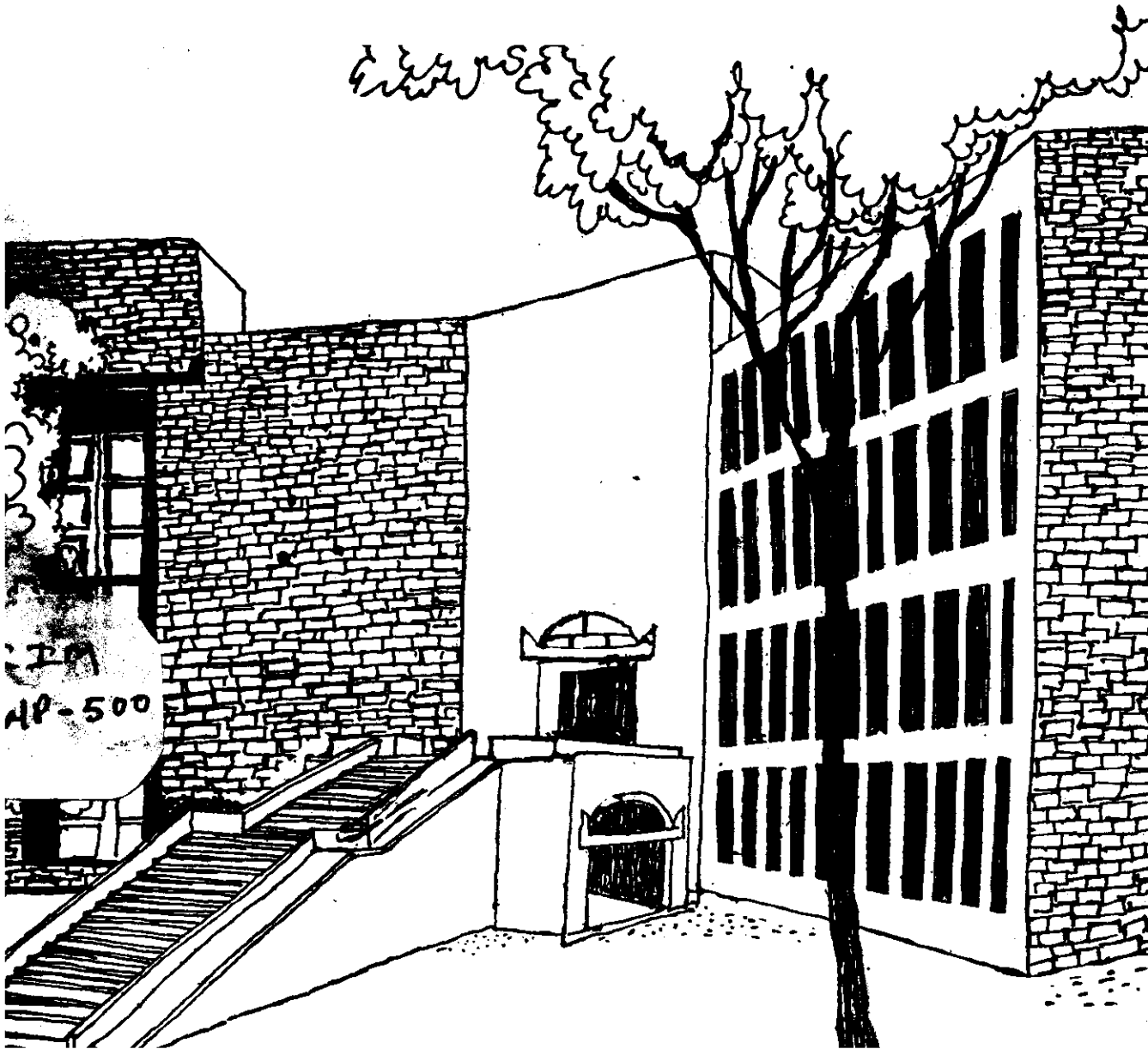


Working Paper



**RECENT GOVERNMENT POLICIES AND THEIR
IMPLICATIONS FOR MANAGEMENT OF
TECHNOLOGY IN MANUFACTURING
INDUSTRIES**

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Recent Government Policies and their Implications for Management
of Technology in Manufacturing Industries*

Shekhar Chaudhuri **

Introduction

Technology has been a major agent of change in the industrial countries of the world for a number of decades. However, it assumed greater significance during the 1960s when the demand for traditional products started showing signs of saturation. The growing selectivity of the consumer was responsible for the gradual institutionalization of new product development within the firm. Investments in R & D increased rapidly. However, these investments do not seem to have resulted in successful introduction of new products.¹ This was the result of a lack of understanding of the innovation process.

Over the years a considerable body of knowledge has been developed to tackle the problems of technological innovation and R & D management in the context of the economically advanced countries.

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This knowledge was however not very relevant to technology management problems in India because of the significant differences in the external environment of the firms. Till very recently the model of economic growth that had been adopted by the Government was based on import substitution within protective tariff walls.

In contrast, the developed countries encouraged intense competition between firms, which was responsible for the emergence of technological change as a competitive weapon. Nevertheless, the economic scene in India seems to be changing and progressing towards a more open and competitive environment. We shall explore this development later in this paper. In the emerging business environment technology is likely to play an increasingly important role. Indian business enterprises would have to learn/manage their technological /to resources effectively for achieving their objective. The knowledge already available would be useful but would require to be adapted to the conditions existing here.

The Emerging Economic Environment

The Indian economic environment is tending towards a more competitive one. Though hard research data is not available to prove this proposition there is emerging evidence which is readily available. Moreover, technology is becoming an important element of the strategies of Indian business enterprises. Consider the following situations :

1) The Powered Two Wheeler Industry²

At present there are about 15 manufacturers, a large number of whom are trying to expand production of existing models or are in the process of introducing new products. Bajaj Auto is trebling its capacity from 1.5 to 4.6 lakhs. Hero Majestic, Ludhiana, which had entered just about 4 years ago, is already selling about 1 lakh mopeds annually and plans to treble that to 3 lakhs. Escorts hopes to move from 60,000 to 2 lakhs. Scooters India has already introduced a new 100 c.c. scooter. The technology factor is likely to be crucial in this industry. Two years ago, there was hardly a two-wheeler in the country which offered much more than 40 Km on a litre of petrol.

Today, most new vehicles offer at least 25 per cent greater fuel efficiency. The new entrants claim that they are introducing vastly superior technologies in collaboration with the biggest names in the world's two-wheeler industry. Honda is tying up with both Hero and Kinetic, the former for a mini-motor cycle and the latter for a new engine for a mini-scooter. Yamaha has signed up an agreement to help Escorts produce a 100 cc motor cycle and Suzuki with TVS. Lohia Machines, Kanpur and Andhra Pradesh Scooters have already tied up with Piaggio, etc.

For a considerably long period of time Bajaj Auto had towered over the rest in the industry. However, the situation is going to change as the new production plants of the competitors are established.

2) The Passenger Car and Commercial Vehicle Industry³

The origin of the Indian Auto Industry can be traced back to the 1940s when Hindustan Motors was set up for the manufacture of passenger cars. This was followed in quick succession by a number of other manufacturers both for cars and commercial vehicles. Since the 1960s however, the industry has not grown significantly. The other striking feature of this industry has been the preponderance of commercial vehicles, which can be explained by the Government's policy towards different segments of the auto industry.

The passenger car industry has been known for almost a total absence of any change in the models or improvements in the designs, technology, performance, safety and reliability standards over the last 25 years. However, there are now signs of new developments with the decision of the Government to set up a public sector undertaking, Maruti Udyog Limited, for the manufacture of passenger cars and light commercial vehicles.

Maruti Udyog has signed a collaboration agreement with Suzuki Motor company, Japan, to produce a number of vehicles. In city driving, the vehicles are likely to give 18 - 20 kms per litre as against the 10 - 12 kms given by existing vehicles. The maintenance cost of these vehicles will also be almost half that of existing vehicles.

Oil change will be required only after 5000 to 10000 Kms, depending on the oil used. Whereas in existing models the range is 2000 to 3000 Kms. Material costs are expected to be much less as the Maruti car will weigh about 630 Kgs which is almost half the weight of the larger existing cars. Hence the price would also be much less. The Maruti cars are also expected to incorporate disc brakes which are superior in performance to the existing brakes in the Indian cars. They will also use better fabrication technology to give greater body strength and electro-phoretic painting for giving greater corrosion resistance.

According to newspaper reports, as a result of the emergence of Maruti on the scene a number of existing firms in the automotive ancillary industry are planning to introduce new technology. Apart from the changes in product technology that are in the offing there is likely to be considerable change in manufacturing technologies. Maruti has introduced flexible machining centres which is a relatively new concept even in the industrially advanced countries. Component supplying firms would also require to introduce sophisticated manufacturing technologies to match the needs of the ultimate product.

Bajaj Tempo is believed to be test marketing a new engine produced in collaboration with Mercedes and in reportedly phasing out the earlier ones.

Hindustan Motors is believed to be getting a new body for its car and a more fuel efficient engine. Premier Automobiles is likely to incorporate a new engine in its car by 1984. DCM is likely to introduce a 3 tonne truck in collaboration with Toyota. Mahindra and Mahindra have already signed an agreement with Peugeot for a new engine. Standard Motors has also signed an agreement with British Leyland for a new engine.

3) The Tractor Industry⁴

This industry also did not see much technological change till about the mid 1970s. There were only a few manufacturers till the early 1970s and the industry was dominated by two or three manufacturers. By 1976-77 there were 11 manufacturers vying with each other for a share of the market made unstable by the interplay of various policies of Government. By this time Punjab Tractors Limited, a company set up by Punjab State Industrial Development Corporation with the technology developed indigenously at the Central Mechanical Research Institute, Durgapur, had already established production. It has since then introduced a number of new models in competition with the existing ones produced in collaboration with foreign companies. During the last 5 years a number of other manufacturers have strengthened their efforts in bringing out new products. Eicher Tractors is almost ready with its 35 h.p. model and is working on a smaller one.

international Tractor Division of Mahindra and Mahindra has developed a 60 h.p. model. HMT has developed a new model indigenously.

The above are only a few industries/which one finds an increasing /in degree of competition, increasing importance of acquisition of new technology for introducing new products or modernizing production facilities and, R & D for developing new products and processes. However, they are illustrative of the kind of situation that may be existing or is likely to develop in many other industries. The increasing competition in industries based on sophisticated technology is evident from their enhanced advertisement in recent times. Also their advertisements project their claimed technological superiority. Example of such industries are : (a) heavy electricals, (b) refrigerator, (c) two-wheeler vehicle, (d) computer, (e) razor blade, (f) electronic components, (g) bearings and (h) fabrication.

One factor which has aided the development of competitive forces during the last few years in a number of industries and the resulting increase in the importance of technology as a competitive weapon is the Government's policies toward industry. In the following sections we discuss some of the changes in the Government's policies and their likely impact.

Recent Changes in Government's Policies Towards Industry
Import-Export Policy : 1982-83

The import-substitution model for economic growth which the Government has been following for the past three decades seems to have been undergone a major change as is evident from the number of changes incorporated in the Import-Export Policy for 1982-83 (Exhibit I). Some highlights are as follows :

- 1) The objectives of the new policy are : (a) to supply industry with its input requirements, (b) providing stimulus to those engaged in exports, (c) simplification of procedure, (d) and upgradation of technology. Achievement of self-reliance comes last in the list.
- 2) The OGL list of items has been enlarged. The new policy places emphasis on import of capital goods. All manufacturer-exporters, defined as those who export at least a tenth of their production, can import any capital good not in the banned list against their import replenishment licence. No clearance from the indigenous angle or the capital goods committee would be necessary for this import.
- 3) The value of automatic licence has been increased and the procedure for their issue has been simplified. Items upto Rs. 1 lakh can be imported from the 'Limited permissible' (the earlier banned list). The automatic licence is now subject to 'repeat' operation which means that any automatic

licence below Rs.1 lakh for all units - previous policy limited this benefit to small scale units - need not be revalidated; it can be 'repeated' the following year. Under the new policy, value of the licence will increase every year by 10 per cent to accommodate increases in price.

- 4) Industries allowed to import machinery for modernization are :
(a) textiles, (b) sea food, (c) dairy, (d) chemical and
(e) woolen.
- 5) Seventy two new items under chemicals have been added to the OGL list.

Other Policies Towards Industry

Changes have also been made in the Government's industrial licencing policy. Relaxations have been made in the application of the MRTPA and FERA⁶. Procedural simplifications have been made for granting licences and allowing foreign collaboration and special incentives have been announced for promoting export oriented units. Some of the objectives of these changes are : (a) optimum utilization of installed capacity; (b) maximising production and achieving higher productivity; (c) higher employment generation; (d) faster promotion of export oriented and import substitution industries and (e) consumer protection against high prices and bad quality.

The liberalisation of the import policy in 1982 had been welcomed by some quarters and criticised by some. Even the Union Finance Minister had called for a re-look at it. Apparently the Government is reconsidering whether the liberal import regime should be continued. One side of the story is as follows :

--- Notwithstanding shrill cries from quarters demanding even further export-import liberalization, New Delhi can ill afford to ignore the perils of such a philosophy. The liberal import regime during the past couple of years was ostensibly aimed at tiding over the critical balance of payments position and ensuring economic solvency. It has done neither. Instead, the balance of payments crisis has been sharply accentuated, while the country's commitment to self-sufficiency is vulnerable to compromise... that New Delhi appears to be having second thoughts on liberalisation may be seen in the commerce minister's reported view that the export-import policy should be designed to boost exports and at the same time maximise imports... with the exhaustion of the IMF loan, the country has to contend with the problem of repayment as well as conform to its stringent conditionality. Under these circumstances import substitution assumes additional importance and urgency...⁷

Another view on this subject is the following :

.... "the entire volume of OGL imports in 1982-83 will be just three percent of total imports - Rs.500 crores out of a total import bill of Rs.15,000 crores... The controversy is limited to a handful of items like viscose fibre, soda ash, polyester fibre and yarn, PVC and alloy steel. The import of these items is less than Rs.150 crores... a microscopic fraction of our industrial production ... Not even this trickle can really be described as liberal. Duties on imported soda ash are more than 100 per cent and on polyester fibre and stainless steel 500 per cent. Auxiliary import duties have been raised thrice within 12 months...

Capital goods imports are booming despite a hike in import duties ... it indicates that at last India is beginning to modernize production by acquiring the best equipment. It is now imperative, in the interests of both consumers and exports, to set up large-scale plants using the latest technology and these often require imports...⁸

In spite of the rethinking that may be going in Government regarding the import-export policy for 1984-85 one can speculate that the reversal of policies that might follow would be selective in nature and not across the board. If the Government is serious about developing export capability in some selected industries import of latest technology and other critical inputs not available within the country or that is exorbitantly expensive compared to international prices would be necessary.

Some Possible implications of the Government's Policies

Competing firms may differ in product mix, scale of operations, modernity of facilities, degree of vertical integrations, locational advantage etc. Their relative competitive positions might be influenced by the quality of their products, efficiency and costs, as well as by the effectiveness of their marketing and distribution and the resulting levels of capacity utilization. As a result of these multiple sources of likely differences in competitive advantages and disadvantages, business enterprises might differ substantially with respect to composition and relative priorities of the areas needing managerial attention. In addition, firms may also differ with respect to the technical expertise, financial resources, and managerial capabilities already existing. Hence, in exploiting any of the opportunities which are now available to industry as a result of liberalisation of the Government's policies, firms will be faced with a number of critical questions :

- i) What is our position vis-a-vis our competitors ?
- ii) What are the current sources of our competitive advantages and disadvantages ? What are likely to be the sources of our competitive advantages and disadvantages in future ?
- iii) What kind of strategy should we adopt to attain our objectives ?
 - a) Growth of market share from existing products;
 - b) Extension of the market by enlarging the productivity;
 - c) Entering new markets;
 - d) Reduction of manufacturing costs;
 - e) Improving quality and reliability of products;
 - f) Vertical integration;
 - g) Growth through internal diversification;
 - h) Growth through acquisition or merger, etc.

The changes in the Government's policies would open up a number of opportunities for a variety of firms in various industries.

Consider the following :

- a) The provision of automatic expansion in production upto a limit of 50% over the approved capacity implies that firms can avail of this facility to reduce their cost of production and compete more effectively with their competitors. However, this would depend on many factors : (i) Size of plant, (ii) the extent to which cost of production can be reduced by increasing production by 50% of the approved capacity if the firm is already producing to full capacity

(iii) market demand, etc. Nonetheless, this provision when seen in conjunction with the liberalised policies towards foreign collaboration, foreign equity participation in joint ventures, and procedural simplifications widens the scope of strategic choice. Established firms could modernize their plant and machinery to produce at a higher volume and lower costs.

- b) Redefinition of the investment limit for small-scale units also opens up a number of opportunities to the medium-scale units.
- c) The Government's policy to encourage 100 percent export oriented units with a number of concessions also opens up new vistas. In addition to encouraging 100 percent export units, the Government would allow existing units to increase their capacity for export. This would allow existing manufacturers to modernize their old plants and produce at lower costs not only for export but also for the domestic market.
- d) The new policy on mergers and amalgamations encourages healthy firms to take over sick companies and therefore modernization of plants and facilities and economic production.

We have seen in a previous section that there is the likelihood of a reversal of the liberal import policy. In case this happens there is the possibility of an increasing R & D focus on new

product development. This is because a number of industrial fields which were earlier reserved for a particular category of firms have been opened up for other categories. However, if this does not happen technology acquisition from foreign companies would be enhanced. R & D then would play a complementary role of indigenization of the imported designs. In either case technology management as a function is likely to acquire greater importance in manufacturing enterprises.

Major Issues in Managing Technology

Technology management is a complex process because of its inter-linkages with a large number of dimensions of a firm's business and its external environment. Though considerable research has been done no definite answers are available on many issues. In this section a number of such issues are raised in the form of some propositions.:

1. Technology and Corporate Strategy

- 1.1 An organization with a focused strategy requires a coherent set of technologies. An inconsistent set of technologies might result in the loss of strategic focus.
- 1.2 In a firm pursuing a related multi-business strategy negotiation of foreign technical collaboration should be the task of the corporate office so that the possible synergy between different technologies can be used to advantage.

However, in a firm pursuing a unrelated business strategy, only the legal expertise can be centralised, while the technical analysis needs to be done at the product-market level.

- 1.3 In a firm with multi-plant, multi-location strategy, technical documentation and rapid transmission of development at one location to another are important for over-all effectiveness of the technology management function. This is also true of firms with related strategies. However, in unrelated business firms, this does not seem to be an important dimension in technology management.

2. Technology and Organization

- 2.1 For competing in the international markets, export oriented firms will require an ability to sense technological changes taking place in the world and incorporate them rapidly into their products. Simultaneously, they would have to develop closer links with the international markets. Within the organization, export oriented organizations would require closer coupling between R & D and marketing.
- 2.2 Leading firms in technology based industries would be required to monitor technological changes taking place all over the world and incorporate them in their business either through foreign collaboration or by developing the technology on their own. These firms would also require strong developmental

skills to remain ahead of the rest. As a result the balance of power within the organization is likely to shift towards R & D function.

- 2.3 Firms in technology based industries would be required to develop mechanisms for linking technological planning with their business planning processes. The stronger the coupling the higher is the likely effectiveness of R & D investments.

3. Indigenous R & D Vs. Foreign Collaboration

- 3.1 In the short run it is advantageous to use foreign technology for manufacturing a product as a firm can generally make profits from the very beginning through the use of CKD packs. However, an indigenous R & D based firm can also successfully compete with foreign technology if the Government provides some financial support during the initial period. A firm based on indigenous technology must, however, develop an innovative strategy with emphasis on rapid new product innovation. Development of technology within the firm gives the indigenous technology using firm an adaptability to environmental forces which is unmatched by the foreign technology using firm.

- 3.2 In a situation where there is considerable uncertainty as to the performance of the technology it is always better to develop the technology on one's own if there is no choice

but to enter that field. This would give the firm the experience though at its own cost. However, if a firm enters into a technological field which is uncertain/unproven, it will have to bear the cost of learning about it and still may not get to the details whereas the foreign collaborator would learn from the experience of the technology receiving firm at little or no cost.

4. Choice of Technology

4.1 Even in industries which are known for economies of scale, there are alternative technologies available, which make possible profitable operations both at very high and very low volumes. To identify such alternative choices, we need to look at the product with a perspective consistent with the environment within which it is required to perform. An identification of the functional requirements of possible clients from the product and the strengths and weaknesses of the recipient environment would generally lead to innovative choices of technology.

5. Negotiation Strategy

5.1 Buying technology in parts may be a good strategy for negotiation in a situation where the technology is widely diffused and the technology recipient firm is very strong in know-why skills. However, in a situation where there are uncertainties involved in the performance of the

technology it would be better to go for a total package from the foreign collaborator. In complex technological areas where the recipient firm possesses only operational skills it is better not to buy technology in parts.

6. Strategy for R & D

- 6.1 It is likely that industries which are research intensive would develop mechanisms like research associations to carry out basic research or collaborate more intensively with Government research laboratories to take advantage of the infra-structure already created. Manufacturing firms are then likely to concentrate on developmental activities.

* * *

EXHIBIT I

Additions/Differences in 1982-83 E-I Policy Compared to 1981-82 E-I Policy

Chapter 3

Import of spares against capital goods licenced : spares required as per advice of the supplier for the maintenance of the capital goods concerned, may, if not provided for in the licence specially be imported to the extent of 10% of the value of the O.G. licence, but within its overall value. But in 1981-82 E-I Policy it was only 5%.

Chapter 4

Automatic licence issued to actual users (Industrial) will be valid for import of prototypes or samples upto Rs.20,000 in value within the value of the licence, provided the import of each type of sample is not more than two in number.

While in 1981-82 E-I Policy it was only for Rs.10,000/-.

Import of samples supplied free of charge upto Rs.20,000 against Rs.10,000/- in 1981-82 policy.

Chapter 6

Industrial undertakings engaged in ship building can import permissible spares for maintenance of their machinery under O.G.L. in accordance with the normal policy.

Any item required by the industry as raw materials, components, consumables, including consumable tools, and spares for the manufacture/repairs of ships can be imported by the concerned

industrial undertaking under O.G.L. For industrial users, electronics components, raw materials, consumables are allowed to import under O.G.L.

Chapter 9

Spares are divided into two categories :

Permissible spares and non-permissible spares.

- P. Sp. - The items other than those appearing individually in Appendices 3, 4, 15 or 30.
- N. Sp. - The items appearing individually in Appendices 3, 4 or 30. (both in 1982-83 E-I Policy)

Chapter 10

The facility available for U.N.G.C. & Oil India for import will also be available to the following parties :

- i) M/s. Coal India Limited
- ii) M/s. Neyveli Lignite Corporation Limited.
- iii) M/s. Bharat Cooking Coal Limited
- iv) M/s. Central Coal Fields Limited
- v) M/s. Eastern Coal Fields Limited
- vi) M/s. Western Coal Fields Limited
- vii) M/s. Central Mine Planning & Design Institute Limited.

For public sector enterprises under Ministry of Defence, import of raw materials is as well liberalised.

Doordarshan and AIR can also import spares under O.G.L.

Chapter 12

Imports of fresh fruits, dry fruits and dates are allowed through the National Agricultural Co-operative Marketing Federation of India (NAFED).

Imports of dyes is allowed under O.G.L. Import of Photographic films (colour) can be made under O.G.L. But the quantum of import and the manner of distribution will be decided by the Government. Different types of Ammunitions are allowed for import. The condition being, only 5% value of the annual turn-over of the arms dealer will be allowed.

Chapter 14

Depending on the professional nature of the capital goods, banned goods import will be allowed.

Import of capital goods, cement, etc. purchased out of Applicant's own foreign exchange is allowed.

Non-resident Indians, returning home can bring electronic equipments for setting up or diversifying their own industry in India under O.G.L. There will not be upper value limit for this category.

Actual users and exporters apply for Export-Import Video Tape recorder units or without camera.

Import of aircrafts and its spares is allowed under O.G.L. Import of B & W photo films is not said in 1982-83 E-I Policy. Cement will be allowed to import under O.G.L. as a selective basis by State Training Corporation of India.

Chapter 16

Import of Video tape/cassette recorder (with or without camera) will be allowed only from blood relation who have been living abroad continuously for more than three years.

Export and Import by manufacture-exporters have been liberalised.

Import of samples worth Rs. 75,000/- is allowed against Rs. 50,000/- last year.

Added articles are :

- i) Motor vehicle (car, jeep, bus, truck, tractor)
- ii) Office machines/equipments
- iii) UOR/UTR

Several provisions have been made in this policy (1982-83) to assist export promotion.

Import of Tools against REP licence has been taken back in 1982-83.

Chapter 19

This chapter is the newly introduced chapter about Import of Technology. Import and Export policy contains a number of specific provisions with the objective of promoting Technological upgradation, cost effectiveness, optimum use of raw materials and energy savings. In order to enable industrial undertakings to reduce energy consumption import of solar equipment is allowed to actual users (industrial) on merits.

Import will also be allowed for the following items :

- i) Improved packing materials and seals
- ii) Special types of anticorrosive paints
- iii) Epoxy coating

- iv) Special coating polymers chemicals for energy conservation
- v) Maintenance free stream traps
- vi) Ceramic fibres
- vii) Foam insulations
- viii) Polyurethane foam insulations.

Summary of Main Objectives

1982 having been declared the year of productivity, imports are liberalised for domestic use and industrial development. But due protection is given to indigenous industries for development. Provision have also been made to give more impetus to the country's export efforts.

For the first time, a new chapter itself is introduced in the 1982-83 Export-Import Policy, viz., import of technology, to meet the import requirements for upgradation of technology, conservation of energy and cost reduction.

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