The need for examining the behaviour of the urban dimensions over time or the sensitivity to changes in the urban systems through space has been felt in the recent urban researches. L.J. King's \(^1\) call for more extensive cross-sectional works, R.A. Murdie's \(^2\) emphasis on the study of cross-national, cross-cultural or at even broader scales, Gerald Hodge's \(^3\) comment on the general comparative study of the urban structures, and Q. Ahmad's \(^4\) attempt in finding out the generalised factors of the urban structures are few of the many attempts around which the present study is based on. The main purpose of this investigation was first to identify the basic dimensions of variation of Indian and American Urban Systems, to test the sensitivity to changes over time and through space and to arrive at a cross-national as well as cross-cultural comparison of the two urban systems.

5.1. CROSS-NATIONAL COMPARISON OF THE INDIAN AND AMERICAN URBAN SYSTEMS: A SYNTHESIS.

The entire investigation is divided into two parts. In part one, the basic dimensions of variation of the American Urban System have been identified and test their sensitivity to change over time and through space. In all, nine factors relating to the various aspects of the urban system have been identified. One of the major findings of this research is that more than 80 per cent of variance of the 164 American cities on 52 variables can be explained by the nine factors only. In other words, the 164 American cities, as a whole, differ mainly from each other in respect of these nine factors. Altogether eight separate analyses have been conducted. The entire range of factors relates mainly to the aspects of population size, education level, level of housing and physical conditions, population age, employment level, community age, ethnic segregation and state of social welfare. Put another way, it appears that American urban centres (cities of 25,000 people or more in 1951 and 1961) may be described in terms of the factors (dimensions of variation or structural features) relating to these eight structural characteristics. In particular, four factors relating to population size, level of housing and physical conditions, population age and employment level recur through the different
analyses conducted separately for total U.S. cities, cities of pacific region, cities of north-west central region and cities of Mid-Atlantic region for the year 1951 and 1961. This substantiates the validity of the hypothesis relating to the stability of some of the major factors over space and through time. The factors relating to the other characteristics show their instability over time or space or both (Table 3-14).

Another major contribution of the present research is related to the grouping characteristics of the American cities. The entire range of 164 cities have been grouped together on the basis of the nine well-defined dimensions of variation relating to the eight different structural characteristics mentioned already. Two separate analyses have been conducted for 1951 and 1961. The finding of the grouping analyses is that the groups of cities showed up in the 1951 analysis duplicated partially in the 1961 analysis. This may substantiate the validity of the second and third hypotheses mentioned earlier in chapter I and complements the study of King on Canadian Urban Systems. On the other hand, the strength and persistence of the major factors through time are reflected on the strong regional contiguity among the

member cities - an purely theoretical idea in the field of central place studies or an aspect of system analysis. This proves the seventh hypothesis of this study.

In part two, a total of 102 cities of India (having 100,000 or more people in 1961) have been subjected to the factor analysis on 52 variables. Three separate analyses have been conducted for the total cities, cities of Northern India and the cities of Southern India. Fourteen factors or the dimensions of variation of the Indian Urban System have been identified explaining more than 80 per cent of the total variation of the cities on these 52 structural characteristics. The factors are related mainly to the urban features of population size, employment level, sex differentiation, rural orientation, education level, accessibility migration, fertility ratios and population change. Put another way, more than 80 per cent of the city to city variation of India could be captured given informations on the 14 factors only relating to the nine structural characteristics.

The temporal aspect of the model could not be examined mainly due to non-availability of the data for 1951 and lack of comparability of the available ones. Only the spatial aspect of the model is examined considering all the cities together and dividing them into northern
and southern groups. Some of the major factors mainly relating to population size, employment level, rural orientation, education level, accessibility, migration and fertility ratios recur in all the three independent analyses (Table 4-14). This research finding clearly suggests that some of the major factors of the urban dimensions model are stable over space and substantiates the first hypothesis. The factors relating to sex differentiation and population change are not stable over space in the sense that they did not emerge in all the three analyses of the Indian cities. On the other hand, factors relating to, for example, accessibility and migration recur more than once in the same region as well as in the same analysis (Table 4-14). This should not be regarded as the discrepancy of the model, rather the same factor may relate to the different structural characteristics of the same category. For example, factor relating to migration of Southern Indian cities, emerged as fifth showing rural-urban movement (Table 4-7) and as eighth showing age-selectivity of the migrants (Table 4-10) in the same analysis. Same type of explanations could be given to the factor relating to the accessibility also.

The grouping analysis of the 102 Indian cities, on the total of 14 dimensions of variation through the use
of computer program, yields one of the interesting results that in the Indian Urban System also there is a strong regional contiguity with a few exceptions. The national metropoleses of India, viz. Calcutta, Bombay and Delhi grouped together showing vastness in size in comparison to the rest of the cities of India. The rests of the 11 groups show a very strong regionalization complementing the theoretical aspects of the central place theory or the system analysis (Table 4-15).

At this stage, a comparison of the factors of Indian cities with those found for the American cities, will help in better understanding of the similarities and differences of the two urban systems. The comparison is highly generalised, yet emphases have been given to the statistical significance of the model and to the minimization of the subjectivity in interpreting the factors or the dimensions of variation of the cities. The statistical soundness of the model is maintained by selecting the same number of variables (52 in all) for all the analyses. As the ultimate factors are nothing other than the "representative constructs" of the related variables, the changes in the number of variables from one analysis to another may have significant effect on the resulting factors. The differences in the total number of observations (102 cities of India and 164 cities of U.S.A.) do not effect the resul-
ting factors in the sense that only the significant factor loadings at 95 per cent probability level have been taken into account for the purpose of interpretation. Granting these, following generalizations can be made with respect to the factors emerged for India and that of U.S.A.

It seems that the factor relating to population size, reflecting the scale of development of a city is the most important factor and a most general ones. This factor has emerged as 'first' in all the analyses of the Indian and the American cities. It alone explains more than one-fifth of the total variation. The significance of 'size' has been emphasised in the ecological literatures. The emergence of the population size factor in all the analyses complements that it is one of the most stable factors through time and over space. Put another way, the variation of the cities at cross-national or at even broader scale may be explained in terms of their sizes to a considerable extent.

The factors relating to the urban features of education level, reflecting the educational attainment of the population and employment level, reflecting the specialization in economic base activities have also emerged to

the Indian cities as well as to the cities of the United States. These two factors also remain stable over space and through time at the Cross-National or Cross-Cultural level. The emergence of the factors relating to population size, education level and employment level, justifies thinking of them as "Common" dimensions of urban structure. That is, they represent fundamental ways in which an urban centre (whether it has economic, industrial or cultural differences) can be measured and easily compared with other centres measured on these same dimensions.

There are some other factors relating to some specific characteristics of the urban structure. They are not stable at the Cross-National level in the sense that they emerged either to the cities of India or to American cities but they are stable at the regional or national level. Factors relating to rural orientation, accessibility, migration and fertility ratios of the Indian cities are spatially stable within the limit of Indian Urban System and on the other hand, factors relating to level of housing and physical condition, and population age are stable both spatially and temporally in the American Counterpart.

A few factors, for example, relating to sex differentiation and population change for the Indian cities and community age, ethnic segregation and state of social welfare for the American cities may be said to be purely
...instable both spatially and temporally. That is, these factors may be said to be as 'specific' or 'unique'. They are, generally, the result of variables inserted in a study to reflect special regional considerations.

5.2. SUGGESTIONS FOR FURTHER WORK.

The present study is a first step in the line of comparative study of urban systems at the cross-national or cross-cultural level where some of the major similarities and differences that exist between cities in non-western and western areas are underlined. In doing this, some of the shortcomings and imperfections are self evident. One of the main problems in this respect is the scarcity of the comparable data. Altogether 52 variables have been taken into account for the American cities relating to the different characteristics of the urban places, but it was not possible to collect informations on the same 52 variables for Indian cities. This is mainly due to the unavailability of the data and due to the differences in the definitions of the variables. The related variables were used in this type of situation. The consideration of the related variables may result in the emergence of the unique or specific factors at the regional or national level. Further, on Indian cities, some of the variables relating to the
housing and physical conditions of the cities, per capita volume of retail and wholesale sales, value added by manufacturing and so on are not available for 1981 census. The need for the inclusion of more representative variables is self evident.

The comparison of the cross-national results from factor analysis may not be taken too seriously because of the fact that no attempt has been made to examine the degree and direction of changes in the correlation matrix. The three-modes involve individuals (cities here), traits (variables) and occasions (here time periods or regional considerations). This method was not used in the present study because of computational and other related complexities.


Finally, this study may be considered as a first step in what a systematic comparison of the Indian and American Urban Structures has been completed. Beyond this, the answers to the questions when posed for other nations, countries or at the global scales, are some of the challenges for future research workers.