CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

7.0. Introduction

This study is an attempt to analyse the behavioural pattern of multinational corporations that exist in Indian Chemical industry with respect to investment, profit, export and technology development. The Indian Chemical Industry was chosen for study because in this industry a large number of multinational corporations are found; further this industry is one of the highly technology-intensive industries. It was able to identify seventy firms defined as multinationals and one hundred and eighteen Indian controlled firms. This study attempted to evaluate the relative performance of Multinationals, investment behaviour, export intensity and technology development in India. The following are the major findings of this study.

7.1. Economic Performance of Multinational Corporations

This study had made an attempt to study the performance of MNCs in relation to non-MNC firms in Indian Chemical Industry during 1979-80 to 1989-90. Three measures of performance were employed. They are (a) Use of Capital (b) Capital Productivity and (c) Labour Productivity. The first measure is affected by efficiency of capital use. It provides a guide to its efficiency. The second and third
measures throw light on the choice of technique. In this study labour is measured by wages and salaries due to the non-availability of data on man days or number of works etc. Use of capital, two indicators of capital utilised are (i) Capital-output ratio and (ii) Capital - intensity. The analysis of capital output ratio reveals that the capital output ratio of non-MNCs is higher than that of the MNCs during the study period. The possible explanation is that the MNCs are as efficient as non-MNCs in utilising their capital per unit of output and are using similar technique; but MNCs are more efficient in achieving higher turnover on capital employed. Efficiency in this sense may also be taken to include economies of scale.

To test the choice of technique implied in the second explanation, capital-labour ratio was employed. MNCs are expected to have higher capital-labour ratios (ie., with lower personnel payments per unit of total and fixed assets). In this study the average capital-labour ratios for the multinational corporations during the period under study is noticed to be 3.145 and the same for non-multinationals is 4.88. MNCs are found to be less capital intensive than non-MNCs. This finding was further strengthened when the ratio of personal payments to total fixed assets was worked out. This study considered net capital employed, net fixed assets and total assets as a
percentage of sales for MNCs and Non-MNCs. It was found that the mean value of the personnel payments as a percentage of total assets was estimated to be 17.8 per cent whereas the same for Non-MNCs was found to be 11.48 per cent. The mean value of the percentage of personnel payments to net fixed assets was estimated to be 23.59 per cent and 18.67 per cent for MNCs and Non-MNCs respectively. Both estimates viz., percentage of personnel payments to total assets to net fixed assets indicate that MNCs make higher personnel payments per unit of asset than that of non-MNCs.

The analysis of capital output ratio and capital labour ratio make it justifiable to conclude that there is no decisive difference in technology arising from the origin of investment.

In order to test the second measure of performance viz., capital and labour productivity different ratios were employed. They are (a) ratio of value added to gross fixed assets. (b) ratio of value added to net fixed assets (c) ratio of net value added to net sales and (d) net value added to personnel payments. The mean value of the ratio of the value added to total assets ratio of MNC is estimated to be 0.251 while the same for Non-MNCs was found to be 0.425. This lends support to conclude that the capital productivity in non-MNC firms is greater than that of MNCs in Indian Chemical Industry during the study the period. Similarly
when the net value added is considered as a ratio of fixed assets, the mean value of it was 0.476 and 0.995 for MNC and non-MNC groups respectively. An analysis of these ratios reveal that non-MNCs are more capital intensive than MNCs. When labour productivity of the two groups are compared, it was found that labour productivity is higher in Non-MNCs than that of MNCs. The mean value of the ratio of value added to personal payments settled around 1.42 for MNCs and 3.77 for Non-MNCs. This means that though MNCs in Indian Chemical Industry are less capital intensive, the labour productivity and capital productivity are lower. The incremental capital-output ratio and incremental capital-labour ratio again establish the earlier observation that MNCs are less capital intensive by employing less amount of capital per unit of labour. The value added ratios considered clearly indicate that Indian controlled firms are performing better than the MNCs.

A comparative analysis of different measures reveals that resource productivity of Non-MNCs in Indian Chemical industry is greater than MNCs.

The analysis of relative performance of MNCs and non-MNCs involves comparison of the respective profitability ratios. Six ratios were considered for comparison. They are
a) ratio of networth to total assets
b) ratio of fixed assets to Net worth
c) ratio of net sales to total assets
d) ratio of gross profits to total assets and
e) ratio of net profit to Net worth

The mean value of the ratio of net worth to total assets for the period under study is estimated to be 0.6745 and 0.71 for non-MNCs and MNCs respectively. This means that even though both the groups of the firms ensure greater security to the shareholders, the non-MNC firms in Indian Chemical Industry are found to be marginally better.

The ratio of net fixed assets to net worth, which is taken as an indicator of financial performance showed that the multinational companies in Indian Chemical Industry display better financial performance than non-multinational. The turnover ratio viz. net sales to total assets ratio shows that MNCs possesses higher value. This signifies that larger investments are matched by larger volume of sales. Thus the multinationals in Indian Chemical Industry show strong financial position and managerial efficiency.

A comparison of the ratio of gross profit to total assets, which is a pure profit ratio, showed the foreign firms showed higher values compared to the locally controlled enterprises. It could be inferred that MNCs are
characterised by efficient management and better profitability compared to the locally controlled enterprises.

The ratio of net profit to total asset ratio reflects the operational efficiency. This ratio for MNCs was found to be consistently higher than that of non-MNCs throughout the period under study. This implies the MNCs are more efficient in managing their resources compared to their local counterparts.

The net profit to net worth, which showed the net profits earned to the shareholders' funds, also assumed greater value for MNCs. This reflected greater efficiency of MNCs in relation to non-MNCs.

In order to understand further the economic performance of the two groups namely MNCs and non-MNCs the non-parametric test Wilcoxon's signed rank test is employed.

It was found that MNCs are found to be in an advantage over non-MNCs in factors like size of the firm, profit before tax, profit after tax and managerial remuneration. The non-MNCs are found to be superior in advertisement intensity, capital-labour ratios, capital output ratio, export intensity and in net capital employed.
7.2. Investment Behaviour of MNCs

This study tried to find the relevance of suitable theory that could explain investment behaviour of MNCs. The neo-classical profit maximisation theory, sales maximisation and market share models were put to test. It was found that while the investment behaviour of MNCs, is explained by profit maximisation. The sales maximisation principle was found to be suitable for explaining the investment behaviour of non-MNCs.

In the investment models, current investment is treated as a function of market share ($M_t$), profitability ($\text{PAT/NW}$), ($\text{NS/n}$), non-production expenditure ($E_t$), Govt. policy changes ($\text{GP}$) and real effective exchange rate ($\text{REER}$).

For the MNCs, the coefficient associated with the market share variable ($M_t$) is not only insignificant but assume wrong sign. This implies that the increased market share does not seem to be the motive of the investment by the chemical multinationals in India during the period of study. The variable that explain the profitability ($\text{PAT/NW}$) is positive and significant. The sales variable, on the other hand, was found to be significantly negative. In the model it was found that accelerator does not affect MNC investment as dramatically as has been expected. The dummy variable for Govt. Policy is positive and significant in the double log model. In order to understand the influence of
lagged investment on the growth of current investment, $A_{t-1}$ was included in addition to other already included variables. It was found that lagged investment to influence current investment positively. The profitability factor positively influences the current investment. The statistical exercise of the determinants of MNC investment enable the researcher to find empirical support to the neo-classical theory that profit maximisation is the goal behind the motive of foreign investment in the Indian Chemical industry.

In order to make a comparative study on impact of the hypothesised variables on the growth of investment of non-multinational corporations similar regressions were run for the identified 118 locally controlled enterprises. Among the variables, sales alone emerges significant. None of the other independent variables emerge statistically significant. However the sales variable is not significant when it was tested with growth of lagged investment $A_{t-1}$. The coefficient of $A_{t-1}$ was very low. It implies that almost the entire desired capital stock has been adjusted in the same period. The acceleration principle emerged as main explanatory factor of investment behaviour of non-MNCs present in Indian Chemical Industry during the period under study.
7.3. Analysis of Export Performance

In order to understand the export performance by MNCs and non-MNCs, a unique export performance index (EPI) incorporating the proportion of output that is exported and the rate of growth of share of export in total production was used. The value of EPI is 5.3747 for MNCs and 5.96879 for non-MNCs. The Wilcoxon's matched sign test also indicated that non-MNCs are marginally superior in the export performance compared to that of MNCs.

In order to identify the determinants of the export intensity of MNCs, it was treated as a function of capital-output ratio (K/O), Skill (MGR) import of technology (TECH), advertisement intensity (ADS), Profitability (PBT) size (NS) and policy variables (GP). For MNCs of K/O and MGR assume negative sign. The ADS, NS and GR assume positive sign. Among the hypothesised variables K/O and ADS emerged statistically significant. For non-MNCs (TECH) and NS emerge significant. It could be noted that NS found to be negatively related.

These empirical results establish that the MNCs present in Indian Chemical industry is found to be in disadvantage in the export of capital intensive goods. This study again shows that the brand names and well co-ordinated marketing network (represented by advertisement intensity) of the parent company positively contributed to the export growth.
of MNCs of this industry. While size of the firms was not found to be significant in the case of MNCs, it is significant for the non-multinationals. Big firms are found to be influencing favourably the export behaviour of the non-MNCs. Import of technology by Indian companies provides them an advantage as far as their export performance is concerned. Thus the conclusions of the analysis is that the multinationality does not provide any unique advantage in terms of export growth.

7.4. Technology Development and Multinationals

Technological capability in any country refers to two aspects. One, the capacity to manufacture goods and provide services to given designs and specifications. Second, the capability to design changes in given products / processes or to design entirely new products / process which is often referred to as the design capacity. This capability is enhanced in the course of technological change, which in the context of developing countries comes through a combined process of import of technology from developed countries and internal development through R & D activities.

In this study, expenditures incurred by MNCs on the development of local R & D is considered as the measure of technological capability in an industry. Remittances abroad on account of royalty, technical fees and dividends are
treated as technology import cost. It was found that combined expenditure of companies on the import of Technology is greater than the corresponding expenditure on internal research and development both in absolute amount and in relation to sales turnover in MNC groups. For the eleven year period under study, the mean expenditure on technology import for the firms with foreign affiliation in Indian Chemical industry is 62.98 per cent of total expenditure in foreign currency. At the same time the R & D expenditure as a percentage of sales turnover for the multinational group is estimated to be 0.06095 per cent. However, R & D/Sales ratio for non-multinational companies was found to be still lower viz. 0.0549 per cent. This result shows that technological effort in India is far from adequate. In order to build a technological capability of chemical sector with reduced degree of external dependence over time, it is necessary that firms should allocate proportionately higher expenditure on internal research relative to technology import.

The statistical test used to examine the relationship between technology import and technology effort reveals that the elasticity coefficient of B is 1.1142. Since (B > 1) it may be inferred that multinational corporations indicate increasing self reliance and hence they account less for external dependence in technology. Two measures of
technology import cost were used as explanatory variable viz. (i) Royalty, Technical fees and Dividend paid abroad (ii) Royalty & Technical fees. It was found that the model is not statistically significant when the dividend paid abroad is excluded. This brings out the fact that equity participation determines technology diffusion and thus ownership is crucial in the technological self reliance during 1979-80 to 1990-91. It further reveals that mere technical collaborations do not significantly contribute for local R & D development. Technical collaborations are for a definite period whereas equity participation is permanent one. The enthusiasm of local firms to absorb the technology before the agreement becomes lapsed may not be there for foreign firms. Therefore there may not be any tendency to invest on R & D by MNCs. When there is a possibility of getting higher profits, MNCs undertake research effort to adopt technology.

More statistical analyses were made in order to understand the influence of foreign companies on the levels of in-house R & D expenditure. While making such evaluation, distinction between two parallel modes of disembodied technology acquisition viz., foreign direct investment and licensing to non-Multinationals is made in view of their possible differential influence on local R & D activity. In order to estimate the influence of
multinationals and non-multinationals in the technology development in chemical industry, the determinants of its variation is analysed through regression equation using the pooled cross-sectional time series data. The extent of foreign direct investment and technology imports by local firms through licensing are taken as 'explanatory variables along with capital-output ratio' skill variable (Managerial remuneration), advertisement intensity and profit before tax. Capital-intensity and skill intensity are used to examine whether richer technological opportunities exist in capital and skill intensive industry.

In this model, more than 82 per cent of total variation in the R & D intensity is explained by the hypothesised explanatory variables as per $R^2$ value. ($R^2 = 0.8202$). F-value is also found to be significant at 0.05 level. As regards technology imports, the variables proxying the two modes of technology imports viz. FCC and LCC found to be influencing the in-house R & D intensity differently. The value of the coefficient associated with MNCs (FCC) was found to significantly negative while the same for licensed local firms (LCC) was insignificant. The tendency of MNCs to locate and centralize R & D activities near their headquarters may be the most likely reason for this. However this is not the case with locally controlled enterprises. $B_2$ value associated with LCC is 0.7725. The
implication of this positive coefficient of LCC, is that technology import under licensing stimulates local R & D spending. The non-MNC firms may undertake more of R & D to absorb, assimilate and master the imported technologies. They may also undertake greater R & D to keep pace with modernisation whereas the MNC affiliates may have continued access to parent companies' R & D and do not bother much about local technological development.

The capital intensity is found to be significantly positive. The $\beta_3$ coefficient associated with ($K/O$) is 1.1356. It tend to suggest the capital-intensive nature of chemical industry offer more technological opportunities. But as has been found in this study MNCs are found to be less capital intensive than non-MNCs. Therefore MNCs spend less on R & D development. Skill variable is insignificant implying that skill intensity of operations does not particularly result in higher outlays on R & D. This study further revealed that Profit margin and advertisement intensity do not explain significantly the variation in R & D intensity.

In order to verify further the technology behaviour of MNC, production function analysis is worked out. It was found that the output is found to increase by 0.889 units for a unit increase in the Gross Fixed Capital whereas the output is estimated to increase by 0.28953 units for a unit
increase in the salaries and wages. The coefficient associated with time assumes a negative sign. The negative value (-0.01067) associated with time reveals that MNCs in Indian Chemical Industry are characterised by technical retrogression. This result confirms the earlier finding that the presence of MNCs do not contribute significantly to the technological progress during the period 1979 - 80 to 1990 - 91. Hence the hypothesis that multinationals in Indian Chemical sector contribute for the technology development is not found empirically supported at least during the time period under study.

The functional relationship between R & D expenditure and the ownership specific, the location specific and the industry specific variables has been empirically tested in respect of Indian Chemical Industry using linear and log linear functions. The product differentiation, skill intensity, technology are the ownership specific variables. The size of the firm and exports of MNCs are the industry specific variable considered. Government policy changes are the location specific variable included. Of the three models considered, the log linear model incorporating policy variables has been found to have greater explanatory power with coefficient of determination ($R^2$) is equal to 0.9789 and F ratio being 19.41. The ratio of dividend paid abroad to Total dividends has been found positively influencing the
technological effort of MNCs. The coefficient associated with size of the firms assumed a negative sign. Therefore the hypothesis that the size of the firms are positively related to R & D intensity does not find empirical support in the chemical industry. This may be because the large sized MNCs spend huge sums of money on R & D in their parent countries. This implies the MNCs do not make serious research effort locally. The royalty paid abroad as a ratio of net sales which has been considered as a proxy for technology import is found to have positively related and it is statistically significant. International competitiveness which has been proxied by the ratio of exports to net sales is positive. This means that external competitive strength induces the multinational firms to make higher R & D expenditure. The managerial remuneration as a ratio of salaries and wages is not only significant and but positively related. This estimate leads the researcher to infer that skill intensity positively influences R & D expenditure in Indian chemical sector.

The coefficient associated with the variable viz., product differentiation has been positive and significance. This enables the researcher to infer that product differentiation motive of multinational firms is another determinant of technology development in MNCs during the reference period. The dummy variable to capture the
influence of policy changes is found to assume positive sign and statistically significant. This finding lends support to the phenomenon that liberalised policy changes in the trade and industrial front enacted in India have helped the growth of research intensity on the part of MNCs in chemical industry. When similar models were estimated for non-multinational corporation none of the variables other than product differentiation were found to be significant.

The overall conclusion is that the ownership specific variables like size, import of foreign technology, skill intensity product differentiation are significant factors that explain technology development in MNCs. Location specific variable namely Government Policy changes positively influence the research effort in MNCs.