Chapter 7
SUMMARY AND CONCLUSIONS

The genesis of the electronics industry in India could be traced back to 1950s, but a real start in its development on modern lines could take place only in the 1970s with the direct intervention of the government. In tune with the then general industrial/technology policy of State regulation, the electronics strategy during the seventies aimed at the development of a balanced and self-reliant industry to meet the domestic requirements by assigning a major role to the public sector and small scale sector with little recourse to foreign capital and technology. The government gradually tended towards the view that over emphasis on regulatory mechanisms acted as a stumbling block to the growth of the industry. Accordingly, a series of liberal policy measures were initiated in the eighties. These policy measures shifted the industry from a regime of government controls and regulations to a liberalized one wherein the emphasis was on minimum viable capacity, easier access to foreign technology, relatively free entry to the private sector (including Monopoly Houses and FERA Companies) with a view to make the industry technologically modern, cost effective and price competitive. This general shift in the policy thrust from "planning" to "market orientation" led to a change in the structure of the industry in terms of product composition and market structure with accompanying changes in the firms' behavior.

A more of less atomistic behavior of firms guided by the
market forces under policy liberalization has had the effect of tilting the product structure in favor of consumer products with higher profits. The results of our analysis of the linkage patterns in an input-output framework by conceptualizing electronics as a broad sector with different sub-sectors, though indicative in nature, were revealing: There was hardly any synchronization between linkages when viewed in terms of maximizing output, income and employment, and minimisation of foreign exchange outflows. Further, the growth was concentrated in sectors with higher linkage in terms of imports whereas, sectors with higher linkage in terms of value added and employment lagged behind in output growth. In other words, the linkage pattern emerging from the changes in the product structure of the electronics industry (sector) in the eighties was such that the output growth was not necessarily accompanied by a corresponding growth in income or employment.

The policy liberalization was helpful in removing institutional barriers to the entry and exit of firms. This has had its impact upon the number and size distribution of firms and thus on the market structure and competitiveness. The case study of computers in the framework of structure conduct performance (S-C-P) paradigm illustrated the broad trends in the market structure of major electronics products in the country. It was found that the industry has passed through three distinct phases during the last three decades. The first phase was characterized by a concentrated market structure dominated by the foreign firms. The government's interventionist policies with a view to building up an indigenous industry marked the second phase.
While the government policy has succeeded in freeing the industry from foreign domination, the resultant market structure, was again a concentrated one but with the public sector domination. Sequel to the continued efforts of the government towards making the industry competitive, the restrictive policies that placed entry barriers were relaxed and instead a liberal policy environment was created for the operation of the private sector in tune with the market forces. This led to the third phase, which marked the appearance of a "moderate" competitive market structure.

The competitiveness of the market structure was based mainly on the existence of a large number of firms. Notwithstanding the entry of "new" firms, the top four firms together shared more than one half of the national market in some major branches of the industry. Further, the old firms continued to exercise market influence on the basis of their R & D-led technological strength in non-standardized products. And, as postulated in the S-C-P paradigm, inter-firm variation in performance (price-cost margin) was found positively associated with the concentration ratio i.e. market power. In general, however, the firms pursued market-oriented competitive strategies instead of technology-based differentiation strategy with the objective of maximizing their short run profits.

In the literature a line of argument has been put forth by Sraffa (1926), Hotelling (1929) and others to the effect that the existence of transportation cost, economics of scale associated with advertising, and after sales service along with restrictions
of the inter-regional movements of goods may lead to the division of national market into different discontinuous sub-markets. Further, if such a regional market segmentation exists, it is plausible that a firm, while controlling only a small part of the national production, has the advantage of possessing a particular regional sub-market of its own with certain degree of "monopoly" power. Our analysis of the above dimension of market concentration, taking television receivers as a case study, revealed that the phenomenon of regional market segmentation did exist though the industry appeared to be highly competitive in terms of four-firm concentration ratios at the national market. In each of the regional market, much of the sales was accounted by a few brands; a few firms thus enjoyed some degree of "monopoly power" in the regional market, though their share in the national market was small and diffused. Also, a positive association between firms' performance (price-cost margins) and their market power was found empirically valid in the context of regional market segmentation.

By conceptualizing technological change in the third world as a function of technology-imports and local R&D efforts, the study analyzed the technology behavior of the firms in, and progress of, the Indian electronics industry. It was found that under the liberalized policy the firms' strategy was to seek foreign collaborations for all and sundry advancements of technology. The outcome was a phenomenal increase in the total number of collaborations in the electronics industry in the eighties. Also, foreign collaborations were more restrictive in terms and conditions which in turn led to a marked increase in
the cost of technology. As for the trends in technology-adaptation and internal technology generation, the emerging picture was found discouraging with a marginal fall and not a marked increase in the expenditure on in-plant R&D. The empirical analysis thus depicted a picture of increasing technological dependence of Indian electronics industry in the eighties.

The results of our regression analysis of the technology behavior of the firms showed that their technology-budget was negatively related to the degree of competition. This would imply that the strategy of firms under policy liberalization to increase competitiveness was not based internal technological capability; the liberal policy neither provided a compulsive environment (as perhaps would have been the case under a protective policy) nor offered adequate market-incentive to strengthen their internal technological capability through domestic R&D investment. Moreover, the firms which were found to be technologically dynamic were the older ones and not the "new" ones. Here again, the firms attempted to build up technological capability in low technology product spectrum; there was laxity in their R&D investment in high technology products.

The types of technological behavior of the firms observed under policy liberalization, however, do not imply that the industry was technologically stagnant. Our estimates of Total Factor Productivity Growth (TFPG) showed that the electronics industry recorded a better technological progress under policy liberalization of the eighties as compared to the regulated policies of the seventies. However, the technological progress
so achieved in the eighties was with increased dependence on foreign technology, and not by strengthening the domestic technological capability based on local R&D effort.

The process of restructuring—the changes in the structure of the industry and behavior of the firms—was found to be associated with an unprecedented output growth of the Indian electronic industry. However, as entrepreneurial decisions were guided by market forces, much of the investment got allocated to the production of quick profit-yielding consumer goods based on imported kits and components. Adequate investment was not forthcoming in sectors like professional equipments and components which are in the nature of capital/intermediate goods entailing heavy capital investment with long gestation lag. The consequent imbalance in the product structure and the lack of integration along with the market-oriented competitive strategies of the firms adversely effected some macro objectives of industrial development like generation of value added (income), employment and foreign exchange resources notwithstanding the unprecedented performance record in the output growth of the Indian electronics industry.

Clearly, the study leads us to conclude that the ongoing process of restructuring under policy liberalization has a mixed effect as far as electronics industry is concerned; the high output growth is accompanied by some unhealthy trends capable of thwarting some macro economic objectives of industrialization. If we treat our analysis of electronics industry as a case study to illustrate the overall impact of industrial restructuring
under market-orientation, we may venture to draw some generalizations: In the Indian context, if the investment decisions are left exclusively to the atomistic behavior of the entrepreneurs guided by market forces, there may be an unprecedented growth in the production of quick-profit yielding consumer goods based on imported inputs and modern technology and thereby a sharp increase in the aggregate output growth in the short run. The productivity and technological progress of such industries may also show improvements. But the inevitable inter-sectoral imbalance in the product structure that follows will be having its adverse implications on some basic macroeconomic objectives like, income, employment and foreign exchange earning and the very sustainability of growth itself. Indeed, the policy liberalization may be helpful in transforming the market structure into an "apparently" more competitive one in terms of the number and size distribution of firms. But the touch-stone of any policy is its success in inducing the firms to adopt "healthy" competitive strategies based on internal technological capability rather than on the import dependent production and marketing. If the findings from our study of electronics industry are taken as the guide-posts, the "import-oriented" competitive strategy devoid of in-house R&D effort is not a path that the Indian industries can afford to follow in the long run. If industries with such specificities as electronics are to be made more competitive on efficiency grounds, the policy liberalization of the kind that India followed in the eighties may not be adequate. For, the conduct of the firms in such an environment is likely to be guided, more often than not, by the objective of maximizing the short-run profits rather than long-
term growth. This, however, does not imply that India should do away with liberalization as a policy option and return to a regime of controls. What is, probably, required is planned liberalization, sufficiently transparent, with a long term perspective; a policy that would generate an environment for structural transformation based more upon internal technological capability than on continuing external dependence.

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