A SUMMARY AND SOME POLICY IMPLICATIONS

The first part of this chapter summarises main findings of the investigation presented in previous chapters. The implications that these findings of the study have for policy questions are then briefly discussed. Finally, the ways in which this investigation might be improved and further extended are discussed.

7.1 A Summary of the Study

Chapter 1 presented a justification of the study of industrial location. It also outlined a model of industrial location. It specified that the location of firms in manufacturing industries would be determined by the degree to which they respond to low cost labour markets, sources of raw materials used, sites of final consumers of their products and location of other manufacturing industries. The force motivating a locational response to any of these factors would be the desire to maximise profits by reducing transportation costs. Later in Chapter 6, an additional factor representing cost reductions available to firms simply by locating in a large industrial centre, regardless of the particular
industries present and not arising from transportation costs, was added to the model. The study started with two main objectives. The first was to measure the factor orientations and geographic association of manufacturing industries in India. The second and the core objective of the study was to quantify the extent to which the generalised agglomeration economies and agglomeration economies (which arise due to inter industry linkages) may have influenced the locational pattern of manufacturing industries, allowing for the effects of other factors of location. For the purpose of investigating these issues, this study took up 66 manufacturing industries and 367 districts, spanning the whole country. Sources of data required for an extensive investigation of this type, have also been delineated in the opening chapter.

Since classical theory of location, which puts substantial emphasis on transportation cost, has been considered as base of this study, Chapter 2 has provided an extensive survey of various theories of location that have been formulated from time to time. This chapter also tried to show the continuing relevance of classical theory of location in the backdrop of recent development in spatial analysis.

Chapter 3 tried to develop a measure of randomness and to critically examine an earlier study in this domain. The approach used for measuring randomness was not considered to
be perfectly satisfactory. However, it was felt to be of sufficient strength to stand by the conclusions based on it, namely that much of industry in India did not locate randomly. The other side of this conclusion was that location of industries was influenced in systematic manner by a certain set of factors. In the next chapter measures of factors influencing location were developed. Potential labour orientation of firms was measured by the relative cost of wages in the firm’s processing costs (the ratio of wages to value added was used as a proxy for this), and eight industries were identified as being potentially labour oriented. Probable orientation to final consumer markets was identified for fourteen industries, which sold a significant proportion of their output to the final demand sector and which also tended to locate close to consumer markets (measured by population concentration). Probable orientation towards primary resource extractors was identified for nineteen industries which purchased a significant proportion of their output from the primary resource sectors and which also tended not to locate near the population concentrations (assuming that primary resource locations do not correspond to those of population concentrations). A means of identifying potential orientation toward other manufacturing firms because of possible reduction in transportation costs of traded
products, using industrial linkages, was then discussed. This approach was also compared with previous measures used for this purpose. A large number of potential agglomeration economies falling into supply-demand and weak strong categories were found to exist among the industries examined in this study.

Chapter 5 of the study explored various measures of the degree to which firms in different industries tended to locate close to one another. The coefficient of correlation between regional employment estimates for pairs of industries was justified as the most suitable measure. A significant locational association was found to exist between more than 13.28% of all industry pairs. Geographic association among firms in more than two industries were not examined because the volume of calculation required for such an examination with available methods was felt to be excessive.

In Chapter 6 the impact of measure of potential agglomeration economies arising from transportation cost reduction on the measure of geographic association for 66 manufacturing industries in the aggregate was first discussed. A significant positive influence was observed. The response of the firms in aggregate did seem to be affected substantially by separate consideration of linkages to suppliers and consumers or of weak and strong links as defined in Chapter 4.
The demand linkage was found to be more important than supply linkage in aggregate analysis. The response of firms in the aggregate did seem to be affected by their identification as market or material oriented according to the methods of Chapter 4. Regression analysis of a sample of fifteen individual industries revealed that agglomeration economies based on transportation cost reductions were important in determining geographic associations for ten of the fifteen sample industries. General agglomeration economies were also equally important, they were also significant for ten of the fifteen sample industries. Linkages of the fifteen sample industries with service industries failed to emerge as an important variable in explaining geographic association. Market orientation was found to have significant impact on geographic association for only one of the fifteen sample industries. Although the results of the models using other factor orientation variables could not be presented but still tentative conclusions were drawn on the basis of correlation matrix of geographic association with other factor orientation variables. On the basis of this, demand linkage was found to have significant impact on geographic association for twelve of the sample industry. Thus separation of average potential linkage into demand and supply linkage was justified.
7.2 Implications of Present Study for Industrial Location Policy

There is extensive literature on public policies intended to influence industrial location. Most writers agree that in all economies which allow firms to make their own location decisions, firms can be assumed to choose locations which maximise returns to the decision makers. Therefore, public policies if they are to have any effect, must have an impact on the rates of return possible at specific sites. Hoover outlined the major kinds of policies that can be used.¹ As he points out, public agencies have within their control a variety of means for affecting returns, primarily through the firm's costs. The major categories of policies include those affecting:

1. The labour market through standards of performance, wage subsidies, training programmes, information services and mobility policies.

2. The capital market through low interest loans, loan guarantees and investment credits.

3. The land market through zoning and other restriction, land assembly for industrial parks and the development and pricing of utilities.

¹ E.M. Hoover, op. cit., pp. 251-278.
(4) The transportation market through location and type of facilities constructed and their pricing and
(5) Taxes which may affect any of the other markets.

In India also the regional authorities have tried to pursue some of these policies to attract industry to their region. But the results have been far from satisfactory.

It is sometimes believed that as public agencies try to affect industrial location only through firm's costs it is not necessary to recognise public activity as a distinct factor of location. In fact the opposite is true. Public agencies need to recognise the strengths of the locational orientation of firms in various industries, which are based on costs, if they are to successfully pursue industrial location programmes. This is specially so when such programmes have as their goal the attraction of new industries and when the means available to implement the programme are only taxes and subsidies. The funds should not be wasted in attempting to attract to non metropolitan regions firms in industries identified as being highly responsive to markets and general agglomeration factors. It has been confirmed through empirical findings that "more basic, economic factors still determine the choice of region of location, and that tax and subsidy policies
are not important in themselves". 2 These policies are marginal in influencing industrial location but, in short run, they may be all that is available to a regional development agency. If tax and subsidy policies are to be used effectively the regional development authorities must have an understanding of the basic economic factors influencing location.

This study has outlined a methodology and has also produced some results that might contribute significantly to such an understanding. Given the normally limited resources (in the form of tax concessions and subsidies, as well as funds for promoting development) of regional development authorities, they should attempt to use these as efficiently as possible. One possible way of improving the efficiency of such agencies might be for them to concentrate their efforts on attracting firms in industries which are not oriented to factors not present in the region. They can also concentrate their effort on attracting firms in industries which are frequently both geographically associated and linked, through potential agglomeration economies arising from transportation cost reduction, with firms already in the region. In this case

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the regional authorities should be attempting to reduce other cost just enough so that the potential transportation cost reduction would become the dominant consideration in a firm's location decision. The existence of the possibility that this might occur for firms in a specific industry could be determined in advance through the methods proposed in this study.

The other possibility is to operate directly on the size of the potential agglomeration economy. This can be accomplished by reducing substantially intra-regional transfer costs. These can be reduced by ensuring that all geographically associated and linked industries are as far as possible located together, as in well designed industrial parks or industrial estates. Transportation costs can also be reduced by providing improved intra-regional transportation facilities.

Another aspect which may be pointed out here is that the linkages with service activities fail to emerge empirically as an important variable in explaining geographic association of fifteen sample industries for which regression analysis were undertaken in the present study. But conceptually the availability of infrastructure (Power, Water, Transport, Communication etc.) is a basic requirement for industrial growth. Emphasising the importance of infrastructure facilities
A. U. Sekhar points out "Of two typical form of incentives, financial incentives and infrastructure provision, the latter has several desirable properties. It provides long-lasting support for industrial development and its benefits are received by all activities within the service areas. Although infrastructure provision may be more costly than the alternative, it would be more consistent with the development objectives for which industrial location policies are maintained."³ Thus it is desirable that government should identify certain regions and metropolitan areas where there is significant industrial potential but which suffer from deficiencies in infrastructure. Adequate physical and social infrastructure should then be provided to these areas.

From the viewpoint of individual firms, direct usefulness of the kind of analysis undertaken in this study appears to be somewhat limited. However, it could still be important for a firm to know where all the other firms in its industry have located and with which industries they have usually been associated. This might reveal previously unknown reasons for some firms being more successful than others. Knowledge of the geographic distribution and locational factors underlying a firm's markets and suppliers could also be valuable to individual entrepreneurs.

³ A. Uday Sekhar, op. cit. p. 101.
Only the potential utility of this kind of study, has been suggested in the preceding paragraphs, other implications are also possible. The value of this kind of study both to the theory of industrial location and in the area of industrial location policy might be increased in a number of ways, some of which are suggested in the following section.

7.3 Scope for Extension of the Analysis

At several points in the preceding chapters limits were imposed on the scope of the investigation. The removal of these might be a useful way of extending the preceding analysis. More confidence might be placed in the findings with respect to the importance of agglomeration economies to manufacturing industries as a whole if manufacturing industries at a more disaggregated level were included in the study. Statements regarding the importance of various factors for location of firms in individual industries would be much more valid if regression analysis of all industries instead of only 15 industries had been completed.

Problems arising in way of the attempt to identify footloose industries had been mentioned in Chapter 3. These might be overcome through experimentation with different criteria for identifying foot looseness. Experimentation with
more and less stringent criteria for identifying potentially significant agglomeration economies and for identifying significant geographic associations might produce a combination of criteria to identify positively only those industries subject to a significant impact. Estimation of more regression models for individual industries, including alternative specifications of functional forms would probably produce better models.

The extension of the analysis of bilateral relationships between one industry and others, to the case of industrial complexes can also be taken up. The methodology for this may rely on knowledge of the linkages accompanied by associations for each industry. Geographic associations among firms in more than two industries can also be taken up.

The validity of the methods used in this study might also be examined. One way of approaching such a validation would be to systematically compare the results of specific regional, industry and firm studies to those of the aggregate industrial approach used here. Hopefully the results would show that individual firms and regions do not differ greatly in characteristics or behaviours from industries in the aggregate.
A final, and potentially the most significant, way in which this investigation might be extended would be to utilise time series observations on both locational and input-output structures. One hypothesis of interest might be that, overtime, more significant linkages are accompanied by geographic associations in an industry indicating, among other possibilities, that competitive conditions force firms to take advantage of all possible economies and that the competitive model is still valid for the economy. Rejection of the hypothesis might, instead, be interpreted to mean that reduction in transportation costs have reduced the importance of agglomeration economies. In addition to these, there could no doubt be other ways also in which the analysis presented in the study could be extended and improved upon.