CHAPTER VII
SUMMARY AND CONCLUSION

Economic reforms have been brought about structural changes in all the major sectors of the economy. The most prominent sector has been industrial sector which transfers on state of technology. And economic reforms brought about major changes in terms of technology transfer. Hence, the present study made an attempt to examine the impacts of new economic reforms, on important industrial performance indicators like structural changes, sources of productivity, employment and technical inefficiency of Indian organised manufacturing industries by classifying them into labour intensive and capital intensive industries. The prime objectives of the new industrial policy are to build on the gains already experienced, to correct the distortions or weakness involved in the system, to introduce liberalisation measures in order to integrate Indian economy with world economy, to abolish restrictions on foreign direct investment, to liberate the indigenous enterprise from the restrictions of Monopoly Restrictive Trade Practice(MRTP) Act, to maintain a sustained growth in productivity and employment and also to achieve international competitiveness. Moreover, the policy also made provision to reduce the load of public sector enterprises with lower rates of return incurred losses over the year. With globalisation policy of economic reforms India including all developing countries are integrated into world economy and at the same time they want to strengthen their industries by improving their competitiveness. The survey of theoretical and empirical literature has revealed that there are number of relevant issues regarding the difference in performance of labour intensive and capital intensive industries which are not yet specified, estimated and analysed properly in a unified manner. There is still running debate on the role of economic reforms on productivity, efficiency and employment performance and their inter relationship in Indian manufacturing sector. It is evident that there is no smooth relationship among selected performance indicators. A review of empirical literature regarding Indian organised manufacturing sector revealed that in Indian context most of the organised manufacturing industries studies focused on manufacturing sector as a whole and a few cross industry studies with a small sample of industries existed. Present study tried to partially fill this gap by classifying selected organized manufacturing industries into labour intensive and capital intensive industries and none them attempted to examine the performance between 4-digit
disaggregate level organised manufacturing labour intensive and capital intensive industries in India.

The present study differs from other similar studies in terms of complete examination on structural changes, sources of productivity, employment and technical inefficiency of Indian organised manufacturing industries as earlier studies have focused only on any one of the above indicators and none of them compared these indicators for labour intensive and capital intensive industries during the period 1990-91 to 2011-12.

Moreover, the implications of the study are of high practical relevance for policy makers. Comparative empirical analysis has been carried out at both selected industries as group and individual industry level. Using DEA based Malmquist productivity index, panel data fixed effect model for Labour intensive industries and panel data random effect model for capital intensive industries and DEA input oriented model for assessing individual industries efficiency and inefficiency scores, the study explored the difference in industrial performance pertaining to productivity, employment and technical inefficiency of selected labour and capital intensive industries. The present study also identified the important factors that can improve the competitiveness, increase employment absorption capacity and reducing inefficiency of selected industries.

7.1 Findings and Implications Pertaining to Structure and Performance of Indian Organised Manufacturing Industries during Pre and Post Reform Period

Investigate growth pattern and productivity trends for the period of 1973-74 to 2011-12 by making use of ASI time series data. The growth of Indian organised manufacturing industries has been estimated in terms of five variables. Yearly and Compound Annual Growth Rate (CAGR) have been worked out and partial factor productivity was estimated to ascertain the impact of New Industrial Policy (NIP) on growth of organised manufacturing industries. For this study used transformed Cochrane-Orcutt iterative and Prais-Winsten Procedure to overcome the problem of auto correlation for estimating the relationship between labour productivity, capital intensity and real wage in the Indian organised manufacturing industries by fitting multiple regression models.
The study found that in post-reform era growth rate decreased in number of factories, employment and total emoluments whereas growth rate increased in gross fixed capital and gross value added. This shows that the post-reform has promoted the use of capital intensive and labour saving techniques of production leading to poor growth of employment, total emoluments and also facilitated the elimination of sick factories in Indian organised manufacturing industries.

The comparative profile of pre-reform and post-reform period revealed that during reform period productivities of labour declined but capital productivity decelerated significantly whereas capital intensity and real wage improved significantly.

Co-efficient of capital intensity is found to be statistically significant at 1% level of significance while the co-efficient of real wage was found to be statistically insignificant which means that increase in labour productivity in the Indian organised manufacturing industries was explained by the increase in capital intensity rather than the increase in real wage during the period under study.

In the dummy variable hypothesis, the null hypothesis was rejected which means that compared to pre-reform era post-reform era created positive impact on capital intensity in Indian organised manufacturing industries. This implies that technology plays an important role in the growth of labour productivity in the Indian organised manufacturing industries.

Labour abundant country like India is confronted with the menace of unutilised capacity and tendency to replace labour by capital. In the absence of a better alternative, government has to devise ways and means to employ such technology so as to encourage output without disturbing employment in the country.

7.2 Findings and Implications Pertaining to the non parametric approach data envelopment analysis

The non parametric approach Data Envelopment Analysis (DEA), based on Malmquist Productivity Index analysis was used to investigate the impact of economic reforms and TFPG in Selected Organised Manufacturing Industries by
classifying them into Labour Intensive and Capital Intensive industries, for the period 1990-91 to 2011-12.

- The labour Intensive Industries have negative TFPG of -4% mainly deteriorated by TECH. Meanwhile the Capital Intensive industries showed positive TFPG of 6.7% mainly contributed by EFFCH 1.6% and TECCH 5.0%. The study examined the TFPG and its components for 20 industries, ten industries from labour intensive segment and ten industries from capital intensive segment.

- The DEA result revealed that Capital Intensive industries benefited from economic reforms by improving their TFPG compared to Labour Intensive industries.

- Eight out of ten organised manufacturing Capital Intensive industries show positive productivity growth during the economic reforms period. These are Basic Iron and Steel, Basic Precious and Other Non-ferrous Metals, Basic Chemicals, Air and Spacecraft and Related Machinery, Motorcycles, Manufacture of Agricultural and Forestry Machinery, Machinery For Textile, Apparel and Leather Production, Electric Motors, Generators, Transformers and Electricity Distribution and Control Apparatus.

- In Labour Intensive Industries three out of ten industries showed positive TFP. Those Industries are Structural Metal Products, Jewellery and Related Articles and Bicycles and Invalid Carriages.

- The result indicate that the adoption of innovation such as technological management in production process, automation, the skill of the labour, on time process and product innovation like improved design, quality, durability of a product, expenditure on Research and Development, Foreign Direct Investment inflow, collaboration of foreign entities into industry through technical and financial collaboration, foreign equity participation, automation of production line and importing new machinery, modern Information and technological equipment from abroad towards capital intensive industries are the reasons for positive TFPG whereas the absence of these factors might be the reasons of negative TFPG in selected Organised Manufacturing Labour Intensive industries in India.
Labour intensive industries face lack of modern technology and products innovation, so government should support this sector by effective implementation of different industrial uplifting policy packages and programme measures to improve their technology, labour skill, and product design etc. This will help this sector to improve their TECH.

7.3 Findings and Implications Pertaining to Economic Reforms and Determinants of Employment in Selected Organised Manufacturing Labour Intensive and Capital Intensive Industries in India- A Comparative Panel Data Analysis

The study tried to identify the determinants of employment using a panel of twenty organised manufacturing industries over a twenty two year period. The functional form of the employment is based on production function, in which labour productivity, lag real wage rate, real gross value of output, real fixed capital and number of factories variables were incorporated as determinants of employment.

To address the issue of unit root or non stationary problem faced in panel time series data IPS panel unit root test along with Hausman test was employed for selecting appropriate model for empirical estimation.

The test suggested that fixed effect model was appropriate for selected labour intensive industries and random effect model was appropriate for selected capital intensive industries in India.

Numerous studies show that economic reform negatively influence employment and present study results also revealed the same.

One of the important finding was that in the selected labour intensive industries and capital intensive industries, the co-efficient of labour productivity was negative and statistically significant, indicating that not only capital intensive industries face reduced employment level but also labour intensive industries.

A rapid increase in labour productivity growth in selected organised manufacturing industries implies that fewer workers are needed to produce a given level of output; unless demand for organised manufacturing output rises quicker for organised manufacturing labour intensive industries than other
sectors, a rapid labour productivity growth will imply a decrease in the share of employment in selected labour intensive industries in India.

- The co-efficient of lag real wage rate is negative but statistically insignificant which implies that an increase in real wage rate is not reducing employment, which may be due to economic reforms providing more an opportunity to technically skilled and trained people in India.

- However, the result of real wage rate associated with employment in labour intensive industries is not surprising because India is a labour surplus economy and for any given wages in an industry there is unlimited supply of labour and; there exists underutilization capacity due to inadequate effective demand.

- With respect to other determinants such as real gross value of output and number of factories, they show positive and significant influence on employment in selected both labour as well as capital intensive organised industries indicating that real gross value of output and number of factories have favorably influenced employment generation.

- Relating to the association of real fixed capital with employment, real fixed capital is positive and significant with respect to labour intensive industries. Whereas it is negative and statistically significant at 10\% level implying that an increase in real fixed capital leads to reduced employment level in selected organised manufacturing capital intensive industries in India. This may be due to in massive rationalization, adoption of capital intensive techniques in production process and downsizing which do not favorably associate with employment.

- Thus, it can be concluded that real gross value of output and number of factories play an important role for generation of employment whereas other determinants such as labour productivity, one year lagged real wage rate and real fixed capital showed that not only capital intensive industries are the main cause for reducing employment in the era economic reform but also labour intensive industries which means that economic reforms created negative impact on employment.
The steps taken to resolve the problem of unemployment have been largely in financial terms. In fact, central assistance should be linked with specific programmes for the development of the relatively labour intensive industries.

Separate industries development programme for labour intensive industries that would enhance efficiency and competitive ability of labour intensive industries through effective implementation of skill oriented programme, technical upgradation programme and quality of product manufacturing in such a way that fulfill the changing global economic environment needs and at the same time create a better economic opportunity to absorb surplus labour force persisting in the economy is the need of the hour.

### 7.4 Findings and Implications Pertaining to Economic Reforms and Efficiency Trends in Selected Organised Manufacturing Labour Intensive and Capital Intensive Industries in India

The relative efficiency trends in selected labour intensive and capital intensive industries for the period 1990-91 to 2011-12 has been estimated using CRS and VRS models of DEA. Further study period has been classified into early reform period (1990-91 to 2000-01) and later reform period (2001-02 to 2011-12). An efficiency score for each observation (i.e., year-wise) has been computed relative to the efficiency characteristics for all other observations and itself. In other words, the efficiency of the industry in 1990-91 has been computed relative to the efficiency characteristics for all the other 21 observations up to 2011-12, and so on.

Following inferences are drawn for labour intensive industry segment: Three out of ten industries namely Knitted and Crocheted Fabrics, Bicycles and Invalid Carriages and Wearing Apparel, Except Fur Apparel industries, relatively performed better during early-reform period (1990-91 to 2000-01). Whereas, Seven out of ten industries i.e., Cordage, Rope, Twine and Netting, Other Textiles N.e.c., Luggage, Handbags and the Like, Saddlery &Harness, Footwear, Structural Metal Products, Furniture and Jewellery and Related Articles, industries performed better during later-reform period (2001-02 to 2011-12).

It was found that during study years labour productivity was affected in almost all selected industries except Footwear, Furniture and Jewellery and Related Articles industries.
In case of technical co-efficient emoluments and fixed capital ratio following industries namely Knitted and Crocheted Fabrics, Footwear and Luggage, Handbags and the Like, Saddlery and Harness industries had higher labour-capital ratio confirming that the employment absorption capacity of these industries has increasing during study period. Whereas Cordage, Rope, Twine and Netting, Other Textiles N.e.c., Wearing Apparel, except Fur Apparel, Structural Metal Products, Bicycles and Invalid Carriages, Furniture, Jewellery and Related Articles industries had lower labour-capital ratio indicating that the employment absorption capacity of these industries has decreased as they widely follow the practice of substituting capital for labour due to economic reforms. This finding confirms that economic reforms have negatively influenced labour intensive industries.

Jewellery and Related Articles, Knitted and Crocheted Fabrics, Wearing Apparel, except Fur Apparel, Luggage, Handbags and the Like, Saddlery & Harness, Footwear and Cordage, Rope, Twine and Netting industries slacks results show that the increase as in net value added has increased the labour base in these industries.

Similarly Other Textiles N.e.c. Structural Metal Products and Bicycles and Invalid Carriages industries slacks result represent that the increases in net value added has increased other resources base like capital rather than labour base.

An average of seven years stand on production frontier as evident from the value of scale efficiency score equal to one indicates efficiency. Whereas for 60% of the study period there was inefficiency with value of scale efficiency scores less than one. This finding reveals that the selected labour intensive industries have shown inefficiency in utilising its resources during reforms period.

Following Inference are drawn for capital intensive industries segment Basic Chemicals, Agricultural and Forestry Machinery and Air and Spacecraft and Related Machinery industries, relatively performed better during early-reform period (1990-91 to 2000-01).
Seven out of ten industries namely Refined Petroleum Products, Motorcycles, Basic Iron and Steel, Basic Precious and Other Non-ferrous Metals, Machinery For Textile, Apparel and Leather Production, Electric Motors, Generators, Transformers and Electricity Distribution and Control Apparatus and Rubber Tyres and Tubes; Retreading and Rebuilding of Rubber Tyres, industries performed better during later-reform period (2001-02 to 2011-12).

In case of technical co-efficient emoluments and fixed capital ratio, all the selected capital intensive industries had lower labour-capital ratio which confirms that the employment absorption capacity of these industries has decreased because the practice of substituting capital for labour due to economic reforms. This finding confirms that economic reforms positively influenced capital intensive industries.

Machinery for Textile, Apparel and Leather Production, and Motorcycles, industries slacks result represented that the increases in net value added increased labour base.

Estimated slacks result represent that the increases in net value added has increased capital base rather than labour base in following industries of Refined Petroleum Products (working Capital base), Basic Chemicals (Capital base), Rubber Tyres and Tubes; Retreading and Rebuilding of Rubber Tyres (Capital base), Basic Iron and Steel (Capital base), Basic Precious and Other Non-ferrous Metals ( Working capital and fuel base), Agricultural and Forestry Machinery ( Working capital and fuel base), Electric Motors, Generators, Transformers and Electricity Distribution and Control Apparatus ( capital base) and Air and Spacecraft and Related Machinery ( Capital base).

An average of five years stand on production frontier as evident from the value of scale efficiency score equal to one and more than 70% of the study period exhibits inefficiency as they are having the value of scale efficiency score less than one. This finding reveals that the selected capital intensive industries have shown inefficiency in utilising its resources during reform period.

The Indian policy planner must design appropriate policy measures so that each industry can utilize its own resources to accelerate industrial growth in
their own vicinity. The, reforms have failed to bring about significant improvement in the scale efficiency of overall selected labour intensive and capital intensive industries. In this context, use of appropriate technology and optimum utilisation of resources becomes a pre-requisite to achieve greater economies of scale in labour intensive and capital intensive industries in post-reform era.

- The analysis showed that there has been a decelerating trend in the efficiency of selected variables. Therefore, technologically vibrant and internationally competitive manufacturing sector needs to be encouraged for sustainable contribution to national output and employment in the era of reform.

7.5 Inferences about Hypotheses

1) There is no difference in the capital intensity of pre and post reforms period in Indian organised manufacturing sector.

- In the dummy variable hypothesis, the null hypothesis was rejected which means that compare to pre-reform era post reform-era created positive impact on capital intensity in Indian organised manufacturing industries. This implies that technology plays an important role in the growth of labour productivity.

2) Economic reforms positively influence Total Factor Productivity in selected capital intensive industries.

3) Economic reforms influence Total Factor Productivity negatively in selected labour intensive industries.

- The evidence from the present study and empirical investigation strongly support the hypotheses that reforms created positive impact on total factor productivity of capital intensive industries whereas negative impact on total productivity of labour intensive industry during the study period.

4) There is reduction in employment in both capital and labour intensive industries during the reforms period.
The comparative results of the employment performance during economic reform between labour intensive and capital intensive industries shows that not only capital intensive industries are the main cause for reduced employment but also labour intensive industries and hence, null hypothesis is accepted, because evidence of the study reveals that the employment determinants of labour co-efficient is negative and statistically significant in both the industries.

A rapid increase in labour productivity growth in selected organised manufacturing industries implies that fewer workers are needed to produce a given level of output, unless demand for organised manufacturing output raises quicker for labour intensive industries than other sectors. A rapid productivity growth implies decrease in the share of employment. The real gross value of output and number of factories play an important role for generating employment whereas other determinants such as labour productivity and one year lagged real wage rate and real fixed capital (only capital intensive industries) show negative influence on employment.

5) Technical inefficiency is only found only in labour intensive industries.

With respect to technical inefficiency hypothesis null hypothesis, is rejected because empirical investigation reveals that technical inefficiency was not only found in labour intensive industries but also in capital intensive industries as well. This shows that reforms has failed to bring significant improvement in the scale efficiency, technological backwardness, lack of optimum utilisation of resources, lack of skilled labour force, lack of product innovation, practicing substitution of labour to capital which are the major drawbacks for technical efficiency.

7.6 Policy Implications

1. To enhance the level of technical progress, the learning-by-doing process needs to be speeded up along with development of indigenous technological capabilities which can match the international standards. For this purpose investment in research and development incur by labour intensive industries and capital intensive industries needs to be encouraged.
2. The government also has play to an important role to promote manufacturing industries through special policy packages for technical up gradation, providing financial, technical assistance, recognise the scope of innovation, providing infrastructural facilities and encourage research and development in manufacturing industries.

3. A proper environment must be created where an entrepreneur will be educated and will have a proper knowledge, skill and experience about internal and external environment of business to compete with multinational companies and fulfilling changing global environment needs.

4. To improve the competitiveness of labour intensive industries in the era of globalisation there is need of growth promoting agents such as Human development which brings about higher productivity. A well-nourished healthy, educated, skilled and alert labor force is the most important productivity asset. Human development requires investment in the people and an enabling macroeconomic environment for them to achieve their maximum potential. Government has to undertake programmes to accelerate economic growth to match with human development growth so that it can be reap the benefit of better human development in terms of higher productivity. India should follow a pattern of development with promotes employment generating growth, equitable growth, participatory growth, grass roots growth and sustainable growth. If such a pattern of development is fostered, then it would be possible to avoid lopsided development and overcoming the problem of jobless growth, substitution of labour to capital etc.,

5. The fiscal policy of India must be designed in such a way that alters the investor’s choice towards labour intensive industries.

6. Labour intensive industries will derive the comparative advantage of abundant labour persisting in India focusing towards export of mainly labour intensive products and try to perform better in the international market.

7. Industries are trying to identify their technological bottlenecks and use proper strategies to overcome such bottlenecks and make their product more competitive and cheap in the global market.
8. To obtain new knowledge, recent changes in technology, information about product innovation, modernization. Collaboration with foreign firms will help the domestic firm to derive optimum benefits of economies of scale. Shares new knowledge among the other manufacturing industries is one of the ways to create positive spillover effects.

9. The government needs to support and encourage for establishment of more number of industries which are efficiently increasing their labour absorption like Knitted and Crocheted Fabrics, Footwear and Luggage, Handbags and the Like, Saddlery and Harness industries so that they support employment creation in the economy

To sum up, during era of globalisation promotion of industrial skill oriented programme for industrial workers, product innovation, technological up gradation, industrial uplifting policy packages and programme measures giving priority to export oriented industries in both labour intensive and capital intensive segment is needed. It also calls for optimum utilisation of modern information, technological equipment from abroad, giving importance to industrial research and development; policies to attract foreign institutional investors and foreign direct investment towards labour intensive industries and capital intensive industries proportionately. As has to India is a labour abundant country with huge working population, policy maker has to give special focus on employment creating aspect and this cannot be sacrificed. Along with the labour intensive industry, capital intensive industries also play a major role in fulfilling the domestic as well as changing market needs. Further, study suggests that technological competitiveness of industries should be improved according to the changing needs. All these efforts might improve the competitive ability of Indian organised manufacturing sector.