



Manufacturing Excellence and Global Competitiveness Challenges and Opportunities for Indian Industries

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The macro-economic policy reforms are opening the floodgates of global competitive forces for the Indian economy. A strategy merely based on exports to combat the might of multinationals can prove to be dangerous, causing erosion in the strength of Indian companies in the home market. Thus, a qualitative nurturing of home market by the Indian companies prior to them being flooded with assorted consumer items by foreign companies is essential.

This study analyses the manufacturing capabilities of Indian industries to face the competitive challenges and presents the new manufacturing paradigms and the distinctive competence needed to successfully compete with the foreign giants.

I Introduction

A major impact of the recent macro-economic policy reforms in India is on her industrial policy. The market-oriented growth model, that is pursued now, is changing the economic environment under which the Indian industries operated earlier. In contrast to the planned growth regime of the past, the new economic policies rely more on market forces and aim to integrate the Indian economy with the international markets. The timing of economic reforms and efforts to integrate the Indian economy with the global market coincides with a deep and sustained recession in the industrialised nations. Access to international markets will be slow in coming. On the contrary, Indian industries will, initially, have to prepare to face greater competition in the domestic market.

Historically, Indian industries developed management practices, which suited the restrictive industrial policies. Clever accounting practices were seen as the main source of generating profits. Until the early 80s, the domestic demand for most manufactured commodities and even the machine tools was exceeding the supply [Dua 1992]. Indian manufacturers preferred to exploit the limited and yet adequate home market. The restrictive policy regime suited and reinforced their inward orientation. In turn, the industrial management practices did not emphasise consumer orientation nor the manufacturing excellence needed in a competitive environment. The reluctance of Indian manufacturers to compete in the international market is evident from India's poor export performance. Since the past two decades, India's exports have stagnated around half a percent of the world trade [CMIE 1992, Table 8.9].

In the 80s, savings from the upper middle class created favourable conditions for industrial investments on the one hand and for a consumerist boom for domestic industrial products on the other. Under the pressure of a consumer demand, new industrial entrants and the changing global trade regime, a gradual liberalization of the industrial policy was undertaken in the mid-80s. Industries manufacturing consumer durables rapidly increased their capacities. Many new products were introduced in the market. Even the old firms, which did not introduce superior products for decades, marketed improved products. For the first time, Indian consumers were offered competitive product choices. But, since the early 90s the domestic consumer boom has stagnated due to the inability of the low-income groups to enter the consumer goods market. The supply capacity of industries is now exceeding the domestic demand. This is evident from the decline in the sales volume of established firms such as those, for example, in the automobile industry. Only a decade ago, consumers waited for over five years to get products from these firms, which are now facing recession.

Internationally, markets in the last decade have witnessed fierce competition led by Japan and the newly industrialised countries. New management paradigms, emerging mainly from the industrial management practices of Japanese firms, have changed the manufacturing perspective, technologies and the practices of the past. Besides, due to sustained recession in the developed nations, the multinational companies (MNCs) are increasingly seeking export of manufactured goods and capital in new markets. In order to compete against world class manufacturing, cheap labour is seldom a major competitive advantage. Experience,



market share and technology innovations are greater determinants of cost leadership than the cheap labour. Superior product quality, design innovations, robust delivery performance, customization, and excellent after-sales service are the distinctive manufacturing characteristics needed to gain competitive advantage. The ability to deliver these capabilities rests on the management's perspective on competition and the manufacturing practices at the firm level. Macro-policy reforms encourage competition, but the ability to compete depends on the dynamism of industrial firms to develop competitive management practices. Besides, the competitive ability of national industries also depend on the endowed factors like infrastructure, human resources, and scientific and technological research all development, and the existence of related industries, especially the capital goods industries [Porter 1990 and Unger 1988]. These factors are also, traditionally, inadequate in all developing nations, including India. The economic policies of the past have failed to strengthen these factors, which are essential to enhance the competitiveness of national industries.

The opening up of the Indian economy to global competitive forces is posing new challenges and opportunities to Indian manufacturers. Industries are seeking export markets, which has become attractive following the decline in the value of Indian rupee. But an industry's competitive advantage cannot be built nor sustained solely by the export market orientation. Development of home market is a vital determinant of the competitive advantage of an industry. The size, consumer sophistication and the growth of home demand shape the characteristics of an industry's products, which are essential to the competitive success in foreign markets. India has a large market, which can provide national industries the scale economy that is essential for cost leadership. But the quality of home demand rather than its quantity is more important in shaping the competitive advantage of national industries [Porter 1990]. Quality of home demand has never been nurtured by Indian manufacturers. To successfully compete with world class manufacturers in domestic as well as the world market, Indian firm will have to begin by offering high quality product choices to national consumers in order to create a sustainable base for national manufacturing excellence. At the time when macro-economic policy reforms are changing the competitive environment and perspective of Indian industries, the relevant questions are: how competent are the Indian firms to compete against world class manufacturers; what new challenges and opportunities have arisen as a result of economic policy changes and what shall be the responses that can enhance competitive abilities of Indian industries. This paper analyses the manufacturing capabilities of Indian industries to face the emerging competitive challenges. The new manufacturing paradigms and the distinctive manufacturing competence needed to successfully compete internationally are presented. The importance of developing manufacturing excellence and balanced industrial development in order to gain national competitiveness is argued. A strategic framework to link the macro-economic policies with the needs and management practices at the firm level is proposed.

II Manufacturing Competitiveness

An analysis of the manufacturing competence of Indian firms is discussed in this section. Manufacturing abilities of Indian firms are analyzed from the past performance of the Indian economy and also in comparison with manufacturing management practices of firms from some selected countries, namely, Brazil, Thailand, South Korea, Canada, the US, Japan, Germany, France and the Netherlands. These nations are chosen for the comparative analysis on the basis of their representative character in terms of competitive abilities and presence in the world market. Table I presents the different productive sectors as a percent of total GDP of a nation. Whereas the share of the industrial sector in India's GDP has grown from 22 to 29 per cent in 25 years (1965-90), the competitive ability of the industrial sector when measured against other nations has remained poor. This is evident from Tables 2 to 6. Table 2 shows the stagnation in the export of capital goods, which is the most crucial sector for a nation's manufacturing competence. Under the sheltered market environment since independence, Indian manufacturing industries have decidedly lagged either by design or circumstances, in developing a robust philosophy, which could have allowed it to compete globally. This inability can be attributed to several macro-economic factors but more importantly to ineffective and outdated management practices. This is evident from a series of indicators that reflect managerial initiative (tables 3, 4, 5 and 6). Managerial effectiveness is judged on several dimensions: labour management, customer orientation, technology innovation and adoption, human resource development (HRD) practices, plant level efficiency and R and D focus; The discussion below



first analyses the competitiveness of Indian industries on the above factors *vis-a-vis* the selected nations and then explores the reasons for the status.

Manufacturing productivity is measured by the extent of value added, both by the process and the workers. Comparative performance of Indian firms for manufacturing value added per worker is lowest (Table 3). This correlates with the highest level of labour absenteeism and the lowest emphasis on plant and equipment maintenance, relatively for India, which contributes to low process utilisation. In terms of the use of information technology for streamlining product and information flows in manufacturing as well as service sectors, India compares poorly with other nations. This is a disadvantage especially for those industries where the role of labour productivity on industrial performance is critical. The remedy lies not in replacing labour with information technology but in equipping the labour with information technology. This relates to the value addition process via job and process enhancement. These issues will be discussed further in this section.

Table 4 shows the customer orientation of the Indian productive sector. Product quality reflects the ability of firms to incorporate quality while designing the product, robustness and replaceability of the product quality of conformance in the manufacturing process, etc. These are linked to the capabilities of the manufacturing process as well as the state of implementation of various quality enhancement programmes, e.g., Total Quality Management (TQM). The attribute product design includes the extent of manufacturability considerations during design as well as the consideration of the customers' choice in product design. On-time delivery is not only a measure of lead-time but also an indicator of service quality. After-sales service reflects the confidence that the manufacturer has in its products and processes and shows the long-term commitment of the manufacturer to its products. Managing channels of distribution effectively is a definite competitive advantage since it allows better co-ordination of the supply chain thereby reducing leadtime and operational costs. All these aspects of customer orientation have direct relationship to manufacturing excellence and consequently competitiveness. It is improbable that firms with high customer orientation and poor manufacturing capabilities can sustain profitability and competitive edge for any pro- longed duration. However, it is possible for firms to lose market share with poor customer orientation despite excellence in manufacturing. Need less to mention, inadequate infrastructural services contribute to poor customer service. As is apparent from Table 4, Indian industries have a long way to go before they can achieve world class excellence in manufacturing in general and a competitive edge over other leading exporting nations in particular.

India has often been cited as a nation with a large concentration of technical manpower. Table 5 reflects that viewpoint. What is more important is to look at the quality of the workforce and the dominant HRD practices in order to estimate the impact of the above observation in making India a world class competitor. Minimal emphasis on relevant vocational programmes is a stumbling block in developing a highly competitive workforce that is skilled in the state of the art technology and practices (e.g., computers, process control, computer aided design, computer integrated manufacturing, etc). The practice of workforce exclusion from corporate decision-making, priority setting, and sharing of benefits can be seen from the relative position of India in Table 5.

TABLE 1: STRUCTURE OF PRODUCTION

Sector as a Per Cent of GDP						
	Agriculture		Industry		Service	
	1965	1990	1965	1990	1965	1990
India	44	31	22	29	34	40
China	38	27	35	42	27	31
Brazil	19	10	33	39	48	51
Thailand	32	12	23	39	45	48
South Korea	38	9	25	45	37	46
Canada	6	4	40	40	54	56
USA	3	2	38	33	59	65
Japan	10	3	44	42	46	56
Germany	4	2	53	39	43	59
France	8	4	38	29	54	67
Netherlands	7	4	35	31	58	65



Source: Derived from Table 3, *World Development Report /1992*, The World Bank.

TABLE 2: CAPITAL GOODS AS A PER CENT OF MERCHANDISE IMPORT/EXPORT

	Imports		Exports	
	1965	90	1965	90
India	37	18	1	7
China	39	41	9	17
Brazil	22	27	2	18
Thailand	31	41	0	20
South Korea	13	34	3	37
Canada	40	50	15	37
USA	14	40	37	47
Japan	9	16	31	66
Germany	13	32	46	49
France	20	34	26	37
Netherlands	25	30	21	22

Source: Derived from Tables 15 and 16, *World Development Report 1992*,The World Bank

This has often resulted in restrained initiative and poor innovation by individual employees as the decision-making space is quite limited. One should also underline here the critical role of equitable labour reforms that are essential for developing a highly qualified, motivated, and flexible workforce. More importantly, it is on the issue of implementation' where the government, management, and the unions have all knowingly defaulted. A detailed study of their impact on manufacturing productivity is needed. However, it is not the focus of this effort. In summary, the workforce is capable but is not provided with modern tools and the management practices are not conducive to individual initiative as compared to other nations.

Another aspect of international competitiveness is the generation of knowledge and its conversion into commercially viable activity. As we can see from Table 6, India's investment in R and D, receipt of patents, and the efficiency with which firms procure, adopt, and leapfrog technology is relatively low as compared to the other eight countries. These attributes are vital for a nation to become a world leader in the generation of knowledge that could be utilized in providing an edge to the industrial sector. Paradoxically, the private sector in India has contributed insignificantly in this regard. The record of the Indian private sector firms in the introduction of new products and processes, that have come out of indigenous research, is extremely poor. Despite the existence of scientific and technological talent and competence in the nation, their utilisation record is dismal. This is one of the factors contributing to excessive brain drain and an increased outflow of capital for technological and scientific services.

As is evident from the above discussion, India lags far behind major competitor nations in terms of the firm level indicators of management performance and measures of manufacturing excellence. The comparative analysis of the performance of the Indian productive sector reveals various sources of operational inefficiency and helps identify areas that require strategic change. This is useful in developing a paradigm for effective manufacturing management in Indian firms.

Industrialization in countries could be categorized, as follows, on the basis of their export of agriculture and raw materials (Level I); handicraft and semifinished products, e.g. gems which are labour-intensive, have low value realization, and are marketed in ornamental consumer segment than in sophisticated industrial segment such as high precision diamond cutting (Level II); manufacturing machinery acquired (produced) through technology transfer (collaboration) (level III); indigenous development of manufacturing processes and sophisticated product and process innovation (level IV); and basic R and D for development in the future (level V).

Tables 7 and 8 show the extent and mix of exports and imports of India. Of the total exports revenue in 1991-92, 39 percent came from the export of manufactured products, 20 percent from agriculture products



and major raw materials such as iron ore and petroleum over 15 per cent was contributed by gems and jewellery while rest of the export revenues (26 per cent) came from all other products, mainly textile and related products, leather and related products, other ores, spices, and tea. It is evident that the exports are mainly resource and labour intensive and correspond to levels I and II in the above classification.

Export performance of Indian manufacturing industries reveals their competitive weaknesses. For example, export performance of the Indian leather industry is the most cited success story in terms of its rapid growth. However, the image of the Indian leather industry in the international market is "a manufacturer of cheap products"-an image which is reinforced by poor average product quality" [Sinha and Sinha 1992].

Basic leather manufacturing is dominated by numerous small-scale manufactures. For example, in the leather and leather products industry in 1972, there were 5,040 small- scale units with an average employment of six [Sandesara 1993]. In 1988 there were 24,028 units with an average employment of three [ibid]. Low investment, low risk and short -term orientation has characterized the operations of these firms, some of whom work as jobbers for foreign buyers who provide designs and even supervise manufacturing [Sinha and Sinha 1992]. In the export trade, these manufacturers collect raw hides and organize the processing of hides to the finished leather stage through a process that is discontinued in the industrialized nations due to its high social cost of environmental pollution.

It is worth highlighting that it is chiefly products with low value addition where India has relatively higher market share in the world (Table 9). Similarly, the extent of value addition by the manufacturing sector as a percent of the output averages around 22.2, which is not very encouraging [CMIE 1992, Table 6.9]. Value addition of leather and fur products as a percentage of total, output has stagnated at 15percent during the last decade [ibid]. Only a few leather manufacturers have focused on value addition and product quality improvement. Except for footwear .the home market for other leather products is not developed. Besides, inadequate development of supplier services and related industries curtail the competitive abilities of Indian manufacturer while competing against the world-class manufacturers. For example the Italian leather manufacturers benefit considerably from the existence of competitive design services and the manufacture of leather working machinery and other specialised machineries within Italy.This has two major implications: first, producing and exporting low value added goods realises low returns in the market and renders import of value added products prohibitively expensive; and second. Absence of value adding industries sends precious jobs offshore and restricts the development of a strong and diverse industrial base within the country thereby denying a larger population an opportunity to fulfilling employment and a increasing standard of living.

Another industry with a high export performance is the precious and semi-precious stone industry .In 1991-92, export of gems and jewellery was nearly a sixth of the total Indian export and 10 percent of world trade in that sector [CMIE 1992, Table 8.4-2]. Despite these impressive export figures value addition has remained low. Around 20 per cent of the total output value [CMIE 1992. Table6.10-2). Equipment used in this sector are traditional and manufacturing is organized on household industry pattern. Product development and value realization is poor since the industry is not competing in the high value market segments such as international luxury market which require product innovations or the industrial segment which requires continuous research and development for improving material properties such as for high precision machine tools. The extend and the excellence of capital goods industry is crucial for a

TABLE 3: INTERNATIONAL COMPARISON OF LABOUR AND EQUIPMENT EFFICIENCY

	Labour productivity	Labour Absentism	Information Technology	Plant Maintenance
India	6177	36.76	44.86	44.32
Brazil	7724	60.29	50.99	51.55
Thailand	9336	72.00	67.00	60.50
South Korea	9291	42.14	63.57	58.57
Canada	30034	49.69	66.25	63.13
USA	44070	55.00	74.75	56.67
Japan	46667	81.95	73.13	81.50
Germany	38207	60.00	68.69	86.94
France	35287	48.12	77.68	62.32



Notes: (1) Manufacturing value added per manufacturing worker. in US \$.1986.
 (2) Extent to which absenteeism adversely affects enterprises. O=high to 100= low.
 (3) Extent to which computer-based information technology is effectively used: O=insufficiently.to 100=utilised.
 (4) Extent to which industry maintains plant and equipment: O=high.to 100=low
Source: Derived from tables in factor 11. The *World Competiveness Report 1990*, IMD and World Economic Forum.

technological leadership and competitive advantage [Unger 1988]. India's export share in world capital goods market has remained marginal at around one-tenth of a percent [CMIE 1992, Table 8.9]. Table 8 shows a relatively high level of capital goods import, which rejects the low level of Level IV industrialization. Interestingly enough, most high-wage service sector activities (e.g., cutting edge plant and systems design, process control software, advanced industrial training, etc) are associated with industrializations of Levels III, IV and V. In fact, most of our export revenues come from sectors that exhibit industrialization of Levels I and II and a small per cent from Level III sector. As a result, the minimal industrialization at these levels is one of the reasons for the near absence of the high-wage service sector. One must point out that it adds to the cash outflows in the event of a technology transfer. Often the strength of an individual industry can be gauged by the market in which it competes, i.e., the extent of competition and the quality of the competitor. As Table 10 reveals, Indian exports of engineering goods to west Europe and North America form a very small percent of the total export revenue. The marginal export of machine tools is also to non-competitive markets, mainly the former soviet block countries. From 1980 to 1985, the machine tool export to advanced market countries declined from over 50 per cent to 14 per cent [Dua 1992, Table 2]. Barring unfavorable trade regimes, one can attribute this to less than world class manufacturing processes, the inability to introduce innovative products, and inefficient channels of distribution.

The present level of manufacturing competence of Indian firms is the historical product of the past economic policies and is suited to serve only a protected domestic market. These firms now face competition from multinational corporations (MNCs) which have demonstrated much superior performance in the world market. Economic liberalisation has opened the world market for the Indian firms, but at the same time it has opened the domestic market to MNCs. At present there are high expectations that macro-economic policy changes will elevate Indian industries into the major players in the world market. Unless a world class manufacturing excellence is developed by the Indian industries, it will be difficult to overcome inefficiencies in manufacturing industries, a detailed analysis at the product level of export markets and their manufacturing requirements. Then, one must design effective operations practices at the firm level that can deliver the desired competitive edge. These firm level considerations must be consistently linked with the macro-economic policy reforms through appropriate industrial policy measures.

As Dertouzos et al (1989) point out, world class manufacturing is a prerequisite for achieving a post-industrial economy. The specific needs of the manufacturing sector in order to overcome these hurdles and to become competitive are world class manufacturing processes, innovative products and reliable services (die-hard customer orientation), and reactive channels of distribution. The prerequisite, however, is the will to excel, strong development of human resource and the necessary national infrastructure to support the above. Having argued for a need for manufacturing excellence in developing global competitiveness, we discuss in the next section some paradigms in manufacturing management that will be necessary to develop manufacturing excellence.

III Manufacturing Management

New manufacturing practices have become the frontier of management of technology as they allow a firm to successfully adopt technology. While discussions on national infrastructure and macro-economic policies have dominated the national media and the academic community, very little attention has been paid in designing policies that map managerial practices to manufacturing excellence. While macro-economic factors affect the investment climate and the extend of the resource available to enhance productivity



TABLE 4: INTERNATIONAL COMPARISON OF CUSTOMER ORIENTATION

	Product Quality	Product Design	On-Time Delivery	After-Sales Services	Managing Distribution
India	41.08	34.05	30.27	41.08	52.43
Brazil	52.39	56.62	36.34	39.15	51.83
Thailand	63.00	58.50	57.00	54.00	66.50
South Korea	60.07	48.57	59.29	47.17	57.14
Canada	68.13	58.06	62.19	62.50	66.45
USA	59.67	69.84	62.62	57.70	74.43
Japan	92.68	81.46	93.17	89.76	72.20
Germany	92.50	71.39	88.06	78.61	75.83
France	55.94	66.96	44.64	45.56	66.09
Netherlands	72.89	63.11	69.78	68.44	74.76

- Notes:(1) Companies are rated 0=poor, to 100=excellence.
 (2) Includes styling and packaging. Companies are rated 0=poor, to 100=excellence
 (3) Companies are rated 0=poor, to 100=excellence
 (4) Companies are rated 0=poor, to 100=excellence
 (5) Managing channels and distribution. Companies are rated 0=poor, to 100=excellence

Source: Derived from table in factor III. The World Competitiveness Report 1990, IMD and World Economic Forum, Lausanne, Switzerland

TABLE 5:International Comparison of Human Resource Developments

	Vocational Training	Skilled Labour	Worker Motivation	Labour Flexibility	Maneagerial Initiative	Managem -ent Education
India	35.68	64.86	42.16	24.86	60.54	66.49
Brazil	36.62	43.43	53.52	54.65	60.56	49.30
Thailand	45.00	47.00	70.00	63.50	70.00	58.50
South Korea	47.14	59.29	57.86	49.63	67.86	47.14
Canada	39.68	49.06	53.75	47.19	61.56	63.75
USA	48.20	53.44	56.39	64.26	73.67	68.85
Japan	78.50	61.94	84.39	67.80	72.20	59.51
Germany	68.89	50.00	68.06	39.72	72.78	56.94
France	51.18	42.90	51.01	28.99	64.64	59.71
Netherlands	53.33	52.44	64.00	36.44	67.11	53.78

- Notes:(1)Extent to which ongoing job training meets the requirements of a competitive economy: 0=inadequate, to 100=adequate
 (2) Ready availability of quality skilled labour:0=not at all,to 100=a great extend
 (3) Willingness to identify with corporate objectives and priorities:0=low, to 100=high
 (4) Willingness of labour force to re-locate, retain and/or assume new work functions:0=not willing, to 100=willing
 (5)Managers sense of Drive, responsibility and entrepreneurship: 0=low to 100=high
 (6)Extend to which institutes adequately prepare executives for needs of business:0=not adequately, to 100=adequately

Source: Derived from tables in factor V, The World Competitiveness Report 1990,IMD and World Economic Forum, Lusanne, Switzerland.

it fails to define and control the parameters of competition namely,cost,quality,deliveryand flexibility. Dertozous et al (1989) point out that, “to understand how a firm interacts with customers and suppliers, detects shift in demand, and uncovers new opportunities,we need to know more than the prices the firm pay for its inputs and charges for its products.” Indeed, the Japanese manufacturing experience has been to bring the firm and its operational excellence in defining national I capabilities. In this respect, the economic



reforms in India are opening 'up new challenges and opportunities before the Indian industries. Whether the Indian firms will be able to convert these opportunities and elevate themselves as viable global competitors shall depend primarily upon the dynamism and abilities of Indian firms to develop world class manufacturing. In this section, we advance this view and focus on manufacturing capabilities and discuss paradigms in manufacturing management that will be necessary to develop an industrial climate of excellence at the firm level.

Taking into consideration the performance of Indian manufacturing as discussed in the last section, we propose the following paradigms as emerging ideas that will be necessary to compete globally dynamic performance measures and reactive control procedures process and product innovation; and supply chain management. It ties excellence in manufacturing with a growth in the high- wage service activities.

Dynamic Performance Measures And Reactive Control Procedures

The engine of manufacturing growth is its resources, i.e the knowledge workers, the technology, and competitive manufacturing and labour practices. However the choice of performance measures drives practices and regulates the decision that managers make, it is imperative that firm selects the measure that assists them in becoming lean producers and consequently competitive globally. These should also be dynamic so as to allow firms to rapidly adapt to changing environments and evaluate the rate of change. In today's manufacturing environment firms have to compete on a portfolio of performance measures. Cost, quality, flexibility and delivery have become the parameters of global competition and manufacturing actions are directly reflected in their levels. In the competition of the 90s, the first three are "order qualifiers" while the last is an "order winner" Manufacturing management practices provide a mapping of operational decisions to the parameters of competition.

Performance measures in manufacturing should be chosen such that the implications is understood by the people on shop floors, they reflect the impact of decisions taken in manufacturing, they should be available in a timely fashion so as to identify decisions taken in manufacturing, they should be available in a timely fashion so as to identify decisions that lead to certain outcomes, and they should be based on operational factors and information. The above-mentioned measures reflect these virtues are robust. Moreover, they capture well the attributes related to lean production Table 11 outlines the relationship between manufacturing management parameters and the dynamic performance measures. This list is not meant to be exhaustive but rather exemplification of how these measures directly incorporate different manufacturing decisions. As a corollary, by measuring, controlling and improving some of these individual manufacturing parameters (eg. queuing on the shop floor) we improve the dynamic measures (which may be easily understood by the non-manufacturing community) and consequently the firm's competitiveness. For example, a reduction in work-in-progress (WIP) inventory results in less money being tied up in non-cash flow generating assets and thereby lowering the cost of operations. Needless to mention, this makes products more competitive. Similarly, by improving the planning process or the reliability of the delivery system, less expediting is required on the shop floor which reduces the cost of the operation since expediting is required on the shop floor which reduces the cost of operation since expediting leads to scheduling delays and an increase in WIP. It is well established now in the manufacturing management literature that a reduction in the batch sizes allows a faster detection of process defects thereby reducing WIP and enhancing the quality of the product [McClain et al 1992]. Product diversity is one of the features that provide competitive strength to firms; e.g, the Honda-Yamaha motorcycle was won by Honda's ability to proliferate the market with twice as many as diverse products as Yamaha in the same period [Stalk 1988]. Diversity along with an ability to produce quickly and cheaply contributes to the inherent flexibility of the firm. Similarly efforts to reduce the lead times directly reduce the span of delivery cycle. This allows a producer to win an order provided cost; quality and flexibility levels are market driven. Hence the need to use a portfolio of performance measures instead of single productivity measure when evaluating manufacturing and related operations.

Another related issue is the use of accounting system for purposes of controlling manufacturing operations. Most cost accounting system (all of which are based on average cost computations) fail to highlight the impact of individual operational decisions on cost. As a result their effectiveness as a control mechanism is poor. For example, two different units of the same product type may have been produced in two different



batches, which may have resulted in different lead times. An average cost obtained from most of accounting systems will fail to flag this difference and help improve the managing productivity. Instead a system which determines individual costs of batches based on lead times would immediately highlight the problem leading to prompt action. The need of incorporating operational measures in designing accounting has never been felt more than now. ABC and transactional-based accounting are efforts in this direction. [Cooper and Kalpan 1986]. The traditional practice of cost plus accounting is a paradigm that results in poor control of operational parameters and weaken's the role of consumers price preference levels in product positioning. A better approach is to follow "market minus"

TABLE 6: INTERNATIONAL COMPARISON OF R & D FORCES

	Total expenditure on R & D as Per Cent of GDP(1988)	Business expenditure on R & D as percent of total R & D Expenditure (1988)	Public funding of Total R & D (1988)	Patents	Search for Technology
India	0.909	13.05	88.07	0.06	50.18
Brazil	0.381	19.80	66.87	0.32	45.43
Thailand	0.342	13.85	69.57	0.02	61.00
South Korea	1.631	29.61	19.00	1.12	53.57
Canada	1.316	55.74	43.00	4.98	51.15
USA	2.658	70.33	45.88	16.72	62.71
Japan	2.852	66.02	21.46	40.52	85.85
Germany	2.791	74.18	37.66	24.42	68.16
France	2.308	59.77	59.39	16.68	63.28
Netherlands	2.321	41.74	41.74	5.14	59.09

Notes:(1) Percent of total funding provided by state, 1988.
 (2) Average annual number of patents granted by residents per 1,00,000inhabitants
 (3) Efficiency of companies in seeking new technologies and commercially exploiting them:0=inefficient, to 100=efficient
 Sources : Derived from tables in factor IX, The world competitiveness report 1990, IMD and World Economic forum, Lausanne Switzerland

Table 7: Major Items of Export

	Agro and Marine Products	Iron Ore	Manufactured products	Gems and Jewellery	Petroleum and Products	Others
1950-1951	144	0	347	0	2	108
1960-1961	218	17	311	1	4	91
1970-1971	432	117	644	43	5	293
1980-1981	1,494	303	2,756	642	8	1,208
1991-1992	6,317	1,432	17,120	6,750	1,022	11,187

Source:Derived from Tables 8.4-2,Vol I CMIE, Bombay (1992)

accounting which first positions the product in the market on price and then works backward to determine the cost of sub-assemblies and processes(through value engineering).[Womack at al]. This type of target accounting forces manufacturing firms to constantly improve their processes in order to bring down the cost of operations to the said target level.



In summary, the choice of a portfolio of performance measures and reactive accounting practices are the first step in designing efficient operations that could compete globally. Basu and Chandra(1993) provide a sequence of manufacturing practices that are appropriate in achieving these objectives.

PROCESS AND PRODUCT INNOVATION

One of the traditional weakness of the Indian manufacturing sector has been its dependence on technology transfers and joint ventures for process enhancements. Several studies in the industrial organization literature have shown that one of the outcomes desired by a firm that is transferring or licensing technology is the discouragement or even abandonment of R and D related activities by the host firm/nation[Yoo 1992 and Lasserre 1988]. Pacey(1991) argues that such an activity reduces the host firm's role to being a "service partner" to the external supplier of process and hinders industrialization.As can be seen from Section II, a large number of Indian manufacturers have relegated themselves to this status. Profitability of individual firms is not an issue here because of the size of the market-which is at stake is the development of the nation's capabilities and the future ability to compete in the growing knowledge domain where India has inherent strengths.

Product and process innovation allows a manufacturer to transform itself from being a technology leader. It permits domestic partners and consequently the society at large to leapfrog several levels of industrial development. A recent survey of 58 firms in India (50 per of which were MNC subsidiaries and the remainder were domestic firms and joint ventures) found that only 9(15percent) had introduced new products that were based on distinct product or process innovation, e g. functional improvement in the product - [Basu 1993]. Most were simply introducing products that had been or were part of the firm's home nation product mix. Domestic firms and MNCs need to conduct commercial R and D in India as it is essential to develop that strength within the country. Wherever firms have innovated the outcome has been beneficial (e g, development of parallel computers like Param, Flosolver and Chipps 16, etc). What Indian manufacturers have to realize is that the future of manufacturing is in knowledge-based products. While traditional sectors will provide us with the much needed export revenue it is going to be increasingly difficult to measure up against the environmental related concerns of these processes and products (e g, chemical colour dyes in the textile sector). A strong research infrastructure and mandate will have to be developed soon in order to produce 'green' goods in the future even in these industries (e g. textiles, leather, etc). To compete globally in industries that are going to dominate international trade in the next decade (eg, semiconductors, biotechnology, light commercial transport, etc) firms or nations will have to draw upon much heavily on their knowledge base. Fortunately, availability of this level of expertise is India's inherent strength and needs to be developed further. However, the future of these firms will depend on how well they are able to utilise this manpower base to innovate both in the process and product domains and that too, very rapidly.

There are two major operational and organizational paradigms that can facilitate process and product innovation in a firm. These are: design for manufacturability and continuous improvement. Once a design is chosen 70 to 80 per cent of the product is already committed [Whitney 1988]. Hence, it is critical to impact the design process if costs are to be reduced. At the same time, the cost of design changes grows exponentially with the stage of the product development at which this change is brought about.

TABLE 8: MAJOR ITEMS OF IMPORT

	Agro produc -ts	Fertili zers	Crude oil and Product s	Coal iron and Steel	Other ores and Scrap	Cap ital Go ods	Professi onal Instru- ments	Plasti -c Mater ials	Drugs and phar mace utical s	Pearls and precio us stones	Othe rs
50-51	98	12	55	16	28	132	8	0	10	1	291
60-61	185	12	69	122	50	356	11	0	10	1	306
70-71	236	84	135	147	130	404	24	8	18	24	416
80-81	813	652	5,263	879	592	1,910	115	121	84	417	1,703



91-92	624	1,520	13,129	2,960	1,855	9,607	1,041	1,403	456	4,822	10,380
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Source :Derived from Tables 8.5-1 and 8.5-2, Vol 1, CMIE, Bombay(1992)

TABLE 9: INDIA'S SHARE IN THE WORLD EXPORTS OF PRINCIPAL COMMODITIES, 1989

Agro and Marine Products	Iron Ore and Concentrates	Other Ores and Mental Scrap	Chemicals and Pharmaceuticals	Leather and Products	Textiles and Products	Pearls and Precious stones	Iron and Steel	Engineering Goods	Capital Goods
0.84	7.79	2.21	0.26	6.02 11.96	4.66 0.39 5.46 1.64	9.64	0.25	0.10	0.12

Notes :

- a. Leather
- b. Manufactures of leather of composition leather
- c. Cotton fabrics woven
- d. Fabrics,woven of man-made fibres
- e. Textile fabrics woven other than cotton or man-made fibres
- f. Textile Yarn, fabrics, madeup articles n e c related products.
- g. Articles of apparel and clothing accessories.

Source : Derived from Table8.9, Vol 1, CMIE, Bombay(1992)

Design for manufacturability is the process of including the manufacturability related decisions while designing a product. It brings a shop-floor expertise into the design process and, leads to considerable reduction in the cost of development and the time to introduce a new product (traditionally, the high level of these two factors in developing countries has discouraged development activities). What links this process to superior performance levels is continuous improvement. Continuous improvement covers under its umbrella a wide variety of practices that have come to be termed as TQM, zero defects, new product development, Quality circles, Just in time, co-operative labour-management relations, etc [Imai 1986]. Such an effort is of particular utility to the developing nations as it builds on the momentum gained by the workforce (which is in large numbers in such countries) and is process-oriented, hence changes are made incrementally. An implication of the latter is that the need for resources is spread out.

For a country like India it is imperative to develop a strong nationwide programme which emphasizes the benefits of product and process innovations and provides to individual firms, training and consulting for implementation of these paradigms.

Supply Chain Management

What distinguishes North America production management practices from the Japanese is the focus of the latter on removing constraints as opposed to managing constraints in North America. The ability to manage the supply chain,i.e the link between the suppliers,manufacturers,,retailers and the customers, has acted as the most formidable constraint to the growth of the Indian manufacturing sector. The aspect of supply chain management which has received some attention, although inadequately, is the manufacture and the regularity part of transactions management,e.g duties, information filing, transportation network(to some extent)etc. It has created an environment where the firms feel they have to indulge in clever management of the constraints, which in India has often meant incurring an additional operational cost. This also reflects the adversarial interaction between the entities involved in including the Government. What we need is a new paradigm that aims at removing constraints and looks at co-operation within the framework of competition. The managerial co-ordination of the supply chain is the call of the day. Anything other than this will reflect a Henry Ford type domination of the suppliers and the customers-a practice, which has been



a failure.

In coordinating the supply chain, firms not only determine the weakest link in the value addition process but also transmit product and process innovation to the suppliers and the retailers. This mode of difficult innovation accelerates the industrial process. Womaketal(1990) attributes to this success of co-ordinating the supply chain to easy accessibility of information sharing,, sharing of innovation, developing long-term contracts based on continuous improvement of quality and delivery reliability, and the reduction of process and product costs. One of the inherent strengths of the Indian business fabric is customization. The network of layers of suppliers can be seen in several sectors, e g, in primary textiles. This network must be strengthened in terms of better technology adoption, better quality and delivery standards and most the importantly, an appreciation of managerial initiatives. The new paradigm also requires the synchronization of the product and component the manufacturer on how to improve the product delivery which will ensure that the decisions at different stages are coordinated thereby leading to reduced lead-time and consequently lower costs. An advantage of such system is the diversification and/or pooling of the business risk, which often prevents small and medium sized Indian manufacturers from investing in the technology and productivity enhancement programmes.

Finally the design-marketing-manufacturing interface ties the manufacturing and design operations with customer requirements both organizationally as well as operationally. How many marketing managers in India consistently visit their plants and provide a feed back on consumer response? Long years of heavy demand have resulted in an absence of service orientation in the manufacturing sector. This challenge before the domestic sector is most real now when it is going to face competition from the MNCs who have a better service philosophy. Service not only entails providing a product with short lead times, at low cost and high quality, and with excellence (in terms of quality and price) after sales record but also incorporating the needs of the customer in designing new products. Brand Loyalty will continue to fall unless channels of distribution develop a ‘lifetime” service approach where the interactions between the dealer/manufacture and the customer is not confined to epochs of sale. These interactions provide reactive feedback to the manufacturer on how to improve the product delivery system.

The success of the liberalization of the Indian economy should be measured by its ability to impact the operations of small- to medium-scale manufacturers. In 1988-89, the small-scale sector alone included over 1.7 million units [Nagabhushana 1992]. The igniting of the Indian economy will not be made possible until this sector is made efficient. As argued earlier, India has strength in decentralized customization. Mass customization appears to be the paradigm of the future. Hence, the Indian- manufacturers have to

TABLE 10:REGIONWISE EXPORTS OF ENGINEERING GOODS IN 1990-1991

Region	South-East Asia	West Asia	Total (Asia)	East Africa	North Africa	West and Central Africa	Total (Africa)		
-Amount	810	260	1,070	178	78	95	351		
Region	East Europe	West Europe	Total (Europe)	North America	Latin America	Total (America)	Australia/New Zealand	Total Exports (All)	
Amount	885	510	1,395	340	54	400	40	3,250	

Source : Derived from Table 8.8, Vol 1, CMIE, Bombay (1992)

TABLE 11: RELATIONSHIP BETWEEN PERFORMANCE MEASURES AND MANUFACTURING MANAGEMENT PARAMETERS

Cost	Quality	Delivery	Flexibility
-WIP	-Batch size	-Lead times	-Diversity
-Yield/scrap	-Setups	-Waiting	-Responsiveness
-Materials	-Technology	-Operation mode	-New technology
-Space	-Vendor role	-Reliability	-New products
-Delays	-People effort	-Due date setting	-Ease of production



- Reliability
 - Expediting
 - Control Systems
 - Indirect labour
 - Overheads
 - Materials
 - Material handling
 - Forecasts
- Controls
- Distribution efficiency
 - Capacity

Develop a relationship of dependence, which is based on the concepts of co-operation within competition. Prato's experience with almost 20,000 small textiles related units in Italy shows the robustness of this organizational structure.[Jaikumar and Menichetti 1986]. There is a need to provide an infrastructure that assists in continuous updating technology and practices(eg. Prato-type cooperative). As Nagabhushana (1992) argues, incorporation of managerial expertise in running small-scale operations will be necessary. Innovation in the operation and organization of this sector is key to the success of the economic reforms (eg. Establishing information and technical services using the expertise of highly qualified retired engineers with phone in consultation especially in the urban and semi-urban sectors). Indian industrialization will become impossible with the demise of this segment. In the next section we look at the role of different segments of Indian productive sector in contributing towards national competitiveness.

IV MANUFACTURING EXCELLENCE

Indian manufacturing has remained resource and labour intensive, which is typical of a developing nation. As discussed earlier, this type of manufacturing survives in a closed and underdeveloped market with cost-based competition. But it is unsustainable in competition against world class manufacturing in international markets. The new competitive environment that is being opened by the economic reforms calls for a complete reorientation of the manufacturing paradigm in Indian industries. One implication of liberalized economic policies is the greater inflow of investments and the access to foreign technology. This entails the danger on one hand of indiscriminate import of technology while on the other hand it provides the opportunity to leapfrog the technological gap with industrialized nations. But to sustain even the investment-driven development, industries have to cultivate an ability to not just apply but innovate over the imported technology. Operations of the world-class manufacturers, for example, the Japanese firms, are innovation driven. In competing against these firms, factor costs are rarely important since their competitive strategy emphasizes product differentiation. Their cost advantage is obtained not from cheap factors costs but high productivity. To be internationally competitive, firms will have to develop a consumer focus and

TABLE 12 : POLICY MATRIX FOR DEVELOPING INDUSTRIAL COMPETITIVENESS

Short Term	Medium Term Government	Long Term
<ul style="list-style-type: none"> ▪ Environment scanning: niche determination and technology monitoring ▪ Develop competitive incentives and instruments to guide small and medium scale industries into new product domains ▪ Co-ordinate activities of organizations that monitor international trade, technology and competitiveness 	<ul style="list-style-type: none"> ▪ Establish MITI type agency for promoting cooperation and competition in the domestic market ▪ Develop market-driven policy instruments rather than regulatory control to influence industry decision ▪ Update the status of Institutional environment: release bureaucratic control and facilitate/promote innovation 	<ul style="list-style-type: none"> ▪ Modernize national infrastructure for the next century ▪ Develop a national industrial focus ▪ Rethink strategies for the organisation of Labour in future



- | | | |
|---|--|---|
| <ul style="list-style-type: none"> ▪ Train bureaucrats in specialized field, eg manufacturing management
 ▪ Develop instruments to train labour in advanced technology using a fraction of corporate tax ▪ Set up professionally manned one-stop centres to provide consulting on markets, processes and practices to small and medium scale industries | <ul style="list-style-type: none"> ▪ Enforce quality standards (e.g. ISI 4000) for all domestic industrial transactions
 ▪ Develop social and environmental priorities based on domestic needs and concerns ▪ Promote infrastructural industries | <ul style="list-style-type: none"> ▪ Develop new mandate for scientific institutions: emphasis on commercial spinoffs and diffusion of innovation to other sectors (eg. Space, defence, etc) |
| <p>Trade Association</p> <ul style="list-style-type: none"> ▪ Assist small isolated manufacturers in updating capabilities: technology and practices
 ▪ Assist in diffusing innovation amongst constituents
 ▪ Assist in developing vocational training programmes in advanced technologies | <p>Institutions</p> <ul style="list-style-type: none"> ▪ Co-ordinate development of technology and practices across different industries, eg. machine tool and textiles ▪ Monitor trade practices within domestic producers
 ▪ Develop sectoral data banks on performance of industries | <ul style="list-style-type: none"> ▪ Develop new products and process to strengthen existing and related industries
 ▪ Play a proactive role in designing future of international trade and liaison with similar trade association in other countries ▪ Set up technology parks |
| <p>Academia</p> <ul style="list-style-type: none"> ▪ Update technology and management programmes by developing courses in emerging areas ▪ Develop co-operation between technology and management programmes ▪ Update skills of trainers
 ▪ Introduce extensive use of computers in curriculum | <ul style="list-style-type: none"> ▪ Develop sector-focused programmes
 ▪ Conduct joint research with industry and assist in technology transfer ▪ Set up pilot projects on technology innovation in conjunction with trade association ▪ Design consulting and training programmes for small and medium manufacturers ▪ Set up vehicles for dissemination of knowledge in manufacturing management, eg. research journals, industry workshops, etc. | <ul style="list-style-type: none"> ▪ Create focused research centres and develop horizontal linkage between such centres. ▪ Provide services to other developing nations.
 ▪ Adopt global standards in evaluating performance of teachers, students and administrators. |
| <ul style="list-style-type: none"> ▪ Adopt dynamic practices based on world | <p>Industry</p> <ul style="list-style-type: none"> ▪ Develop expertise in strategic management of | <ul style="list-style-type: none"> ▪ Adopt a strategy of continuous process |
-



class manufacturing paradigm

- Redesign organizational structures: integration of functions in the firm and emphasise inhouse innovation
- Become more responsive to domestic consumer's needs
- Increase R and D activity in India

manufacturing at firm level

- Invest in updating skills of workforce in technology and managerial effectiveness
- Invest in technology
- Develop linkage with educational and research institutions
- Participate in national infrastructure development
- Participate in the evolution of standards at ISI
- Set up focused commercial research centres
- Develop environmentally viable products
- Develop a strategy of joint development of technology

manufacturing practices will have to be upgraded significantly to support innovation.

A nation cannot become competitive in all industrial segments. In attempting a transition to a higher technological level, it may not be possible or even desirable to make technological advancement on all fronts. One task of national industrial policy is to identify the industries and technologies in which a nation can gain competitive advantage at the present time and to ensure that the foreign capital is coming into right sectors [Kurien 1993]. Often in periods of major technological transition, the advanced nations may find it more expensive to give up the old technologies and knowledge in which they have high investments. Nations also benefit to high degrees from natural resource endowments, which acquire different values with technological change. Such situation offers developing nations a "window of opportunity" through which they can gain competitive advantage and leap to catch upon even by pass the advanced nations [Perez and Soete]. But the catching up cannot be achieved just by acquiring technology but through generation and improvement of technologies as opposed to simple use of them"[ibid]

For the competitive success of the Indian firms both in the domestic as well as the international markets, a national competitive strategy should be evolved as a part of the new industrial policy which will help in translate and link the macro-policy reforms with the firm level management practices that are required for gaining competitive advantage. In terms of technology policy and manufacturing practices, the basic aim of a national competitive strategy should be to promote manufacturing excellence in Indian firms. It has to be co-ordinated effort involving the government, industry associations, firms and the academic and research and development organizations.

The government's proactive role should be to promote infrastructure industries like transport, communication and electric power, support scientific and technological research and development and facilitate development of supporting services such as the development of product and process quality standards. Government agencies should co-ordinate the actions of domestic industries with R and D organizations and monitor and moderate the competition among the domestic firms in chosen industries. This will promote co-operation and thereby confer competitive advantage to these firms in external markets. India has a very large number of small industries in all-important industrial segments. The government policy towards the small industries sector should be focused on actions that promote a long-term perspective. This would include incentives for technological innovations and improvements in product quality, enforcement of quality standards, incentives for the use of services such as design, technological and management consultancy, and regulating the competition with a view to promote co-operation. One aspect of modern production is that it lends itself to smaller and more specific firms [Rosenfeld 1992]. Product specialization rather than scale economy is a natural competitive advantage for small-sized firms. Industrial policy for small and medium industries should provide incentives for product specialization. Some other aspects in which the government can help are –industrial extension service to transfer information, selective capital allocation for technological innovation, and modernization and locational policy to promote greater synergy among industries.

In Japan the Ministry of International Trade and Industry (MITI) played a significant role in influencing innovations and efficiency in the firms such as the programmes for energy efficiency and for developing special purpose robots[Porter 1990:235 and 414]. The Japanese government encouraged collusion in the



domestic market to facilitate dumping in the world market. In the process of enhancing the competitive advantage of domestic firms in global market. Japan has developed and perfected the co-operative form of government-business relationship. Japanese experience shows that industrial policy could be a major instrument for developing competitive advantage of local firms. Some important aspects of industrial policy in Japan have been the identification of industries to be developed and the choice of best means to develop the chosen industries by monitoring the competition among the domestic firms and exercising the controls to guarantee the economic health and effectiveness [Johnson 1982]. Industrial policy in India can adopt some elements of the Japanese policy listed here which are attributed to its success-(i) the existence of small bureaucracy, specially trained in manufacturing management, for policy implementation,(ii)market-confirming methods of state intervention, and (iii)pilotorganisation like MITI which controls the industrial policy needs to combine planning, energy, production, international trade and a share of finance-particularly capital supply and tax policy. For such an organization to remain active and accountable it will have to seek partnership with different constituents,i.e industry, trade associations, non-governmental group, etc and develop checks on its mode of operations. Industrial association in India have functioned in the trade union concerning mainly with the short-term interests of the firm vis-à-vis immediate government policy regime(mainly the tax regulations).Industry associations can positively influence the interests of their constituents by promoting co-operation in technological innovation including sharing of costs, transferring innovations across firms within an industry as well as from the national laboratories to firms, and promoting services and quality certification,e.g.ISO 9000, and monitor and enforce industrial and environmental standards. Along with it is the need for institutions like BIS to help develop programmes for implementation of standards and the need for developing a strong consumer protection programmes. This would signal a move towards supporting only good quality processes and products. The trade association should develop training programmes for its constituents,in conjunction with academic institutions, at the same time have a responsibility to update the programmes to include productivity related training,e.g teaching industrial engineering in every discipline. Another important step in that direction would be to start a programme in manufacturing management, which will train engineers and technologist in new manufacturing practices and the tools to manage them. Academic institutions have, by and large, failed to perform rigorous research. The government, industry and institutions will have to seriously evaluate the past strategies and develop a strong interrelation quickly especially in promoting research that can be commercialized, if the Indian economy has to stand up in the future as a global force. The initiative for competitive success however has to come from individual firms. Value realization in the world market requires value addition and superior product performance. Effectiveness of firms to deliver these advantages depends on their manufacturing competence. To compete with the world-class manufacturers, Indian firms need to integrate the new manufacturing paradigms within their corporate strategy. A concern and respect for the domestic market will have to be the part of any strategy to globalize. As new entrants in the world market, which is already in recession, Indian firms need to follow an aggressive strategy. But to successfully compete with the industry leaders, the challenger will require-(i) a sustainable competitive advantage in cost or product differentiation;(ii)proximity to the leader in other activities; and (iii)some impediments to retaliation by the leader[Porter 1985:515-516].Achieving these conditions would require that firms forge manufacturing into competitive weapon. In the short run, the defensive strategy of continuing to compete in the labour and raw material intensive industries may be considered for a few sores and reactive control procedures, production sectors. In the long run, national competition of product and process innovation, and supply chain needs an aggressive strategy management, which takes into account the managerial paradigm's disgust practices worldwide and the strengths discussed earlier of the Indian productive sector. Finally, in Table 12 we develop a policy matrix to outline the role of the government, in developing industrial competitiveness. It includes (trade associations, academic institutions, and R and D organizations), and the institutions and the industry towards this industry in developing and promoting short, medium, and long-term implementing the new manufacturing para actions prescribed for each segment paradigm. Details of short, medium, and long term industries based on idle arguments of these sections term policy actions are outlined in order to develop manufacturing excellence for achieving a long-term global competitive advantage. These are to integrate the Indian economy in the world market that has predominantly focussed on redesigning structural constraints and suggesting improvements in the macro- economic environment. In this paper, we have argued for a need to develop manufacturing excellence in order to deliver a sustainable report(See Porter 1992).Poner conducted the study in the industrialized nations which account for total economic grow in



half of total world exports. The study showed true failure to do so. In the current context, that the home demand conditions had some economic environment, has two major implications: India could be relegated to the position 2 Most important benefit of home-based suppliers of a dominant export market for others according to Poner (1992) is in the process which could lead to of innovation and upgrading. The exchange of a growth of protectionist sentiments within research and development experience acceleration to counter such a market dominate with innovation in the entire industrial nation. The success of the economic reform existence of competitive domestic supplier was far more preferable to relying on foreign suppliers. W 3 Porter categorizes stage of national competing firms to compete globally present a competitive development as driven, investment paradigm for manufacturing management driven, innovation-driven and wealth-driven and develop a framework of policy. The first three stages represent increasing conventions that would be needed to assist in the competitive abilities and the last stage represents a development of manufacturing excellence decline in national competitiveness. In this the need to leap-frog to a post-industrial categorization, the resource and labour intensive stage of development has been one of the size manufacturing correspond to the factor driving forces of the new economic- driven stage, At Investment-driven stage, competitive advantage are drawn from improving factor conditions as well as firm's strategy based on low value added products.i.e post- structure and domestic rivalry of India *vis-a-vis* other developing and 4 M Patibandla (1992) notes that the ministry of developed nations, on a range of performance and MII in Japan used the carrot and performance indicators is quite low. An enhance- stick mechanism as Provided selectivement in the value addition of current Level the capital to the [Inns in targeted sectors for I and II exports is desirable in order to adopting new technology and increasing pro-improve the employment and income productive capacity at the lowest cost. But essentials in the rural and semi-urban market time the performance of a firm fell below the towns, e g, setting up agro-processing units, standards set by F and Mill.

Notes

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1. See Poner 1992: Poner conducted the study in 10 industrialised nations, which account for half of total world exports. The study showed that the home demand conditions had some influence in nearly all industries studied.

2. Most important benefit of home-based suppliers according to Porter (1992) is in the process of innovation and upgrading. The exchange of research and development experience accelerates innovation in the entire national industry. Existence of competitive domestic supplier is far more preferable to relying on foreign suppliers.

3 Poner categorises stages of national competitive development as factor-driven, investment-driven, innovation-driven and wealth-driven. The first three stages represent increasing competitive abilities and the last stage represents a decline in national competitiveness. In this categorisation, the resource and labour intensive manufacturing correspond to the factor- driven stage. At investment-driven stage, competitive advantage are drawn from improving factor conditions as well as firm's strategy structure and domestic rivalry.

4 M Patibandla (1992) notes that the ministry of finance and MII in Japan used the carrot and stick mechanism. They provided selectively the capital to the firms in large sectors for adopting new technology and increasing productive capacity at the lowest cost. But every time the performance of a firm fell below the standards set by MOP and MII the stick was used as these ministries controlled the rationing of capital and also the allocation of imported materials and technology.

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