CHAPTER - 5

THE NATURE OF TRAFFIC FLOW

Traffic, the core element of transport system attracts the complexities of economic interactivities. The nature and establishment of all kinds of economic activities depend on the nature of movement of things over the earth, the volume of traffic and the distance covered between the centres\(^1\). In other words the level of economic and regional development and the factor of distance are the basic ingredients which affect the extent of traffic flow between the regions and so they are applied in a gravity model. Between the centres having the population greater, the interaction would be greater and vice-versa\(^2\).

The interaction is a result of areal differentiation but differentiation alone does not account for total interchanged though it does so to some extent. Interaction originates between two areas of having demand and supply. Interchange occurs only after specific complementarity is achieved which is a function of areal differentiation promoting spatial interaction\(^3\).
Interchange depends on complementarity only if has an intervening complementarity source of supply which is a manifestation of Stouffer's law of intervening opportunity, a fundamental loss of spatial interaction. Mahoba and Mauanipur, and Moth play their role of intervening opportunity between Banda-Jhansi and Orai-Jhansi centres respectively.

Transferability, measured in terms of displacement and cost of time, is used for the measurement of the final factor of interaction system. If there is a greater distance between the marketing and supplying areas, interaction would not succeed though have perfect complementarity and absence of intervening opportunities, and thus the transport cost upgrades between them.

In order to establish links between centres or areas, and the nature of spatial interchange, it needs some way of measuring and mapping the nature of traffic flow including the volume and speed of movement as well as its origin and destination. These aspects of transportation are dealt with in the next pages clearly.

Passenger and freight are the two significant
heads of traffic handled by any transport system. As there are fundamental differences in the traffic carrying characteristics of the different modes of transport, it needs most to analyse them separately.

**RAILWAY TRAFFIC**

**PASSENGER TRAFFIC FLOW:**

Fig. 5.1A exhibits the number and heavy traffic as well as high density of passenger trains, running various railway lines in Jhansi Division which provide direct links between east-west and north-south India. In Bundelkhand there are two main lines, one connects Delhi to Bombay via Jhansi and Lalitpur and the other joins Allahabad to Bombay via Manikpur by their heavy traffic in general.

There is a minor variation in the various sections of a line in plain or plateau land. Jhansi-Kanpur via Orai, Ait-Konch, Jhansi-Banda via Harpalpur, Banda-Kanpur via Ragaul and Banda-Manikpur via Karwi are sub-lines of Jhansi Division. On Jhansi-Banda railway line the lowest traffic flow exists as fig. 5.1A shows. The heaviest traffic flow occurs along Delhi-Jhansi-Bombay railway line (over 28 UP and down trains daily).
FREQUENCY OF PASSENGER TRAINS:

Fig. 5.1B represents the number of passenger trains stopping at a station in a day within a particular time along the different section of Railway lines, by which the idea of volume of passengers and importance of that area is easily achieved. The passenger trains stopping\(^5\) at a station, within a certain time period, have the great importance for rail-service provided to the people particularly in case of exchanging. In preparation of frequency of trains map, a circular zone with a radius of 8 kilometres distance has been drawn around each station. This belt of 8 kilometres is most significant because it provides the maximum benefit from the frequency of service at a particular station. Fig. 5.1B represents the overlapped and non-overlapped circle zones of numerous stations. The zones of overlapping are categorised in approximate proportion to the frequency of service and various zones have come into existence. The pattern of frequency of service clearly denotes the differences within and between these zones\(^6\).

Fig. 5.1A reveals the number of passenger-trains running on a particular line in comparison to another, but it does not mean that its all the stations carry on equility in greater privilege
than those having fewer trains. It's all important depends upon the number of trains stoppages. Jhansi section of Jhansi-Delhi and Jhansi-Bombay lines has largest number of trains running along them. Actually a few stations of these railway lines have greater frequency than the others having one or two trains daily. These stations have not better service except a few up and down trains. Table 5.1 shows separately that Jhansi (48 trains), Ait (22 trains) and Manikpur (20 trains) stations have the greater frequency of trains lying in up and low and Bundelkhand tract. Of course these stations are the suitable junctions and nodal points of the region. On the other hand Jakhaura, Dailwara, Jiron, Jakhalon and Dhaura stations in Lalitpur district carry the lowest number of frequency of two trains daily respectively.

**TABLE - 5.1**

**STATIONWISE FREQUENCY OF TRAINS (1985).**

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>TAHSIL</th>
<th>STATION</th>
<th>NO. OF TRAINS DAILY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhansi</td>
<td>Moth</td>
<td>Chirgaon</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moth</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erich Road</td>
<td>04</td>
</tr>
<tr>
<td>Mauranipur</td>
<td>Ranipur Road</td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Jhansi</td>
<td></td>
<td></td>
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<tr>
<td>----------------</td>
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<td></td>
</tr>
<tr>
<td>Mauanipur</td>
<td></td>
<td>06</td>
<td></td>
</tr>
<tr>
<td>Rora</td>
<td></td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Garhmaw</td>
<td></td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Parichha</td>
<td></td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Jhansi</td>
<td></td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Orchha</td>
<td></td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Barwa Sagar</td>
<td></td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Karari</td>
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<td>10</td>
<td></td>
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<tr>
<td>Bijauli</td>
<td></td>
<td>04</td>
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<tr>
<td>Khajraha</td>
<td></td>
<td>04</td>
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<tr>
<td>Babina</td>
<td></td>
<td>16</td>
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<td>Jalaun</td>
<td>Konch</td>
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<tr>
<td>Konch</td>
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<td>Parauna</td>
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<tr>
<td>Orai</td>
<td>Ait Jn.</td>
<td>22</td>
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<tr>
<td>Bhua</td>
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<td>04</td>
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<tr>
<td>Orai</td>
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<tr>
<td>Kalpi</td>
<td>Ata</td>
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<td>Usargaon</td>
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<td>Kalpi</td>
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<td>Hamirpur</td>
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<td>Ingohta</td>
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<tr>
<td>Bharwa Sumerpur</td>
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<td>Charkhari</td>
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<td>Maudaha</td>
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<td>Maudaha</td>
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<td>Charkhari Rd.</td>
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<td>Mahoba</td>
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<td>Kulpahar</td>
<td>Kulpahar</td>
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<td>Belatal</td>
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<td>Ghutai</td>
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<td>Banda</td>
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<td>Khairar</td>
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<td>Banda</td>
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<td></td>
<td>Dingwahi</td>
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<td>Naraini</td>
<td>Khurhand</td>
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<td></td>
<td>Atarra</td>
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<td>Badausa</td>
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<td>Bharatkup</td>
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<td>Karwi</td>
<td>Sheorampur</td>
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<td>Bahilpurwa</td>
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<td>Manikpur</td>
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<td>Bargarh</td>
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<tr>
<td>Lalitpur</td>
<td>Matatila</td>
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<td>Talbehat</td>
<td>Talbehat</td>
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<td>Lalitpur</td>
<td>Bijrotha</td>
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<tr>
<td></td>
<td>Jakhaura</td>
<td>02</td>
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<tr>
<td></td>
<td>Dailwara</td>
<td>02</td>
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<td></td>
<td>Lalitpur</td>
<td>08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jiron</td>
<td>02</td>
<td></td>
</tr>
</tbody>
</table>
Jakhaura 02
Dhaura 02

Source: A report of Regional Manager, Central Railway, Jhansi.

Further it is obvious from Fig. 5.1B that frequency of 14-16 trains daily is found as a medium at Banda and Babina stations. Jhansi with above 22 trains is important junction point in western Bundelkhand. There is a majority of stations having only 4 trains daily. In brief, it is evident that the frequency is high on junction and nodal points and low on general stations, where ordinary passenger trains stoppages serve the local traffic. Fig. 5.1C shows the volume of passenger traffic at different stations. It clears that the frequencies are in general, in proportion to the volume. The greatest volume of passenger traffic (above 6000 persons daily) is found at Jhansi junction while the lowest at Dingwahi, Jakhaura, Dailwara and Jiron stations. However, along a Banda-Kanpur line, the volume of passenger traffic is comparatively greater in proportion to the frequency of trains obviously indicates the ill train service.
FREIGHT TRAFFIC FLOW

The freight traffic flow in the region follows the features like the passenger traffic flow. Fig. 5.2 presents the rail borne freight traffic flow. Jhansi-Lalitpur and Jhansi-Delhi railway lines (with 28 goods trains daily up and down) carry the maximum cargo and record the heaviest freight traffic flow. After this, on Allahabad-Manikpur-Bombay line the freight traffic flow (with 24 goods trains daily up and down) becomes very significant. On Banda Kanpur railway line the freight traffic flow (13 goods trains daily up and down) carries a worse condition.

There are two important sharp breakers in the freight traffic from west to east at Jhansi, Manikpur centres. Former having a large number of goods trains is the main transit centre, north and south of which they get divided on the three main lines. Along the Allahabad-Manikpur-Bombay line which takes lion's share of the freight traffic latter break exists at Manikpur from where a part of the traffic is handled over to the northern railway. Khairar, Ohan and Ait are other minor break-points having minor significance of traffic.

The variations of freight traffic on
individual routes are very obvious. The most striking variation is observed in Jhansi-Lalitpur route because the rise in density of freight traffic flow is much steeper there. But a gradual decrease is visible on the Jhansi-Kanpur line. The freight traffic density on individual lines per day is almost constant e.g., on Jhansi-Gwalior section it is 28000 tons, on Jhansi-Kanpur section 20,000 tons, on Jhansi-Manikpur section 9800 tons, on Banda-Kanpur section 9000 tons and on Allahabad-Manikpur-Katni section 24,000 tons (fig. 5.2B.).

There is a great disbalance in up and down freight traffic. Generally, the trains entering the region from all sides are the loaded trains, while departing from the region often are empty.

**STRUCTURE OF FREIGHT TRAFFIC**

The structure of freight traffic is formed by the traffic of different commodities flowing on different railway lines. Owing to lack of data it is very difficult to analyse the present structure of various commodities, but any how with the help of useful material and some data it may be easy to be known. The total freight traffic has been divided into two heads: -

(a) Agricultural and forest product, and
(b) Origin and destination of commodities.

(a) Agricultural and forest products form the main item carried by the railways and accounts for about 40% of the total revenue earning traffic. The main items transhipped by rail are food-grains, pulses, oil seeds, sand, timber, charcoal, bidi-leaves and kerosene oil. In Jhansi Division from Jhansi junction general goods, firewood, timber, foodgrains, sand etc. are transported to new Delhi, Bombay, Kanpur, Lucknow, Satna, kalpi, Dhaulpur and Agra. In Banda region the important stations of trade and commerce are Hamirpur road, Akona, Ichauli, Mahoba, Belatal, Kulpahar, Banda, Atarra, Karwi and Manikpur. The agricultural products of the region are collected at Rath, Hamirpur, maudaha, Sumerpur, Charkhari, Panwari, Kabrai, Muskara, Kurara, Srinagar, Kherala and Kulpahar stations, from where they are exported to other regions by road or rail. Sand of late becomes one of the most important items of export from Hamirpur and exported by rail from Sumerpur railway station. About 447584 metric tons commodities are annually transhipped from Sumerpur railway station.

A deep study of volume of mercantile
commodities reveals that all the regional lines are busy in replacement of various commodities like food-grains, pulses, bones, sand, general goods, firewood, timber, oil-seeds, charcoal, military stores etc., and also terminate in out of the region. Besides this salt, cement, coal, fertiliser, general goods, petrol, steel, military stores, rail-material, sugar, jaggery, medicines, coconut, scrap etc. are imported from other regions or states of the country. The foodgrains and oilseeds originate from several stations while terminating stations are a few. Rice product is both originating and terminating from the region but it is general in practice in plain and irrigated part of the region.

**ORIGIN AND DESTINATION OF TRAFFIC**

It is interesting to note the origin and destination of commodities from one place to another and the routes followed by them, because it throws the focus on various important aspects of economic geography, viz., the nature of inter-regional spatial inter-action, the direction of movement and the distance of haul. This aspect gives a help in study of many problems and planning for the future transport development.
From the beginning decades of twentieth century the region had developed important trading centres like Mauanipur, Kalpi, Hamirpur, Banda and Lalitpur which are dealt with the origin and destination of various commodities for the purpose of human-welfare and economic development of the region. These trading centres serve for goods, whether imported or locally made. During the thirties and early forties the trade and commerce of the region mostly hindered and declined on an account of the general economic depression, but as the result of Second World War the pace of economic recovery was accelerated and several new industries came into existence. The process continued and with the achievement of freedom, more population attracted towards trade and commerce, though agricultural commodities dominated in the markets as far as the trade of the region is concerned. On the basis of above description as well as dates and diagrams the origin and destination of commodities has been elucidated and grouped into three parts - (i) Inward-traffic, (ii) Outward-traffic and (iii) Traffic of complex movement.

(i) **INWARD TRAFFIC** :

Inward traffic means the movement of
those commodities which are imported from outside of the region. They are mainly sugar, cement, iron, machinery, oil, cloth, kerosene oil etc.

SUGAR:

Sugar is imported into the region at various stations in huge quantity from its neighbouring trade-blocks. Banda, Atarra, Karwi and Manikpur railway stations import sugar from Kanpur, Allahabad and Varanasi, Chirgaon from Hargaon, Meerut, Gorakhpur, Satna and Bhopal while Lalitpur from Bombay, Howrah and Nagpur, Mauranipur from Patna, Satna and Katni and Kalpi and Orai from Kanpur.

CEMENT:

Cement is another important mercantile article which is imported at Babina, Barwa-Sagar and Chirgaon railway stations from New Delhi, Kanpur and Satna, Lalitpur, Mauranipur, Moth and Talbehat from Nagpur and Satna, and Konch and Orai from Kanpur. In Hamirpur district Hamirpur road, Sumerpur, Ragaul, Ichauli and Belatal stations import about 70% of their total commodities from other parts of the country.

IRON AND MACHINERY:

Iron Steel Bars, sheets, girdle and
machinery etc., are imported from New Delhi, Kanpur and Bombay through Jhansi, Kalpi, Orai, Babina and Lalitpur stations. Banda, Atarra and Karwi are the stations which import from Kanpur and Varanasi. About 20% of the total import occurs by these commodities.

SALT:

Salt is compulsory as well as terminating article of trade. It is mainly imported from New Delhi and Bombay to western and southern stations of the region, while eastern part of the region (such as Hamirpur and Banda stations) imports from Patna and Howrah.

KEROSENE OIL:

It is supplied to region from New Delhi, Kanpur, Bhopal, Bombay and Howrah trade-blocks through the stations of Sumerpur (10% of the total import), Belatal (56% of the total import), Jhansi, Babina, Chirgaon, Lalitpur, Mauranipur and Banda (about 30% of the total import). As in the account of importance it is highly needed by all men.

CLOTH:

Banda and Hamirpur trade-blocks import the cloth from Kanpur and Varanasi through the
stations of Sumerpur, Banda, Atarra, Karwi and Manikpur, while Jhansi Kalpi, Orai, Lalitpur etc. import from Kanpur, New Delhi and Bombay. Mauranipur trade-block is famous for textile industry which supplies a huge amount of cloths to the region and country.

(ii) **OUTWARD TRAFFIC**:
Those commodities which are chiefly exported from the region such as foodgrains and forest-products come under this consideration.

**FOODGRAINS**:
As early stressed food-grains are exported from the region to various trading centres of the neighbouring regions or states. There are five trading centres which export foodgrains to other trading centres of the country only to balance the supply and demand of commodities.

**TABLE - 5.2**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>TRADING REGION</th>
<th>AMOUNT (in metric tons)</th>
<th>IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Jhansi</td>
<td>2,05,000</td>
<td>58.3</td>
</tr>
<tr>
<td>2.</td>
<td>Hamirpur</td>
<td>60,000</td>
<td>17.0</td>
</tr>
<tr>
<td>3.</td>
<td>Banda</td>
<td>50,000</td>
<td>14.3</td>
</tr>
<tr>
<td>4.</td>
<td>Lalitpur</td>
<td>20,000</td>
<td>5.6</td>
</tr>
<tr>
<td>5.</td>
<td>Manikpur</td>
<td>17,000</td>
<td>4.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>3,52,000</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source:** Statistical Bulletin, Publishing data of various trade-blocks of U.P.
Table 5.2 clears that Bundelkhand (U.P.) is a surplus producer of grains, therefore, it exports the highest amount of foodgrains as 3,52,000 tons. Jhansi trading region includes Jhansi, Babina, Chirgaon, Mauranipur, Barwa-Sagar and Ranipur-road stations which exports the highest amount of foodgrains (58.3%) to other regions.

Hamirpur region exports to Kanpur, Lucknow and New Delhi (17.7%) while Banda region exports 14.3% of the total amount to Allahabad, Varanasi and Southern parts of the country through Banda, Khurhand, Atarra and Badausa stations. Atarra is the largest whole-sale market of rice commodity in Jhansi region. Lalitpur trading region supplies 5.6% of foodgrains to Bombay, Nagpur and New Delhi trade centres. Manikpur region shares, 17,000 metric tons (4.8% of the total) of foodgrains transported to Allahabad, Howrah, Calcutta, Jabalpur and Bombay centres.

THE FOREST PRODUCTS:

The forest product includes chiefly Biri-leaves and timber, exported to Lucknow, Agra, New-Delhi Bombay, Ujjain, Howrah and Calcutta from Jhansi, Lalitpur, Talbehat and Manikpur railway stations. The Biri industry of Manikpur
is an important cottage industry of the region which is specially based on the raw material of Tendu leaves.

(iii) TRAFFIC OF COMPLEX MOVEMENT:

Having a complexity of movement any commodity differs in intensity. For example foodgrains, general goods, cloth, and military stores are imported in huge amount and also exported in little amount.

THE FOOD-GRAINS:

These are exported to Bengal and Bihar in the east and Maharashtra, M.P., Saurashtra and Gujrat in the south and south-west. Other grain articles are transported from Banda and Hamirpur regions to Kanpur, Lucknow in the north, Allahabad and Varanasi in the east, and Agra, New Delhi in the west. In bad years these are imported from Punjab, Buland-shahar, Etawah, Saharanpur, Sitapur and Kanpur in the north and north-west. Comparatively import is approximately 2% of the export of foodgrains.

THE GENERAL GOODS:

These commodities are exported from Jhansi, Orai and Lalitpur regions and sent to
Kanpur, Lucknow, Agra, New Delhi, Jalgaon, Bhopal and Bombay. Hamirpur and Banda regions export to Allahabad, Patna and Calcutta in the east as well as to Bombay in the south. The import of general goods occurs from New Delhi, Lucknow, Kanpur, Gorakhpur, Bhopal, Gwalior, Agra, Mirzapur, Indore, Ujjain and Bombay. In this regard Chirgaon, Jhansi, Babina, Barwasagar, Erich road, Hamirpur road, Sumerpur, Akona, Mahoba, Belatal, Kulpahar, Banda and Karwi are the stations of both originating and terminating points.

**CLOTH AND MILITARY STORES:**

In Bundelkhand region Mau ranipur is only the largest cloth emporium since British period from which handloom cloth has been exported to Ahmedabad, Calcutta and Gwalior and wool to Bhadohi and Delhi centres. Gwalior, New Delhi, Kanpur, Bombay and Varanasi are the main trading blocks. For military stores Jhansi and Babina are the main exporting stations in the region. These goods are transported to Lucknow, Agra, New Delhi, Kanpur, Howrah and Jhansi cantonment centres.
PATTERN OF RAILWAY TRAFFIC FLOW

Now on the basis of above analysis of passenger and freight traffic the pattern of rail-traffic flow can be discussed in the light of following conclusions.

Bundelkhand (U.P.) owing to its specific situations, area, surface conditions etc., has all types of traffic viz., local, originating, terminating and bridge traffic through the trunk and main lines which connect to north and south India.

All railway lines predominate in having passenger traffic flow. The pressure of passenger traffic flow is higher on the trunk and main line but freight traffic flow is very poor on the branch lines. The main lines mostly cover the terminating and bridge traffic. Originating traffic includes mainly foodgrains and forest products. About the nature of traffic flow of trade Barker remarks "the circulation of trade-traffic is as the circulation of the atmosphere or the oceanic waters. The volume and regularity depend upon the restriction or the facilities, which enumerates at any or every stage." This circulation of trade has been survived by the fundamental forces in any spatial
inter-action. Prof. Ullman put three main factors to explain the inter-action involving transportation.

(i) Complementarity: a function of demand and supply between the regions,

(ii) Intervening opportunity: an attraction for inter-action between two regions, and

(iii) Transferability: measured as a value of cost and time of transport and effects of improvement in facilities.

By these responsible factors the traffic flow of commodities is constituted. In other words the provision of transport facilities and low rate push the volume of traffic.

Within the region there is a lack of complementarity, and the pattern of rail traffic flow including passenger and goods exists from east to west and south to north-east.

Evidently, the above discussion reveals that the railnet of the region does not play a unilateral function. Therefore, according to density
and characteristics the railway lines have been classified into three categories e.g. trunk, main and branch lines (fig. 5.3B).

TRUNK LINE:

It is an important type of rail road line as Wallace remarks, "it links region railnets and connects first order of rail foci which may be ports or internal centres. Jhansi-Lalitpur-Bombay line lies in this category.

MAIN LINES:

These are secondary lines of rail-road system. Connecting the important traffic centres they radiate other branch lines. Kalpi-Jhansi via Orai and Bargarh-Markundi via Manikpur lines come under this category. These lines interconnect the towns to the trunk line and maintain the balance of traffic-flow. These are constructed in 1889.

BRANCH LINES:

On the basis of nature of traffic and functional relation with the railway reticule the branch lines have been classified as lateral, originating, terminating and balanced traffic branches. Within the region only lateral and balanced traffic branches exist. Jhansi-Manikpur and Banda-
Kanpur are the lateral branch lines which connect the two main lines viz., Jhansi-Kanpur and Allahabad-Bombay at Jhansi and Manikpur junctions. The Ait-Konch line is balanced traffic branch line where inward and outward traffic flow is almost equal.

**ROAD TRAFFIC FLOW**

From the above discussion it is evident that the rail-net provides the inter-region freight traffic-flow and gives a care to road transport for intra-region-traffic. The road transport distributes load from door to door and pick up and put down passengers any where.

**ROAD TRAFFIC DENSITY :**

There is only power-driven traffic on roads in the whole region. Figures 5.3A and 5.4 show strikingly the features of passenger and freight traffic flow of road-transport. These are as follow:

(i) The heavy traffic exists around big cities and the freight traffic in comparision to the gradual rise of passenger traffic is more progressive.
(ii) The heavy traffic density is found on trunk roads running parallel to railways.

In case of former it may be said that due to the central service of cities for surroundings, the traffic from umland naturally rises towards the service centres. Jhansi, Orai and Lalitpur on the western fringe of the region and Banda and Hamirpur service centres have heaviest traffic densities (fig. 5.4). The 'col' of low traffic density between the centres of heavy density further certifies it. The traffic passing through low density 'cols' presents the bridge traffic flow between the focal centres. It is a fact that the traffic flow from these centres decreases along the distance. The other factor of discussion is that these cities are the nodal centres and transship the traffic from road to rail and vice-versa. The traffic gathers sharply from origin place to destined area of a city for many views and denotes the importance of friction of distance and transferability.

The following factors are responsible for gravitating the traffic on main and other roads of the region.
(a) The National Highways provide inter-region link and the vehicles plying on them are quick, comfortable, frequent and cheaper in services than railways.

(b) The economy of the region with few industries of light nature is agrarian. Ayurvedic medicines and Aluminium at Jhansi, Bharat Heavy Electrical Ltd. at Khailar, hand-made-paper at Kalpi, mini-sugar at Jalaun and Hume-pipe at Karari are the main industries which prefer road transport to rail, due to its flexibility and door to door service, appearance on difficult gradient and also running on poor roads. The traffic flow along main highways covers the great distance, so traders have greater preference for road transport. Besides this, road transport saves multiple charges such as handling and extra carting. Apart from these general views there is much regional variation in case of power-driven freight and passenger traffic, which is distinguished as given below:

(A) ORAI-CUM-KALPI REGION:

It has the highest traffic density on the National Highways which links Orai to Kanpur and Jhansi. This is the region which has the greatest number of buses (roadways and private) including originating and destinating from both sides.
The frequency of buses is more different between the centres as Kanpur 150, Jhansi 100 Hamirpur 100, Jalaun 120 and Konch 78 daily. Private buses tranship about 17000 persons daily. The general pattern of flow is from north-east to south-west.

(B) **JHANSI REGION:**

Jhansi is the focal point of this region. It connects to Kanpur via Orai and Kalpi, Agra, Shivpuri and Lalitpur through National Highways and Mahoba via Mauranipur through State Highway. The total number of buses plying on the roads of this region is 350. The general pattern of flow is north-south and east-west.

(C) **BANDA REGION:**

It stretches over the umlaned of Banda, Baberu and Naraini plains. It interlinks Hamirpur, Kanpur, Mahoba and Allahabad through State Highways. From this region 282 buses originate daily. The general pattern of flow is east-west.

(D) **HAMIRPUR REGION:**

This region covers the vast umland of Maudaha and Hamirpur sectors. Passenger traffic is more prominent on Hamirpur-Kalpi, Hamirpur-Rath and Hamirpur-Maudaha roads, which converge
at Hamirpur centre. The frequency of buses is 223 and the pattern of traffic flow follows as east-west and north-south direction.

(E) **MAHOBA REGION:**

It comes under upland Bundelkhand plateau. Due to undulating terrain the passenger traffic is less developed than the others. From Mahoba nodal centre the roads radiate to Panwari, Srinagar, Maudaha and Banda. Buses plying on State Highways are 243 and the flow pattern is east-west.

(F) **LALITPUR REGION:**

It also comes under upland plateau covering an area of Lalitpur district. The volume of passenger traffic spreads towards Jhansi and Gona along National Highways while Deogarh and Mehroni along the district roads. The frequency of buses plying on various roads is 165. The freight traffic flow is prominent on National and State Highways. The general pattern of traffic flow is north-south.

For the above different density patterns of the region, the following factors are mainly responsible.
(i) The region is so situated that it is known as 'gate way' between north and south India. Every movement from north to south or east to west crosses through this region and so the density of National Highways is high.

(ii) The region has a backward agricultural economy because of the lack of perennial canals, unfertile land and less industrial development. So it generates intra-regional and inter-regional freight traffic.

(iii) Generally, where the population density and industrial development is higher than the other region having low density, the density of passenger-traffic becomes more like Jhansi and Orai. The intra-regional mobility also affects the transhipment between the centres.

(iv) The traffic density is greater in that region which has closely settled towns, such as Orai includes Orai and Kalpi towns and so the density is higher than that of the others.
(v) The distributional pattern of roads accounts much for flow pattern. On National or State Highways where feeder roads converge, the density is higher. In the region the Jalaun Plain has radial pattern of roads, hence the density is greater while in Banda and Mahoba region having fork pattern, the density is lower.

(vi) The better surface condition of roads and the bridges existing at required points also account much for traffic flow. Jalaun and Jhansi regions come under this consideration. But in lack of one of these, the traffic flow is more handicapped as in Banda and Hamirpur regions.

**TRENDS IN THE GROWTH OF TRAFFIC AFTER FREEDOM**

After freedom as the nation has got a bright chance of economic activities for its development, the volume of traffic also has considerably increased. Although owing to the dearth of data regarding to road transport the measurement of actual dimension of traffic-growth leads to much difficulty, yet this growth can
be estimated with the help of crude figures as
the number of vehicles and surveys done for freight
traffic volume at important road-points. The
variation in rate of growth and various criterion
urge to deal with this under two heads viz.,
(a) Passenger and (b) Freight, power driven.

Fig. 5.5 gives an information of stage
carriages, available regarding the growth of
both the passenger and the freight vehicles.
It is apparent that between 1948-75 and 1984-85
the tremendous increase of traffic is more
than what these figures reveal. That is the increased
capacity of road-transport to handle passengers
by its comfortable service, construction and
repair of roads and the role of new bridges on
the one side and increased mobility of population
on the other. During 1984-85 the minor increase
of stage-carriages lies as constant (Fig. 5.5B).

GROWTH OF POWER DRIVEN FREIGHT TRAFFIC

The motor-trucks were started to ply
in the region since thirties, but their number
was not large upto 1947. It was experienced during
IIInd World War (1939-45) a great shortage of
 wagons for transporting the goods, which led
to the introduction of motor-trucks for this purpose. These are very useful and convenient for goods traffic. Their number gradually increased and now they can be seen as rushing day and night on all the main routes of the region. Fig. 5.4 shows the tremendous growth of freight-traffic density on important roads. The traffic movement is prominent around the big cities as Jhansi, Orai, Maunipur and Banda and on the Jhansi-Shivpuri, Jhansi-Agra, Jhansi-Kanpur and Jhansi-Lalitpur road. As the volume of traffic around the towns increased tremendously, the inter-regional traffic also became prominent with the increased number of freight vehicles, as is shown below:

<table>
<thead>
<tr>
<th>TRANSPORT REGION.</th>
<th>NO. OF TRUCKS IN 1974-75</th>
<th>NO. OF TRUCKS IN 1984-85</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Jhansi - (Jhansi, Jalaun &amp; Lalitpur Districts)</td>
<td>598</td>
<td>740</td>
</tr>
<tr>
<td>(b) Banda (Banda and Hamirpur Districts)</td>
<td>497</td>
<td>598</td>
</tr>
<tr>
<td>DIVISION</td>
<td>1095</td>
<td>1338</td>
</tr>
</tbody>
</table>


It is obvious that the reflection of basic economic activities and improved condition
of road transport carry the higher traffic density. Economically more advanced the Jhansi and Orai regions have greater intra-region movements than the others and have also greater inter-regional relations. The vehicles departing from different regions i.e. Kanpur, Auraiya, Delhi and M.P.State to these parts of the region also testified the same. The Karwi (around Manikpur) and Banda (around Baberu and Naraini) are economically stagnant regions, have a little increase of traffic.

**ROLE OF BRIDGES**

The regional water streams play an important role for affecting the spatial interaction in two ways i.e. the regional bonds and barriers. For instance in prehistoric times the unbridged rivers such as the Yamuna, the Betwa, the Dhasan, the Ken etc., were a big hindrance in the movement. Thus, of the old and big bridges under the control and maintenance of the Central Railway, the oldest, which was constructed in 1884, is on the Pahuj river and is at a distance of 8 kilometres from the Jhansi railway station. Two other big bridges constructed by the Railways are on the Dhasan and the Narain. The other important railbridges, constructed on the Betwa in the west and on the Ken, Bagain and Paisuni in the east pay an important role in rail-transportation. Like
the rail, the bridges on the streams were very compulsory for the growth of road transport. It is helpful with this fact of correlation between the construction of bridges and the growth of road-traffic in the region. The construction of bridges may be seen in three phases on different perennials.

(i) Major bridges after 1947,
(ii) Major bridges under construction and
(iii) Pantoon bridges (Fig. 3.3C).

Before 1947 little attention was paid to the construction of bridges. Some minor road-bridges were constructed along the Jhansi-Moth-Kalpi, Jhansi-Nowgong (1854), Lalitpur—Mehroni, Mehroni-Mandaura (1908), Jaitpur-Kulpahar, Hamirpur-Rath, Banda-Sumerpur, Hamirpur-Kalpi etc. roads. But no major bridges were constructed so far hence the road transport was crippled. After independence numerous major bridges constructed on various streams. Special mention may, however, be made of two on the Betwa, at Jhararghat (on Jhansi-Sagar road) and Naughat\textsuperscript{16} (on Jhansi-Mau-Harpalpur road). The former was opened to traffic in 1957 while the latter in 1965. The other bridges appeared at Dhunkwan, Baratha, Orchha, Erich
on the Betwa, Hamirpur on the Yamuna and Betwa, Kalpi on the Yamuna, Banda on the Ken, Badausa on the Bagain and Karwi on the Paisuni. Along the Jhansi-Mauranipur-Banda, Jhansi-Shivpuri and Jhansi-Kalpi roads, the several bridged constructed on various tributaries. This resulted in massive increase in the density of traffic flow along the main Highways. An attention has been paid in the construction of National Highways on which the traffic increased manifolds after the construction of bridges. The new bridges gave a chance for many of the recent trends related with the growth of road traffic-flow.

There are some places where bridges are badly needed. The bridges if be constructed at Deogarh, Rajghat, Mata Tila on the Betwa, Kotra, Gurha on the Dhasan and Pailani (Banda) on the Ken, the traffic flow will be easy. Along the Banda-Bisanda-Pahari road the two bridges viz., at Saipur, on the Bagain and Kaheta on the Paisuni should be urgently constructed, but no construction work is going on. If these bridges be completed they will certainly provide a link between Banda and Pahari with a great density of traffic flow.

The pantoon bridges tranship the traffic (passenger and goods) towards each side of river. In fair weather season on the some important points the pantoon bridges appear at Sher Garh
(Jalaun), Chilla, Augasi, Dado and Rajapur (Banda) on the Yamuna. In rainy season they break-up their service to the people of the region.

**GENERAL CONDITION OF ROAD TRANSPORT**

From the above discussion it is evident that the road transport contributes a lion's share in the regional economy. The road transport of the region commonly consists a system of both passenger and goods traffic. It is survived by the Government roadways as well as by the private operators.

**U.P. GOVERNMENT ROADWAYS**

Before the nationalisation of buses the contractors were monopolised in getting the licences to run their buses. Actually the tendency of contractors was to earn a lot of money without caring for the comfort of the passengers. Instead of the facilities of public they losed the restriction of seat limit and packed the passengers into the bus like anything else-where as be possible more, because of their tendency of fetching high-money. But the road transport was nationalised in 1947 to provide facilities to the passengers, such as stoppages at certain definite wayside, halts on prescribed routes, punctuality in the arrival and departure of vehicles, fixed rates of fares and freights, avoidance of over-crowding in buses, etc.\textsuperscript{17} The U.P. Government roadways organisation was
constituted into the U.P.State Road Transport Corporation (U.P.S.R.T.C.) and started to run passenger buses since June, 1972 under Government Control routes within the region. These buses contributed a handful income to the Government as well as maximum satisfaction to the passengers. Now there are a large number of routes which are controlled by the government. Public Works Department maintains and improves the road conditions, therefore, the passenger traffic flow increases year to year. Comparatively the government bus-service is proved itself very convenient and advantageous, due to the low rate of fare, less wastage of time with other adequate facilities. In every district people travel from interior to the district or Tahsil head-quarter for various purposes. So, comparatively, the road-transport is more flexible and comfortable to the people than railways. The most important factor that greatly accelerated roadways is its punctuality and comfort rather than most convenient, frequent, timing, better organisations and facilities of waiting rooms. Buses ply on the roads with high punctuality and with without any overcrowding. Drivers and conductors move vehicles with a single passenger also, if adequate passengers
are not available for allotted seats. The speed of buses is 48 Km. per hour together with arrival and departure at every stoppage. The tickets are issued at every stoppage like the railways. After nationalisation the Govt. Roadways are working with such a zeal that by 1974-75 the total number of roadways was 56 in Hamirpur, 48 in Banda and 51 in Jhansi transport region. Now there is tremendous rise in the number of passenger and freight vehicles (fig. 5.5). During 1984-85 the Government Roadways had a fleet of 295 buses plying over 54 important routes and the number of passengers served during the year was 68.58 lacs. Jhansi, Rath, Mahoba, Hamirpur and Banda are the sub-regional depots which release the buses over the different routes of the region. For the maintenance and repairing there are two workshops in Jhansi and Banda. Orai is developed as a sub-depot in the region. In many ways the role of roadways related with the satisfying the need of passengers is more admirable and the future of road-transport in Bundelkhand region appears to be bright.

**PRIVATE STAGE CARRIAGES**

The private vehicles provide their
service in connecting villages with the urban centres. Generally, the roadways ply on State and Municipality metalled roads while private buses on both the metalled and unmetalled, but for short stretches they run parallel to roadways and approach the urban centres (Fig. 5.3C). There is a rule for private operators that they can not take up the passenger under the jurisdiction of Govt. roadways. But they do not care for such a type of restrictions, therefore, the economy of the Govt. Roadways decreases from time to time. The fundamental features of private stage carriages are the bad organisation, in efficiency, overcrowding, old buses and carelessness of timing. Private operators are working well for the sake of goods traffic. The private carriages ply for long distance inspite of heavy surcharges while enroute besides heavy licence fee. Because of the lack of co-operation the transport operators face a problem of ill competition among them and another trouble resulted between haulier and operator.18

**RIVER TRAFFIC :**

As previously stated the river transport in the region is insignificant. At the ferries of navigable river Yamuna the country-boats only are used locally to carry people and local
goods e.g. sand, hay, fruits, vegetables etc., are supplied to the far east river-side centres through Kalpi, Hamirpur, Augasi and Rajapur points.

THE NATURE OF RAIL-ROAD COMPETITION

In fact the pattern of traffic-flow about the rail and road transport is largely competitive in the region. As figure 5.3 D reveals the forms of inland transport, the rail and road are mostly parallel. Before 1947, the percentage of metalled roads was very poor. But after 1947 the road milage has greatly increased with the result of the construction of roads parallel to the railways. The motor buses also extended to the confined passenger traffic distances. In 1971 only the private buses were running all over the region. After the provincialization of road-transport the private buses scarced for running on roads as their number was 551 in 1975. During 1963 the freight traffic for movement by trucks had not developed to any appreciable extent, but now road transport involves 631 Kilometre distance parallel to railways. Simultaneously the construction of new bridges made it more efficient. At present 17.9% of the metalled roads are running side
by side to the railways in the region. Partially the national and State Highways share 7.2%, 10.7% to the total metalled roads and carry a bulky traffic, both passengers and freight despite of Govt. hard restrictions on the inter-state transhipment and heavy tax burden.

All motor vehicles are enforced to taxation under the U.P. Motor-Vehicle Taxation Act 1935, affected since 1963. Jhansi, the regional transport office collects the passenger tax, goods tax and road tax. Besides this sometime the municipalities manage for such a collection and represent a considerable addition to the tax paid by the operators. The degree of competition on various routes is not revealed due to the dearth of actual figures.

In brief, the competition is resulted by the uniformity in the nature of traffic and the flow-pattern both in rail and road. But the road-traffic is preferred by the public to the rail mainly because of competition in speed, reliability, care and flexibility of motor transport.
From the above discussion it is evident that the nature, flow-pattern and working intensity of both rail and road transport are distinct, but the latter is more gravitational for people specially in rural area.
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