.71	5818	18.4	25.85	6387	10.5	24.44	703
1979-80	8.5	68.83	23	15.0	19.14	6230	17.3	23.38	6826	9.9	22.81	789
1980-81	8.8	61.22	24	15.1	18.85	6457	15.8	26.13	7011	9.4	27.70	786
1981-82	7.4	48.21	25	13.7	19.14	6563	15.3	27.23	7876	8.7	30.63	797
1982-83	9.0	37.30	21	13.5	18.66	5884	16.0	27.73	7207	10.2	29.50	717
1983-84	8.1	85.08	22	16.4	21.86	6054	18.0	31.38	7138	11.1	28.39	794
1984-85	8.2	*	21	16.5	20.18	6078	18.2	33.80	7168	11.5	31.47	734
1985-86	7.6	*	46	14.8	21.47	6307	17.5	37.14	7648	11.6	36.09	802
1986-87	7.5	39.02	33	15.3	22.36	5978	16.3	36.49	7254	11.8	38.55	700
1987-88	8.1	37.31	43	15.0	24.89	6390	15.9	32.94	7584	11.7	42.75	830
1988-89	6.6	41.51	45	14.4	27.05	6335	14.8	31.474	7711	9.6	35.73	775
1989-90	5.9	61.44	29	10.9	21.76	6683	13.7	37.35	7753	8.5	46.93	859
1990-91	4.7	53.53	37	10.9	20.51	6964	12.8	40.87	7738	8.4	60.49	824
1991-92	5.2	58.61	44	10.6	23.73	6890	12.1 (combined 35+36)	46.82	12771	7.7	55.89	739

Years	Prime Movers & Boilers 352			Industrial Machinery for Food & Textiles 353			Industrial Machinery other than for Food 354			Refrigeration & AC 355		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	20.1	*	623	25.2	20.45	1003	34.1	*	402	23.4	18.41	128
1974-75	19.3	32.59	689	19.2	21.53	977	29.5	15.41	541	19.0	17.98	161
1975-76	14.7	33.72	732	19.2	20.45	1028	23.2	18.17	437	21.4	13.43	121
1976-77	15.5	43.46	776	20.2	24.39	1130	20.9	20.34	499	13.8	17.76	130
1977-78	14.0	42.17	757	14.4	25.11	1250	27.2	10.67	642	14.0	29.02	151
1978-79	13.1	31.84	719	30.3	27.62	1289	26.7	14.22	656	14.3	24.91	155
1979-80	12.0	28.10	782	18.8	23.32	1357	25.0	15.21	740	16.8	21.22	162
1980-81	11.5	26.97	800	17.3	36.95	1359	22.6	16.59	737	11.9	23.61	200
1981-82	11.3	29.22	1097	16.3	21.52	1565	22.0	15.21	768	12.2	25.99	259
1982-83	11.3	28.97	822	19.0	20.79	1250	20.9	15.64	718	11.8	32.63	164
1983-84	13.9	26.23	838	18.8	22.70	1448	22.8	22.44	725	16.6	31.49	167
1984-85	14.4	40.23	942	19.5	25.01	1226	21.9	22.77	715	16.8	29.03	165
1985-86	13.3	44.61	940	19.9	32.92	1296	17.0	21.40	829	16.6	40.15	159
1986-87	12.0	28.52	871	15.1	28.23	1240	18.6	23.06	835	13.9	35.51	173
1987-88	11.0	29.98	956	17.2	28.84	1206	19.1	31.62	940	13.6	36.30	199
1988-89	13.3	32.58	902	13.2	29.34	1272	17.0	31.47	995	14.0	40.60	190
1989-90	12.1	34.59	770	11.5	41.92	1271	13.5	36.70	1158	15.9	59.45	155
1990-91	10.1	32.59	759	10.8	45.53	1241	13.4	31.40	1121	15.4	50.77	196
1991-92	10.0	30.24	797	11.2	47.79	1289	13.6	32.54	1073	16.2	54.56	212

Years	Machine tools & Parts 357			Electrical Machinery 36			Electrical Industrial Machinery 360			Transport Equipment 37		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	40.1	14.60	590	19.9	23.22	2380	21.4	27.82	1141	28.5	22.35	1600
1974-75	37.4	17.87	586	20.0	21.23	2340	24.3	25.32	998	28.8	19.07	1680
1975-76	34.7	15.86	827	18.2	22.55	2390	18.6	28.74	843	27.5	19.67	2752
1976-77	31.8	16.36	847	16.1	24.10	2596	16.2	30.33	837	24.1	24.14	2204
1977-78	34.5	14.35	934	16.7	25.65	2740	17.6	31.24	915	26.1	23.84	2348
1978-79	32.6	15.10	910	15.8	25.87	2882	16.4	30.10	955	25.8	24.14	2528
1979-80	30.2	16.36	949	14.7	24.32	3277	15.9	28.05	1036	24.4	19.37	2867
1980-81	26.7	14.85	1009	13.7	27.64	3406	15.5	33.30	1046	22.9	19.97	2815
1981-82	25.1	21.14	1011	13.1	28.74	4229	15.1	33.75	1062	21.9	22.05	3339
1982-83	27.7	20.32	1166	14.6	35.32	3641	16.2	42.27	1138	22.5	24.73	2816
1983-84	32.5	24.47	1075	17.3	36.91	3661	19.4	42.19	1105	24.1	26.20	2815
1984-85	23.4	21.52	1027	18.5	42.23	3831	23.7	60.05	1148	23.6	26.53	3041
1985-86	32.3	22.99	1076	15.5	35.99	4066	19.5	41.02	1129	21.2	26.00	3267
1986-87	29.2	22.69	1039	15.0	39.86	3888	19.8	44.65	1071	20.4	30.07	3120
1987-88	29.8	28.95	975	14.4	45.02	4241	18.7	47.72	1304	19.4	28.32	3318
1988-89	26.4	25.05	1051	12.1	48.05	4496	16.1	47.76	1378	16.8	30.82	3345
1989-90	24.5	25.98	1039	11.2	54.13	4790	15.5	56.30	1556	14.9	34.83	3637
1990-91	23.1	**	985	11.2	54.72	4995	14.8	65.08	1655	13.9	42.01	3625
1991-92	26.8	**	935	**	**	**	15.4	57.24	1739	16.3	37.23	3704

Years	Motor Vehicles 374			Motorycycle, Scooter 375			Bicycle, Part 376			Other Manufacturing Industry 38		
	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories	Labour Intensity Ratio (%)	Labour Productivity (Rs 000)	Number of Factories
1973-74	20.1	*	523	16.2	*	114	12.7	*	464	30.6	12.55	1662
1974-75	19.6	29.12	569	18.0	15.88	147	12.5	10.75	498	29.7	11.89	1566
1975-76	18.5	28.49	990	18.1	18.96	110	12.9	10.75	581	25.4	17.62	1473
1976-77	17.5	35.45	1021	16.9	15.88	146	11.0	11.74	600	23.4	17.62	1871
1977-78	19.2	36.08	1023	15.1	20.15	201	12.5	11.54	598	21.7	15.63	1897
1978-79	17.7	36.40	1113	17.2	21.57	215	11.0	9.95	643	18.2	15.41	1799
1979-80	16.0	27.85	1205	16.3	23.47	270	10.4	12.74	694	18.4	15.84	2047
1980-81	15.0	28.49	1297	15.8	20.15	235	7.8	13.53	676	18.7	18.72	1956
1981-82	14.8	35.45	1565	15.0	22.99	293	8.0	17.12	748	18.3	18.72	2383
1982-83	15.9	38.38	1334	15.5	28.24	255	9.0	16.87	638	18.7	23.45	1475
1983-84	17.9	41.14	1302	15.4	25.57	257	9.4	17.84	669	19.9	28.46	1871
1984-85	18.9	42.05	1529	14.2	29.61	287	8.7	15.84	658	19.8	35.61	1509
1985-86	16.5	42.76	1594	13.2	38.87	295	8.1	12.04	673	19.0	54.78	1725
1986-87	15.7	47.80	1567	29.1	33.46	348	8.3	15.58	627	20.8	38.16	1573
1987-88	15.0	43.31	1463	10.6	28.71	432	8.7	17.77	687	17.1	38.66	1742
1988-89	13.4	48.72	1498	10.0	29.84	460	7.6	18.35	691	17.5	35.90	1792
1989-90	12.2	55.27	1008	10.3	24.96	550	7.5	17.27	693	12.9	45.29	1795
1990-91	11.51	55.78	1079	9.7	41.85	481	6.8	28.01	696	12.74	41.74	1758
1991-92	14.80	59.41	964	10.5	44.42	518	6.5	22.00	724	12.20	55.51	1843

**: Data not available *: Extremely high or low value not conforming to the pattern

Note: According to the recent reclassification on NIC, industry group 30 (Rubber & Plastics) and 31 (Chemicals & Products) have been interchanged. But we use the same codes as in the earlier study to maintain comparability.

Compiled by
Anil Kumar

Book Review

***Technology Development, Adaptation & Assimilation Strategies at Corporate Level* Survey Report. Asian Productivity Organization, Tokyo, 1994, 306p.**

The volume under review is the report of an APO survey organized in 1990 and 1991 with the help of experts from seven member countries viz; Taiwan, Hong Kong, India, Japan, Pakistan, Singapore, and Thailand. The survey focuses on the role of top management in the decisions about, and the outcomes of technology transfer projects. The final decision on whether to go ahead or not with the technology transfer project depends on the consideration of various salient issues by the top management of the firms concerned. Those issues pertain to identification of business opportunities, formation of business partnership, narrowing and overcoming the perception gap between the two parties, organizing and staffing, and mobilization of resources. The present report, in this sense, differs from other studies on technology transfer which focus on downstream activities.

The study defines technology transfer as the process of planned, rational movement of technology from one firm to another which is caused by business transaction across national borders. Technology gaps existing between the supplier and recipient are a major motive of transfer. The concept of technology transfer as used in the study views assimilating, adaptation, and development as its three successive stages. The assimilation stage involves the absorption and internalization of new technology by a recipient to achieve set targets by using it in the way the original technology served its purpose. The adaptation stage involves the modification of the introduced technology to suit local conditions. It serves to broaden and strengthen the scope of the new technology's applicability. The adaptation stage requires the recipient to possess basic capabilities to cope with repair, maintenance, and production control in quality, cost, and delivery. The process of technology transfer is completed when the recipient acquits capabilities in part and process design, as well as in manufacture, maintenance, and production control. The developmental stage involves the recipients' ability to undertake engineering renovations in design, process, or operational knowhow of the original technology. This stage requires capabilities for both products design and R & D.

The report deals with technology transfer projects based on decision making and risk taking by private sector firms. A set of 19 case studies concerning as many technologies across seven countries, are outlined and analysed, The country and technology-wise breakdown of the projects is as follows: automobile design, air conditioning, and electrical machinery in Taiwan; Kiln furniture, motorcycle engines, and cassava-based acetic acid in Thailand; photocopiers, programmable controllers, and light commercial vehicles in India; plastic mould injecting machines and cordless powertools appliances in Hong Kong; tyre manufacturing, two-wheeier scooters and three-wheeler automobiles, and multiplexing and transmission system for carrier telephones in Pakistan; printed circuit board (doublesided) and magnetization in Singapore; and suspension preheating system for clinker calcinating, heat transfer media boilers, and flexible hose in Japan. The cases covered in the report are thus quite diversified but their descriptive framework is uniform throughout the study.

The findings and conclusions of the case studies lead to the identification of the critical success factors associated with technology transfer projects. In what follows, these success factors are outlined briefly.

The case studies show that the suppliers' decision-making in forming partnerships depended on the extent they share the recipients' corporate philosophy and develop mutual confidence. The successful cases suggest that partnerships are developed between parties who possess strong corporate culture and have a very clear-cut concept of, and approach to technology transfer with clear target setting.

Another key factor is the supplier's assessment of the recipient's absorptive capabilities in general, and capabilities for commercialization in particular, before deciding whether to license the technology or not. This is paralled by the recipient firms" assessment of the supplier's reputation and capabilities. The partners should therefore explore ways to identify a built-in structure that lends itself to removal of barriers, biases, and problems. An effective remedy for dealing with barriers and biases is mutual trust and confidence in the partnership between the two top managements.

Top management of recipient firms possessed a forward looking attitude toward future gains at the cost of immediate short-term profit. Successful top mangers were characterized by their ability to determine turning points at the right moments in their competitive business environment in terms of the "voice of market".

The survey findings suggest that the party that is likely to gain more from the technology transfer project should take the initiative in forming the partnership. The supplier's willingness and support beyond the written commitment specified in the contract, including such services as the provision of knowhow, free consulting, or joint operations for problem solving, are particularly crucial in the case of time-consuming and risky projects. The case studies emphasize the significance of informal relationships beyond the contract in this context. The studies also caution against a structural trap in technology transfer. The recipient firms, may for example, try to accomplish the project with minimum investment because they believe the necessary resources are readily available. The suppliers, on the other hand, may believe the contrary and emphasize that additional investments should be made to supply the missing resources. Such a perceptual disparity may endanger their mutual confidence and cooperation.

Another success factor commonly observed in technology transfer projects was that the top management always established a modest, steady target-setting pace for project implementation. This approach also facilitated the adaptation of technology in the light of local conditions regarding raw materials, manpower, market, production costs, and unexpected problems. In this context, organizational development as a methodology for surmounting various barriers was seen as important. Organizations must be continuously renovated by stimulating employee attitudes in order to cope with the requirements of changing markets and technologies. This is also essential for maximizing the synergy effects. The latter are not limited to technology only, but also extended to influence market, product, information, and organizational resources.

A high level of communication and collaboration between design and manufacturing departments are other critical requirements. Production knowhow needs to be integrated into design blueprints. Production technology needs to be viewed as an integral triad of design technology, manufacturing technology, and production management. Design technology embraces functional, production and industrial designs. Manufacturing technology includes knowledge about plant equipment, operational capability, and maintenance capability. Production management comprises control of quality, cost, and process. Production technology thus need to be managed in a holistic manner.

Technology transfer is a process of directed change toward learning and mastering new and more sophisticated technological skills; creating new systems, methods, and procedures; and above all developing a new frame of mind. Suppliers may often be unwilling or unable to help the recipients mange such a multi-dimensional process of change. Their interests may also not be quite compatible with those of the recipients. For these reasons, it is extremely important that the recipient firms cultivate and acquire capabilities for problems identification and solving on their own initiatives. In order to be able to do so, they have to rely on the creativity, commitment, and cooperation of their human resources, and engender a corporative culture of excellence and innovation.

The volume under review is a welcome addition to the literature on technology management. It should be quite useful to managers of industrial enterprises in general, and technology administrators in particular.

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Business Process Re-engineering **by M.S. Jayaraman, Ganesh Natarajan and A.V. Rangaramanujan. Tata MC Graw-Hill Publishing Company Ltd., New Delhi, 1994, 217 p. Rs. 165**

'Business Process Re-engineering' is the first book of its kind to be published in India on the subject. It unfolds the potential and application to re-engineering business in Indian context. The book has been as a result of the authors' work in the application of Business Process Re-engineering specifically to Indian conditions.

The chief executives of public and private sector companies are on the look out for evolving strategies for reorienting their business thrust to align with the new paradigm shift. As many organisations have grown huge and unwieldy they find it impossible to acquire the flexibility required for survival in the new customer oriented market place. Such a situation calls for a review of the manner in which the companies have functioned so for. The concept of division of labour and functional specialisation propounded by Adam Smith & Henry Ford is no longer relevant in the light of these changes. These work division principles were ideal for a situation where the customer waited for receiving a product or service in line when domestic competition was low and global competition was non-existent.

The need for the redesign emanates not only to optimise the economies of scale, but also as an important aspect for economy of time, flexibility and quick response to customers's need, Such a paradigm shift calls for leaner and flatter organisations with focus on customer orientation and quick response time, quality, and cost minimisation. Such a situation can only be achieved by redesigning and having a fresh look at the business and functioning of the organisation. It is in this context that Business Process Reengineering (BPR) has great importance.

The authors have advocated a five-step methodology for implementing BPR propounded by Beckhard Prize award winning seminal work by Thomas H. Davinport of Ernst & Young and Kames Short of MIT Sloan School of Management. The authors have successfully synthesized the Business Process Reengineering with Indian Philosophy and Vedic scriptures, which is a welcome sign as it has been long felt need of Indian managers to imbibe Indian ethos for successful adaptation and absorption of various management thought processes and their application to Indian situations.

Four case studies have been discussed at length in the book; these cases relate to manufacturing and service industries from western and southern region of the country. In the case of Nethrajyoth International Hospital providing specialised medical care, by reengineering the patient service fulfilment process, the consultants were able to eliminate wasteful waiting time procedures. With the improved patient service process, the hospital was able to give appointment to patients upto six months as against two months. In this case the Information Technology was ingrained in the work process, so that process owners and process users were able to align their efforts towards customer needs. The second case relates to the Decan Tribune, a newspaper chain with multi-editions published simultaneously from different localities With BPR their advertisement billing which was centralised at Headquarters, the old procedure taking nearly 70 days, was cut down to two days.

The third successful case relates to an engineering industry in western India which embarked on reengineering order fulfilment process to cut down their delivery period from eight weeks to eight days. This example demolishes the theory in the Indian management circles that workers and staff in India are not willing to be shifted from their work areas. In this particular company, the workers were willing to be retrained and redeployed by the management, as long as their jobs and emoluments were protected.

The fourth example is based on Best Fit Valves Company's export area. In this case, it was the realistic estimate for a single-piece of simple product with a slender margin that decided whether the company makes good profit or end up incurring a substantial loss. By reengineering the export order process, the company was able to achieve a higher hit rate i.e. the ratio of number of inquiries to order increased by 400% in the span of nine months.

Though Business Process Reengineering has been used by American Companies to bring about radical changes in their organisations in various processes, the cases dealt with by the authors relate to only one process change being achieved by Indian Organisations. Reengineering exercise can transform the nature of the work and bring down traditional inter functional and intra-departmental barriers. For successfully bringing about radical changes, Information Technology plays an important role in empowering people,"Moment of Trust".

The authors have dealt at length on the relationship of TQM, ISO-9000, Business Process Reengineering and Information Technology Strategies and also attempted successfully to address the frequent problems confronted by the Indian managements, when so many techniques are being talked about. The authors have applied self-restraint in specifying the names of Indian Companies which have adopted this technique with success. This information would have been of interest to management consultants and researchers. This is not a limiting factor as far as the quality of literature the authors have produced.

The book under review is a well timed contribution to management process in Information Technology area and can provide a take off point for various management

professionals and chief executives of private/public sector undertakings to bring about a their agenda for management of change. The book is recomended for those interested in management thought process and their application to Indian situations.

The book is moderately priced and affordable. It is interesting reading for chief executives, executives, management practioners and researchers.

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Labour Law, Work and Development **by Debi S. Saini, Westvill Publication House, 47, B-5, Paschim Vihar, New Delhi, 1994, 221p, Rs. 294.**

The present edited volume contains ten essays contributed by eminent scholars in honour of late Professor P.G. Krishnan, an outstanding teacher and scholar in labour jurisprudence. It provides valuable insights into contemporary labour law and labour adjudication issues. The volume is particularly significant in the wake of the current debate on the impact of globalisation and market economy on the capital labour relationship in India.

The book is divided into four parts. The first part dealing with labour law and labour power opens with a brilliant contribution by Upendra Baxi who very systematically unfolds the disempowerment process of 'unorganised' labour not only in the domain of private capital but also in the arena of states productive activities. Politics of production accentuates primitive accumulation through agrestic serfdom, carceral exploitation of workers, deployment of force and fraud at every conceivable level in dealing with the slightest form of assertion of collective rights. Baxi wants codification of laws to protect the interests of unorganised labour and calls upon legal activists to use democratic rights as a resource for the struggle against capitalist domination and exploitation.

Debi Saini's essay is a comprehensive study of the working of compulsory adjudication system in India. The essence of his essay is that the concept of collective bargaining recognised under the Industrial Disputes Act in the form of compulsory adjudication of labour disputes operates merely as an aspect of State regulation of capitalism and as a 'Source of power' because the device of adjudication is normally used as a "coercive instrument for containing the shop floor and for bringing about the consequent peace at the work place". Legal regulation of workers is excessively legalized and juridicialized resulting in the weakening of labour power and strengthening employer's dominance. Like Baxi, he wants the working class to develop counterveiling power through organisation and struggle.

Contributions by Arjun Patel and Kiran Desai, Vidyut Joshi and Suresh Srivastava (comprising part two of the book) focus on the existent conditions of migrant, bonded and agricultural labour. Patel and Desai's analysis based upon a study of migrant labour in rural Gujarat shows that the law has remained largely ineffective in ameliorating the conditions of these labourers who still continue to work for longer hours and are denied even basic amenities like medical care, accommodation potable water and electricity. Female workers are frequently subjected to sexual exploitation and wage discrimination. According to the, "the dominance of vested interest is so strong that laws become toothless" Joshi's paper tells the same story about the conditions of various types of unfree labourers, especially the bonded labourers in Gujarat. Srivastava examines the adequacy of social security schemes for agricultural labour and suggests the extension of benefits like workmen's compensation, provident fund, ESI Scheme, gratuity, pension and Unemployment insurance to agricultural labourers.

Issues of globalisation, privatization, industrial relation law and industrial restructuring have been handled by Venkat Ratnam, Mamkoottam, and Manik Kher in section three of the volume. Ratnam examines the implications of privatization on social and labour matters. Citing experiences of other countries, he suggests changes in the existing labour laws in view of liberalisation. Mankoottam evaluates the efficacy of the Indian industrial relations laws in meeting emerging techno-economic realities as a result of privatization of economy. He gives a very interesting account of the new economic policy of the Indian government including the exit policy and National Renewal Fund and assesses the compatibility of these policies with the existing industrial laws. In his opinion privatization would inevitably lead to the "deteriorating terms of employment and reduction of union density followed by loss of union power".

Kher's essay examines the contemporary work ethics and work culture. Citing some judicial decisions she argues that the courts have generally adopted a very technical and judicial approach to discipline questions and, have to some extent contributed to the rowing indiscipline in industrial activities. She believes that the realisation of basic values including human dignity, living wage and minimum standards of employment is contingent upon the basic postulation of work ethics and work culture. She

hopes that the courts will "demonstrate appreciation of Industrial relations realities in selecting alternatives in their decision-making process" (p 173).

The concluding section of the volume focusses on issues of labour justice. Mehta argues that worker's participation in industrial management can never be achieved in a capitalist regime. He proposes an alternative in the form of a decentralized economy with a plan of labour participation in the ownership. Such a decentralized economy can be established by evolving the economic base on the co-operative principle of development. Mehta, however, concedes that in the present context of domination of foreign capital, the proposed model of development would seem to be a far cry. Rani Advani and Debi Saini's essay emphasises the need of social empowerment of the unorganised labour through the device of public interest litigation and social action by committed voluntary organisations and legal aid clinics.

Debi Saini deserves mention for bringing out such a volume in honour of an illustrious scholar of labour laws. The book is a welcome addition to the growing literature on industrial and labour relations and will be of immense use for students of law and society and sociology of labour law.

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Worker and Automation The Impact of New Technology in the News Paper Industry **by Ranabir Samaddar. Sage Publications, New Delhi, 1994, 266p, Rs. 285**

The book is a well researched volume containing wealth of information regarding the process of automation in newspaper industry.

The book has seven chapters and begins with the birth and growth of the All India News Paper Employees Federation (AINEF). The process of automation in all the facets of the newspaper industry is elaborated with an account of various technologies such as Word Processing, Modular System, Wire Services, Colour Scanner, Electronic Page Maker, Facsimile Transmission System to the Composite Set-up etc. The book goes on to analyse the political and economic reasons for technology entering newspaper industries. The social fabric is undergoing a sea change and the role of news paper has become important as an opinion former with a boom in television and magazine competition the newspaper industry is poised for a multi-fold growth and hence the recent spurt in technology; states the author.

The book reviews various wage settlements between the union and the management of different news papers and identifies the limitations of the leadership of unions in the process of wage determination and related issues. The author aptly identifies how new technology has brought in new issues and how inadequately prepared are the union leaders for addressing these issues on behalf of labour. The author has clearly brought out how the working life of the labourer is affected by the induction of new technology.

The book concludes that union structure has been outmoded in the wake of the introduction of new technology. The present study is no doubt well researched and enlightening. However its utility would have enhanced further if it had covered the implications of automation on the managerial class of workers in the newspaper industry.

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Agricultural Productivity in Asia **by D.S. Sidhu and R.S. Sidhu. Oxford & IBH Publishing, New Delhi, 1994, 124p. Rs. 240**

The subject matter of the; book deals with , Agriculture and Industry in Asia, with emphasis on Trends in Agricultural Productivity. The book provides more material and insights particularly in respect of India than what a common reader would expect from the title of the book.

The book begins with a brief account of the different concepts used in the main text, the main features being: the difference between total factor productivity index and partial productivity; the inability of measuring total factor productivity and the constituents of Integrated Approach to Quality Management.

The productivity trends in Bangladesh, India, Indonesia, Japan, Rep. of Korea, Malaysia, Pakistan, Philippines, Republic of Singapore, Sri Lanka, Thailand and Taiwan are described in reference to the process of transformation which took place during the last four decades in these countries. The authors argue that because of the process of transformation, agriculture is not the mainstay of the people in Japan, Korea and Taiwan and as such the present economic situation in these

countries can be compared with the Western industrialised nations. On the other hand, Thailand and the Philippines have experienced expansion in cultivated land in relation to number of agricultural workers thereby land-labour-ratio has increased in these countries. In most of the other Asian countries including Indonesia, India and Pakistan, there has been limited expansion of cultivated lands where as the number of agricultural workers has increased continuously. As a result, these countries are in the category of labour surplus and land-scarce countries. Variation in land labour ratio has influenced the use of modern inputs and mechanisation. The cumulative effect of all these factors on land and labour productivity has been shown.

The book presents the comparison of productivity trends in agriculture and productivity in respect of different countries. On the basis of the analysis of the data, the authors conclude that the growth rates of labour productivity of the agricultural and industrial sectors during 1960-80 of relatively less developed countries such as Bangladesh, India, Indonesia, Pakistan, Sri Lanka, and Thailand were lower than rates in relatively advanced countries such as Japan, Taiwan, Korea and Singapore.

The analysis of data presented in the fourth chapter highlights the trends in land, labour and capital productivity in different states of India and also the trends affecting agricultural production and productivity. Since Punjab has witnessed a marked transformation in agricultural productivity and is a dominant partner in the green revolution a separate chapter dealing with costs and returns for wheat crop in the state has been included in the book. Trends in input use and wheat yields; input and output prices; cost structure; cost prices and margins alongwith partial and total factor productivity have been given.

Impact of cooperation and cooperative efforts in terms of agricultural credit, marketing, processing, storage, farming on agricultural productivity in India has been highlighted. The book also gives a brief idea about the factors affecting cooperative development in India. At the end some suggestions for improvement in the cooperative movement have also been made. The book also suggests steps to increase productivity in agriculture and prospects for agricultural development in Asia.

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Globalization: Challenges to Implementation

Changes which run with the mores are easily brought about, but . . . changes which are opposed to the mores require long and patient effort, if they are possible at all.

W. GRAHAM SUMNER