INTRODUCTION

Transportation has been studied traditionally as a structural feature in regional studies and as a topical field in engineering, economics, geography and planning. Its advent into the social sciences is more recent and studies on system analysis, geometric design, locational analysis and models of production allocation etc. dominate in it. It has long played a major role on its traffic engineering, mass transit, rapid transit, designing of bridges etc. Broadly speaking, transportation has been conceived as an area of research and study where analysis and quantitative techniques have an edge over descriptive or quantitative approach. With the advent of the quantitative revolution in Geography, however, a new opening for transportation was created with several possibilities viz. analysis of interaction matrices, linear programming models for movement of commodities fall in this group.

Transport Geography

The origin of transport geography, in the modern sense, may be attributed to Ullman, who developed the fundamental concepts of the subject and advocated for adopting the systematic approach in the study of
transportation. According to Ullman the prime concern of transportation geography is the study of various features of traffic volume, origin and destination, rate structure etc. and types of actual physical facilities, i.e. the effect of terrain and other environmental conditions as well as of changing technology on transportation and, conversely, impact of improvement in transport facilities upon process of economic growth.\(^1\) The flows of goods, people, and ideas stem from the socio-cultural structures of the generators and absorbers of these flows on the one hand, and from the network efficiency on the other. The flows along the defined channels and their spatial arrangements provide the basis for more complex system of interactions which integrate the space economy.\(^2\) It is also important to distinguish routes and networks from the nature and magnitude of the flows. In the more restricted sense, the study of transportation in relation to the space economy may be grouped as follow:

(i) Structure and space – the study of transport networks in the space economy.

(ii) Interactions and space – the study of flows in the space economy.
The study of transport network relates to the evaluation of its structure and efficiency. In a large number of studies conducted around the world, the relationship between the networks of different modes of transport and their role in the intra, inter-regional and metropolitan contexts have been represented by traditionally through the use of cartographic techniques with the help of accessibility maps, isopleths, and route density maps etc.

The application of topological concepts and graph theoretical techniques to the analysis of transportation networks has also been attempted in many recent studies. With advances in such studies, several methods have been evolved to measure the efficiency of networks in their entirety.

Kansky argues that the structure of the transportation network of any area cannot be studied in isolation from the geographic characteristics of that area. He uses the abstract graph theories to analyse hypothetical relationships between the structure of transportation networks and the level of economic development.
Transportation linkages serve human habitats which are either rural or urban settlements of varying sizes. An important aspect, therefore, is the analysis of the structure of the transport network in relation to the spatial organisation of particular type of nodes. Such types of studies have been done by Mayer, Johnson, Ramachandran, and Kumar. Hagget has identified various levels of nodes and a structural hierarchy on the basis of interaction attributes. Taaffe and others have also examined the spatial diffusion and socio-economic growth accompanying the expansion of a transportation network.

Studies on the impact of highway development on the economy of the neighbouring regions constitute an important area of investigation in transport studies. Campbell has assessed the results of transportation programmes in developing countries. Gauthier also conducted the study of relationship between changes in accessibility to the highway network and the growth of urban centres in Sao-Paulo.

The study by Ullman of U.S. commodity flows may be considered to be a significant and pioneering work in flow analysis. Theoretical as well as empirical contributions by Probst, Alampiev, and Bedenkova relate
to the flow of commodities and formation of economic regions in Soviet Russia. Britton has used origin and destination data on road freight flows at the city and regional level for England and Wales as a means of identifying regions connected in chains and hierarchical pattern. Currie also presents a detailed economic survey with specific reference to the role of transportation in the Canadian economy.

Transport Studies in India

With reference to the Indian context, such studies on transportation are rare. Jagdish Singh had done a study on the transportation of South Bihar with reference to its varied geographical features. He has used simple techniques in analysing the different transportation features. R.B. Singh (1964) has also followed the similar pattern for the state of Uttar Pradesh. Both of them have done their study in the integrated manner to provide measures for the future planning with reference to the past and present. Likewise many scholars have done their studies on transportation of North Bihar.
Madhya Pradesh and other parts of India. Besides, some other studies with specific emphasis on commodity flows and other aspects have been taken up by many scholars. Reed has provided a detailed picture of commodity flows in the Bihar-Bengal industrial belt\(^20\). Johnson has presented an economic survey of the Indian railways in the historical context\(^21\). A study by Raza and Aggarwal also examines the relationships between economic base and commodity flow characteristics\(^22\).

The above brief survey reveals that the Transportation Geography, though neglected for a long, have appeared in the recent decades. With valuable literatures on transportation geography as well as the studies concerned with planning for an articulated transport system in order to promote economic development have also made remarkable strides. In India, the transportation studies in a systematic way have special significance as transportation system is the switchboard of the whole apparatus of economic development. Its importance in improving the standard of living of the people
by well planned economic development programmes and
to defend the sovereignty and unity of the country,
and to conserve the integrity of the diverse popula-
tion cannot be overemphasised.

Objectives

The present study is an attempt to provide
an integrated study of the transport geography of
Manipur. The study has a two-fold objective.
First, it tries to present a case study in systematic
analysis of transportational system, and second, it
aims at a thorough study of regional as well as
district level transportational features in Manipur
to serve as a backdrop for planning the future
transport network. Thus, the scope of this work
is limited to the systematic analysis of the existing
transport network in Manipur through simple topolo-
gical indices. The geography of transportation is
concerned with the study of transportation, its
development, location and operation within the
territorial economic complexes of countries and
regions, and its inter-relationships with the location of industry, agriculture, population and cities, and of natural phenomena and resources. The study focusses on various transportation characteristics and analyses the road network of the state of Manipur.

The Study Area

Manipur (Area: 22,327 sq.km/Population: 14,20,953 in 1981), a hill-girl tiny state in the North-East India, ranks 20th among the states and union territories of India. It is centrally located on the eastern arm of the Himalaya – the Purvachal, which separate India from Burma. It is almost rectangular in shape with a small fertile valley in the middle, which is surrounded by the hill ranges, constituting over 90% per cent of the state area.

The state is divided into eight districts – Imphal, Thoubal and Bishnupur in the central valley and Chandel, Churachandpur, Senapati, Tamenglong and
Ukhrul in the hills. Five hill districts have larger area and small population, while the valley districts are densely populated. The districts have been divided into sub-divisions and blocks for administrative convenience and developmental purposes (Map 1). The hill districts have autonomous hill councils which provide self government authority to the tribal people living in the hill areas of the state. While other hill districts have only one autonomous district council, Senapati district has two - (i) Senapati (including Mao-Maram and Paomata sub-divisions, and (ii) Sadar Hills with headquarters at Kangpokpi (including Sadar Hills East and West subdivisions).

Manipur, having great areal variation within a limited small area, remained largely unexplored and underdeveloped for centuries for want of efficient means of transport and communication. Even today she is little connected with the outside world. Over and above, the high ranges of mountains and hills surrounding the central basin hamper the construction
of highways. Until and unless the transport systems - roadways, airways, waterways, railways or tramways, ropeways and pipelines to some extent are properly laid out and developed, there will be little progress on the economic front. So, the easier and cheaper means of transportation are must for the economic development of the state.

The Design of the Study

The present study is divided into three parts and eleven chapters. The first part comprises the geographical background of Manipur to which the patterns of various transportational features are closely interlinked. This part contains two chapters - Chapter I dealing with the Physical Setting and the second chapter with the Cultural Setting of the state.

Part two comprises seven chapters dealing with various transportational features. It commences with Chapter III, which surveys the evolution of transport in Manipur from the ancient period upto the present in the historical perspectives. It highlights the historical forces that have shaped the existing
Chapter IV explains a systematic and analytical appraisal of transport arteries, their distributional pattern, nature, density and distribution in different regions of Manipur as well as in North East India.

Chapter V examines the nature of accessibility and the effectiveness of the existing transport network. Besides, physical accessibility and concept of relative accessibility have been utilized to measure their effectiveness. Further various topological indices have also been used to measure the degree of accessibility in various districts.

Chapter VI gives a detail analysis of the nature and flow of both passenger and goods traffic. Inspite of the serious scarcity of data, the study attempts to portray a clear picture of the density, structure, transportational features, and origin and destination of road traffic in the State. Scattered statistical materials were collected from various sources and the entire available data was tabulated for the purpose. The surveys of both the passenger and goods traffic
were conducted by the author himself and analysed.

Chapter VII deals with characteristics of the urban transport with emphasis on the impact of transportation in the evolution of towns. A few towns have been selected for indepth study with help of intensive field investigation. The traffic survey was conducted in Imphal, Churachandpur, Kakching, and other small towns to have first hand information about the general transport problems in the urban areas of the State.

Chapter VIII deals with different aspects of rural transport, the density of rural roads per 100 sq. km area and per 10,000 population, have been analysed. The data for this chapter was collected from diverse sources and extensive field works.

Chapter IX examines the need for demarcating transport regions for planning purposes with a brief note on the methods for demarcating such regions. Such a regionalisation will be of much use in future planning of the transport network in the State. Part three deals
with the problems and planning and comprises of two chapters. It commences with Chapter X in which more emphasis has been laid on the problems of various transportational systems, both in urban and rural areas in the plain and hill tracts of Manipur.

Finally in Chapter XI a number of suggestions for the improvement of various means of transportation at regional, inter-regional, urban and rural levels have been discussed. Introduction of ropeways, and railways have been suggested besides introduction of pipelines for transportation of petroleum products including natural and L.P.G. gas.

A summary of the findings forms the concluding section of the present study.
REFERENCES


    National Geographical Society of India,

    Department of Geography Research Paper No.110,
    University of Chicago, Chicago, 1967.


    1986.