Industrialization is the only answer to the problems of mass unemployment and poverty in Under Developed Countries. Industrial sector has enough potentiality to provide productive employment opportunities as the law of increasing returns operates over a longer range here through increased productivity of labour\(^1\).

Eugene Staley\(^2\) marks an association between industrialization and high productivity, which makes high average incomes with industrialization unemployed, underemployed and disguisedly employed labour in agriculture can be transferred to industrial sector for providing employment. By this transferring, aggregate production increases, as marginal productivity of labour is greater in industrial sector compared to agricultural sector.

The contribution of manufacturing to employment generation stems not only from the employment it provides directly, but also more importantly from its indirect effects, These indirect effects operates through manufacturing sector's extensive linkages with the remaining sectors including the service sector, and through income induced demand for services as per capita income rise\(^3\).

Industrialization leads to economic growth because of so many reasons, Firstly, modern growth theories (e.g. Romer, 1986, Krugman, 1986)\(^4\) have assigned central importance to the role of technical change and technological knowledge in explaining income differences between the rich and the poor countries. In this

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context it has been emphasised that the agricultural low income countries can exploit better technological possibilities in the manufacturing sector than the agricultural sector, which leads to an increased labour-productivity in the former. This is an important source of higher economic growth through manufacturing.

Secondly, as explained by Hirschman\(^5\) the growth of manufacturing sector increases the demand for the goods and services produced by many supplying sectors and it becomes a source of multiplier effects. Many dimensions or the transformation of an economy during the process of development, i.e., with rising levels of income per capita, have been studied by Kuznets, Maizels, Chennery\(^6\) and others. In these studies an increasing level of income per capita is associated with an increasing share of manufacturing production. On the demand side, growth of income per capita is accompanied by a shift in demand from primary products to manufactured products and services. On the supply side accumulation of physical and human capital is accompanied by a shift in comparative advantage from labour intensive agriculture activities towards more capital and skills intensive production process. Consequently, the level of industrialization can be conceived of as an alternative proxy for the level of Economic development as developed a strong correlation between the level of per capita income and the share of manufacturing sector in the economy.


Manufacturing sector could grow because either by allocation of factors of production at an increased rate or through technological progress. The former method of achieving a higher rate of growth of the industrial sector is obviously less economic. This is because diminishing returns are bound to set in after a certain period of time in the absence of technological progress. Thus, the rate of growth increased through technological progress is most economic. New growth theories developed by Romer and others have highlighted the importance of technological progress in shifting the production frontiers to higher levels.

Higher productivity or technological progress has a significant role in accelerating the pace of industrialisation in developing countries. Increased productivity or technological progress enables the industrial sector to reduce its dependence on scarce resources and thereby helps the industry to mitigate the supply constraint. Higher productivity or technological progress also enables the industry to supply the manufactured products at a lower price. This coupled with higher income and price elasticity or demand for industrial products helps the industry to ease the demand constraint also. Further, in today’s globalised world higher productivity growth is an important prerequisite to achieve and maintain international competitiveness.

Advancement in technology and techniques of production enables humans to save resources and make more productive on the supply side, and to satisfy an array of greater human needs at low prices on the demand side. Greater the advancement of
technology, the greater is the role of economic development in a given society at a given time and space.

The debate on the relationship between liberalisation policies and economic performance attained new heights in the 1980s due to several factors, such as third world debt crises, reforms in the East European transition economies, the success of East Asian countries. Neoclassical growth models emphasise that technological change is exogenous, unaffected by a country's liberalization polices. New growth theories however assume that technological change is endogenous. Several studies have attempted empirical tests of the effects of openness on economic growth [Dollar, Wha-Lee, Sachs and Warner, Harrison, Jin and Greenaway et al.].

The impact of openness on productivity growth has been explored in two recent studies [Edwards and Milner and Upadhyay]. Despite the voluminous empirical literature, the relationship between liberalisation and economic growth remains highly contentious.

It is important to examine the liberalisation policies link at the disaggregated level, given that much of the controversy centers on the macro analysis of liberalisation and growth linkages. Further literature on production and aggregation tells us that there are several important conceptual and empirical advantages to focus on TFP growth at the disaggregated level. The nature of the liberalisation polices has implications for growth in industrial productivity. There are many arguments explaining why more open trade regimes lead to productivity improvements in the industrial sector. Perhaps the most basic is that returns to entrepreneurial effort increase as exposure to foreign competition rises [Martin and Page\textsuperscript{16} and Tybout\textsuperscript{17}]. Finally, greater openness may accelerate adoption of technological innovations originating in industrial countries leading to more investment in product development. There has however been no clear confirmation of the hypothesis that countries with an outward orientation benefit from greater growth in productivity in the component sectors of manufacturing. When combined with the small static costs of protection, this finding leaves those with a predilection towards a neutral trade regime in a quandary. Further, a conducive macroeconomic environment is also a necessary ingredient to establish the linkage between liberalization policies and productivity growth.

The shift towards open economy industrialization, and export orientation changes the terms of reference for technology policies. It helps to focus on two key issues.


First- export orientation implies that industrialization policy must help firms in the home country to enter global markets which in many cases are oligopolistic, in the context of export promoting policies, monopolistic control of information by technology suppliers, whilst still often a reality, does not necessarily lead to the transfer pricing practices which were so much a characteristic of the import substituting case.

Second - When firms seek a place in a global industry they need to be concerned with more than just the problem of initial entry. They also have to find ways of sustaining themselves in markets where in varying degrees depending on the sectors, there is innovative competition. It means that they must have access to relevant technological capabilities to cope with continuing innovation in the international market.

Import of technology is one of the important factors, which promote competition in domestic market, it may either substitute or complement (or a combination of both) local R&D. In an Indian case study done by Katrak found imports of technology to be stimulating adaptive R & D. The magnitude of the effect, however, appears to be "rather limited" and weaker for the complex technologies.

Foreign Direct Investment (FDI) is one of the most important channel of harnessing the resources of Transnational corporations (TNCs) for

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industrialization of developing countries. It acts as a conduit for technological change in these countries. FDI usually flows as a bundle of resources including capital, production technology, organizational and managerial skills, marketing know-how, and even market access through the marketing networks of multinational enterprises that undertake FDI. These skills tend to spill over to domestic enterprises in the host country. Therefore, FDI can be expected to contribute to growth more than proportionately compared to domestic investments in the host country.

A number of studies have analysed the relationship between Liberalization and economic growth, the issue is far from settled in view of the mixed findings reached.

Rugman\textsuperscript{21} in his study found, that innovations occur in the home country of MNEs rather than in the country of its subsidiaries. However Lall\textsuperscript{22} while trying to explain firm level R&D expenditure in Indian engineering Industry found the foreign ownership with no significant influence .

Veugelers and Vanden Houte\textsuperscript{23} found a negative effect on the presence of MNEs on the innovative efforts of domestic firms in Belgian Manufacturing especially if their products were less differentiated.

\textsuperscript{22} Lall, S. (1983) 'Determinants of R&D in a LDC: The Indian Engineering Industry.' \textit{Economics Letters} vol.1-13, No.4
Young et al.\textsuperscript{24} suggests that linkages between MNEs and local firms will stimulate local development, and the technological capacity of local firms. Balakrishnan et. al.\textsuperscript{25} on the other hand found no evidence of increase in productivity since the onset of reforms in 1991-92.

Krishna and Mitra\textsuperscript{26} in his study found no evidence of increase in productivity growth in some industry groups, which in some industries they found competition and productivity growth.

Blomstrom et. al.\textsuperscript{27} suggest that a 'technology gap' may exist between local and foreign firms. If this gap is too large, imported technology can not be assimilated by domestic firms, and spillovers will not take place.

The study done by Goldar and Kumari\textsuperscript{28} shows that a reduction in effective rate of protection to industries appeared to have had a favorable effect on productivity in Indian Industries.

Sen and Chand\textsuperscript{29} show’s that a reduction in the price-wedge has a positive impact on productivity growth.

It is important to examine the liberalisation and technological change linkages at a disaggregated level particularly in view of the controversies at the macro level relationships between liberalisation and industrial growth. However there are several studies in this field, yet, more research is needed in this direction to bridge the gaps.

**Objectives of the Study:**

The present study has the following objectives-

1. To compare the industrial performance of India before and after liberalisation.
2. To examine the impact of liberalisation on technological change in Indian manufacturing sector i.e. to examine whether import liberalisation, foreign direct investment and export orientation had improved productivity in the Indian manufacturing sector.
3. To analyse the inter-industry variations in productivity and examine how far these are influenced by outward orientation.
DATA BASE AND METHODOLOGY

Relevant data to study the role of liberalization policies in technological change in Indian manufacturing industries will be collected from several secondary sources such as Annual Reports of different Industries, various, publications or Centre for Monitoring Indian Economy and Stock Exchange directory (CMIE) New Delhi etc” issued by Government of India.

Selection of explanatory variables will depend on the availability of the data and the review of literature. The effect of different variables on technological change in Indian Manufacturing Industry will be examined through multiple regression model and related calculations will be done with the help of SPSS software.

TENTATIVE CHAPTER SCHEME

CHAPTER

1. Introduction
2. Review of Literature
3. Data Base and Methodology
5. Inter Industry Analysis of Technological Change
6. Conclusion and Suggestions

Appendix
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