

ROLE OF AUTOTEMPO AS A MODE OF  
PUBLIC TRANSPORT IN DHAKA CITY

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BY  
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## A B S T R A C T

In Dhaka city there are different modes of public transportation of high and low speed. These are bus, minibus, autotempo, autorickshaw and rickshaw. Among all these rickshaw is the slowest but important mode of transportation in the city. Rickshaws are identified as one of the major sources of traffic problem in Dhaka city because of their inferior flow characteristics within the present traffic stream. Therefore, Government has decided, to limit the number of rickshaws both by direct and indirect measures.

At present, the autotempo is being considered as one of the viable alternatives to rickshaw. Because of better service performance and supply characteristics autotempos are expected to play a significant role in urban transportation of Dhaka city in the near future. This study explores the role and characteristics of the autotempo in Dhaka city as an intermediate mode of public transportation between conventional rickshaw and bus and its relationship with the existing public transportation system.

Due to short supply of conventional transit modes like bus and minibus autotempos are gradually taking a reasonable shape to fulfill that transportation demand. Because of higher passenger carrying capacity and less journey time than by rickshaw and by offering comparable service performance to bus and

minibus, autotempo has already been successful to attract a significant portion of passengers from bus, minibus and rickshaw.

The role of autotempo suiting the travel need of Dhaka city is found to be more appropriate to operate as a feeder mode to other transit modes. The role should be complimentary in nature over the primary network and supplementary in nature over the secondary road network.

As there is no stage bus service in the secondary roads, thereby an increase of autotempo will help minimize the number of rickshaws significantly on the roads of Dhaka city. On the other hand an increase of the bus and minibus will stifle the development of autotempo in the primary roads. Both the trend leads to lower generalized transportation cost. The study is concluded with suggestions for policy decisions to foster the growth of autotempo population and concerning their positive role to help minimize the urban public transportation problem of Dhaka city.

Title of the Thesis: Role of Autotempo as a mode of Public Transport  
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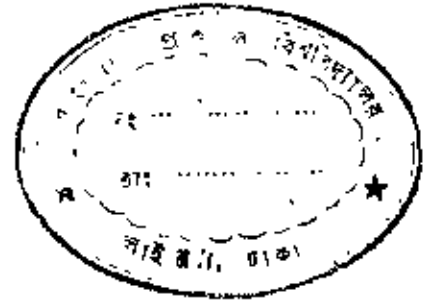
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## CHAPTER- I

### INTRODUCTION



#### 1.1 Background

The socio-economic characteristics of a population play an important role in planning transport systems. Developed countries have reached a fair amount of stability in their urbanization pattern, population growth and socio-economic characteristics, thereby making the task of planning Urban Transport Systems to suit their conditions considerably simple in comparison to developing countries where significant variation in urban characteristics is still observed.

In Dhaka city there are different modes of public transportation of high and low speed. These are bus, minibus, autotempo, autorickshaw and rickshaw. Among all these rickshaw is the slowest mode of transport, generally does not make any long-haul trip. The autorickshaw makes longer haul but they are very expensive. The minibus is the smaller version of bus having higher fares than that of buses. However, the quality of service is more or less identical. Bus is the popular mode of public transportation with least unit fare.

Rickshaw is the most important mode of transportation in Dhaka city. Roughly it accounts for about three fourth of all passenger vehicles (excluding

bicycle & motorcycle), and a significant portion of Dhaka's population depend directly or indirectly on rickshaw.)

As mentioned, rickshaw is dominating the scene of public transportation in Dhaka city. However, due to its inferior flow characteristics within the traffic stream, it has now been identified as one of the major sources of traffic problem in the city. It is considered that the growing number of rickshaws on the city streets has made the traffic problem worse. Besides being expensive to travel, its standard of safety is also very low. In response to the ever increasing traffic problem in the city, for which rickshaws are considered to be mainly responsible, Government has decided to limit the number of rickshaws both by direct and indirect measures.

The 8-12 seater autotempo is being considered as one of the viable alternatives to rickshaw. Already a large number of autotempos are plying on the different city routes. A complete network of such service is, however, yet to develop. But it is expected that autotempos are going to play a significant role in urban transportation of Dhaka city in the near future.

Significantly lower capital investment than conventional buses or minibuses has made autotempos to be attractive to the private owners. In terms of journey time and cost, its service performance is much better than rickshaws but inferior to buses. In case of passenger comfort and safety it is expected to bring about considerable improvement for the users.

Considering these facts, autotempos are expected to play a vital role in urban transportation in the near future. Also it is expected that due to its better service performance it may replace the traditional rickshaws to a great extent or at least help check the growth of rickshaw population and thereby help minimise the traffic problem in the city.

As with most of the other problems of the city life, there is nothing new about congestion in urban areas. Ancient Rome experienced traffic jams to such an extent that all except public vehicle were banned from the downtown streets during the day hours. The problem of urban traffic congestion today pertains primarily to vehicles and changing patterns of population from the highly concentrated area of the central city to the relatively thinly populated places of the city which caused heavier reliance on automotive transportation. Therefore the changes in the transportation pattern have accelerated rapidly in the last two decades. With the advent of mechanized transportation, the shape of the cities began to change. In the days of horsedrawn carts and pedestrians a radius of between two and three miles was a comfortable commuting distance for the urban dwellers, and the size of most of the cities were limited to about twenty square miles. But transportation by bus, car, rail, and rapid transit lines later expanded the radius of urban movement (Bartholomew, 1952).

As the land and roadspace is not unlimited and cannot be increased according to ones own will, therefore, expansion of roads and its ancillary facilities cannot be provided indefinitely. The unabated growth of any mode of transportation will have to be brought under control at some point in the future.

Therefore, time has come for fresh thinking in order to deal with the necessities to cope with the increase of vehicular traffic and its growing demand.

In order to bringing about a solution, all types of transport should be discouraged and bus transport should be introduced to lesson the load of traffic on the roads (Plowden, 1960). Plowden argued that if we wish to save our towns then we must accept public transport. Therefore some forms of more efficient system are to be formed with the emergence of new needs, with the increase of population and rapid growth of our metropolis thereby dealing with more complex activities of our daily life.

The transport pattern of cities differ from one country to another depending on economic conditions, technological advancements, and local factors. Economic prosperity and the advancements in transport technology have enabled and forced the developed countries in Europe and America to think ahead and to invest heavily in more efficient transport systems. But still, congestion, road safety and environmental problems are major issues in most of the cities of the developed countries.

The present study explores the role and characteristics of the autotempo in Dhaka city as an intermediate mode of public transportation between conventional rickshaw and bus and its relationship with the existing public transportation system.

## 1.2 Scope and Objectives of the Research

Transportation problems are among the major urban issues of concern in Dhaka city. Each day the number of vehicles is increasing only to minimise the capacity of the roads. The capacity of the roads are not expanding according to the need of the vehicles. As a result the level of congestion and overcrowding is ever increasing. Rickshaws are presently dominating the scene. However, in terms of passenger carrying capacity they are the least efficient form of transportation. Higher capacity mechanized transport like autotempo with superior flow characteristics should bring considerable improvement. For many reasons the autotempo population of Dhaka city is rapidly increasing. Thereby it deserves to be a good choice of study concerning the problem of urban transportation in Dhaka city.

However, the present study on the role of autotempo has been limited to examining the present route network, performance standard, the extent of service and problems faced by the owners as well as the users. Besides, an attempt has been made to examine the role of autotempo as an intermediate mode of transportation in Dhaka city. Considering it as a para transit mode of transportation, recommendations have been made on the basis of its observed service performance and prospect.

Study of the total performance standard of autotempo was not possible as this would require lot more information on loading capacity, journey speed, and space required by autotempos to run in normal standard speed. The designing of

parking system and importance of it with respect to autotempo operation, improvements of minor road systems and radial roads to accommodate more traffic could not be studied very well.

In examining the users demand, all aspects of users demand could not be studied. However, the study undertaken was comprehensive enough to present a generalized picture of the overall problems of autotempo users. The users demand was examined by means of questionnaire survey at some selected autotempo stops.

In the last phase, a series of structured interviews were done with the personnel related to autotempo business, operation and management. In discussion with those personnel, all aspects related to autotempo growth and it's future demand could not be covered because the association of autotempo is not yet well organized. On the other hand there is no public authority who could overview the issue very well.

The study was conducted with the following specific objectives:

- i) To study the existing autotempo services
- ii) To study the problems of operation and management of autotempo services
- iii) To examine the role of autotempo as an intermediate mode of public transportation between conventional rickshaws and buses in the present transportation system of Dhaka city
- iv) To estimate the future growth of autotempo
- v) To draw recommendations towards solution of the problems identified



### 1.3 Methodology of the Study

The methodology of the study may be described in the following steps:

i) LITERATURE SURVEY: In order to gain a basic understanding on the subject, literature survey was undertaken and information was collected from published and unpublished works. For this purpose, attempt was made to collect information regarding urban transportation problems floated in the daily or weekly newspapers and broadcasted on any mass media like Radio or Television.

ii) COLLECTION OF DATA FROM SECONDARY SOURCE: Efforts were given to collect data available from government, semigovernment and other relevant organizations. Significant data was obtained from Dhaka Metropolitan Police (Traffic). Also data was collected from different transport owner's association. Besides, the autotempo drivers and owners provided preliminary information on data source.

iii) ROUTE SURVEY: Existing major routes were surveyed to collect information on traffic flow. All the autotempo routes in Dhaka city were observed to study the volume of autotempo flow. Attempt was made to estimate the number of autotempos passing through a section per hour, number of travellers in each autotempo and the number of trips made by each autotempo per day. Also emphasis was given to examine the number of autotempos available in each of the routes and how many of them were actually plying in that particular day.

iv) PASSENGER SURVEY: A sample questionnaire survey was done on the autotempo users. The principal aim of the survey was to study the nature of problems faced by them. For this purpose 5 major routes were taken into consideration. A total of 500 autotempo passengers were interviewed in this regard.

v) INTERVIEWS: A series of structured interviews and group discussions were made with the autotempo users, operators, drivers, conductors, helpers and concerned transport officials. The aim of those interviews were to collect information about their problems and suggestions if they had any.

The activity diagram of the methodology may be described in figure-1.

### ACTIVITY DIAGRAM OF THE STUDY

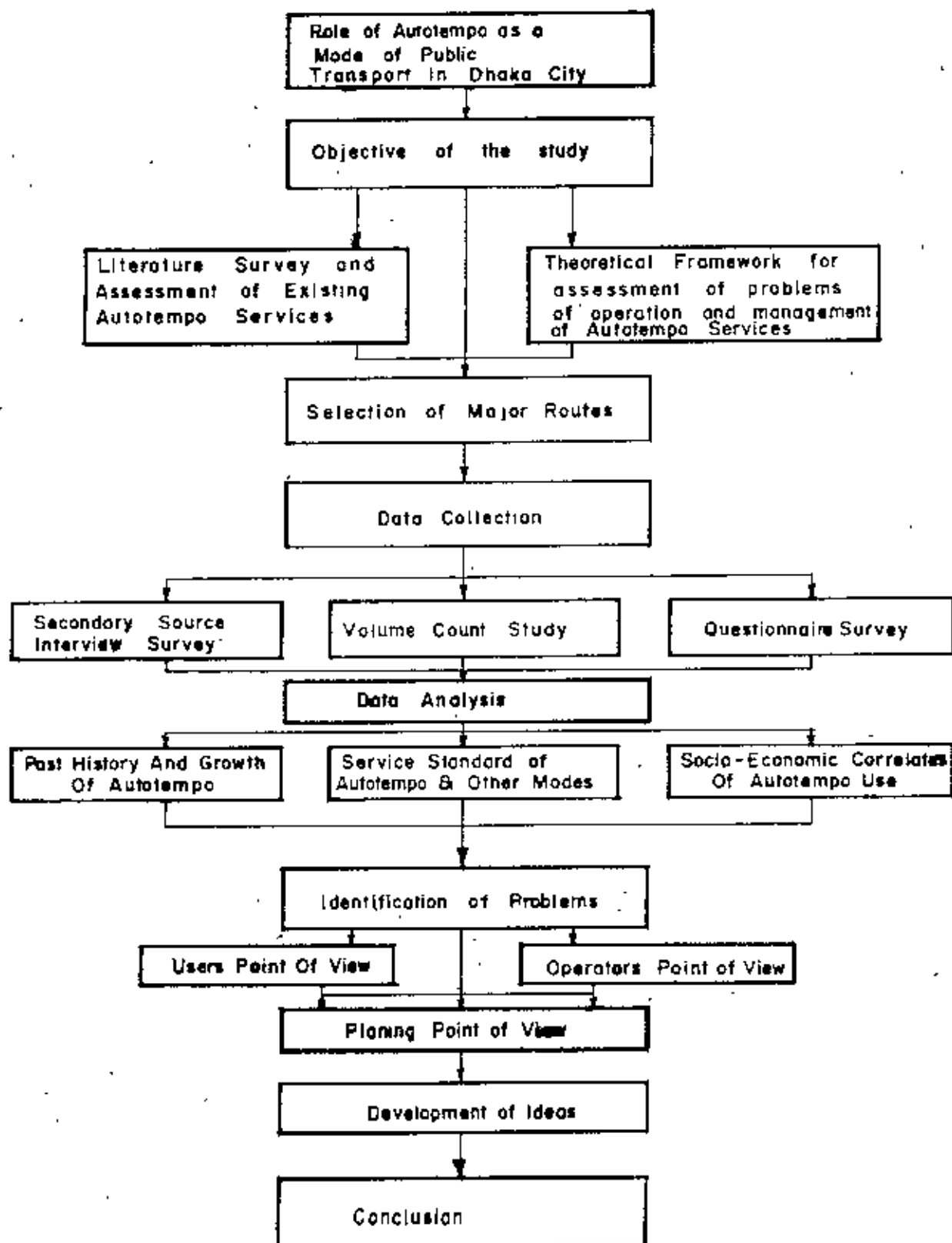


FIG.- 1

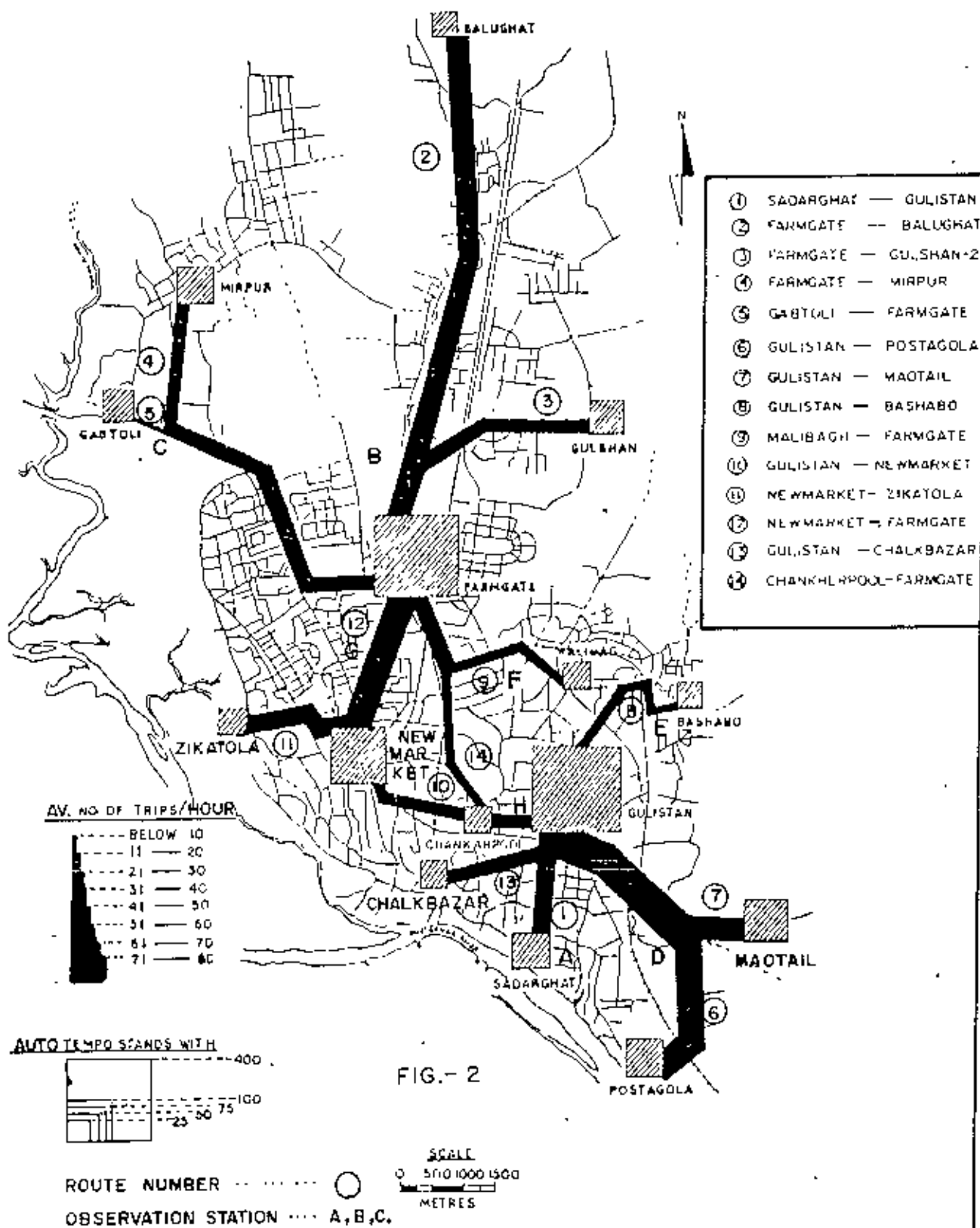
#### 1.4 The Study Area

The pre-Mughal (before-1608 ) history of Dhaka is obscure. Probably it was only a small trading centre. After the Mughals Dhaka grew from a small service center of hardly few square miles to a metropolis. By 1717 it had a flourishing trade with a population of 900,000. From 1971 it has been the capital of Bangladesh.

At present there are about 660 km. long road network in Dhaka (Hossain , 1987 ). An official source (Paribahan Chalak Samity, 1988) estimated about 80,000 (eighty thousand) mechanized vehicles of all types like bus, truck, minibus, car, jeep, taxi-car, truck-tractor, autorickshaw, motorcycle, autotempo and 300,000 (three lacs) non mechanized vehicles like rickshaw, -cycle, bullock-cart are operating on the roads of Dhaka city. Out of the 1660 km. paved long road network, only 300 km. long is used by bus and minibus (Bus Owners Association, 1987). This is the lowest length of road being covered by any mode of transportation. On the other hand almost the entire road network ( recently restrictions have been imposed on the operation of rickshaws on certain roads) is being used by rickshaws.

A plan of the existing major routes of the city and autotempo operation network is shown in figure-2.

**ROUTE MAP OF AUTOTEMPO  
OPERATION IN DHAKA CITY  
1987**



- ① SAOARGHAT — GULISTAN
- ② FARMGATE — BALUGHAT
- ③ FARMGATE — GULSHAN-2
- ④ FARMGATE — MIRPUR
- ⑤ GABTOLI — FARMGATE
- ⑥ GULISTAN — POSTAGOLA
- ⑦ GULISTAN — MAOTAIL
- ⑧ GULISTAN — BASHABO
- ⑨ MALIBAGH — FARMGATE
- ⑩ GULISTAN — NEWMARKET
- ⑪ NEWMARKET — ZIKATOLA
- ⑫ NEWMARKET — FARMGATE
- ⑬ GULISTAN — CHALKBAZAR
- ⑭ CHANKHAPOL — FARMGATE

### 1.5 Limitations of the Study

This study do not aim at preparing a comprehensive autotempo operational plan for Dhaka city which could help solve the city's transportation problem. But what it does intend is to work out distinctive features to determine the role of autotempo in the urban transportation stream of Dhaka city, which could then be readily used to prepare a more meaningful and viable comprehensive transportation plan for the city. Hence, in this context, this study is limited to the study area only. Also, the sample size handled in the study area was limited to fairly manageable level so as to be well within the time and funds available.

### 1.6 Literature Review

There has been little investigation and research on urban transportation management in Bangladesh. Urban transportation system of the then East Pakistan did not receive enough importance due to central policies that favoured planning and administration from the top and remained only as service institution having little power of overall planning and administration.

After the independence of Bangladesh, all the successive governments suggested for a better urban transportation system and for this purpose several attempts were made. It is very important to observe that the urban transportation service in Dhaka city is dispersed amongst a large number of agencies like Dhaka Municipal Corporation and Rajdhani Union Kartipakhha. The major function of those two institutions is to construct roads within the city area while Dhaka

Metropolitan Police(Traffic) is in operation to execute the rules and regulations of traffic act.

The books, articles, journals that were available on transportation policies of urban areas throughout the last thirty years reflected the importance of efficient use of available resources to ensure urban mobility within a wide range of model options, to better serve the users. Of these literature those written on autotempo or any other para transit mode were virtually nil.

Detail information on number of autotempos were obtained from the Dhaka Metropolitan police (Traffic). A large number of data on operation and management of autotempo were obtained from the owners, manufacturers and employees of different Autotempo Associations. Socio-Economic Correlates of the autotempo passengers were obtained through a structured interview.

Till now the report of Shankland-Cox Partnership (1979) may be considered as one of the important documents for the transport planners. In that report detail study was made on the slow moving vehicles. Also attempt was made to study the role of intermediate mode of transportation in Dhaka city. The role of rickshaws were identified in the context of city's demand and need. The report was followed by the recognition of the role of rickshaw and stressed the need of intermediate mode of transportation in Dhaka city.

Baque (1980) in her study entitled "A Study of Traffic in Old Dhaka" gave stress on the congestion in the old city areas and recommended that for an easy

and safe movement of vehicles there must be time restriction for selected vehicles, parking provision for loading and unloading, one way system, minor adjustment to road corners, banning of selected vehicles to selected road, road maintenance and land use control. Although this study was made for old Dhaka but now a days it is applicable to the whole city.

Kumar (1981) gave emphasis in his study entitled "The Role of the Rickshaw in the Economy of Dhaka City" about the rickshaw and the rickshaw industry. He also studied whether phasing out of rickshaws would benefit the public and the pullers or not. He found that rickshaw pulling in the 1970's was more attractive than it had been in the previous decade. His findings also emphasized on the traffic management, improved design of the rickshaw and appropriate licencing system for solving the traffic problem of Dhaka with respect to the use of rickshaw as a mode of public transportation.

Chowdhury (1983) studied about the improvement of traffic management in old Dhaka city and identified the plan for the recognition and positive management of rickshaw traffic. He emphasized the positive role of rickshaw in the city's informal economy and suggested control of rickshaw rather than eliminate the mode. That study stressed the need for traffic management measures for immediate implementation in Dhaka with particular regard to segregation of slow and fast moving traffic, and with particular reference to the old city and central area. The study concluded with some short-term proposals for improving the existing traffic system.



Ferdous ( 1984 ) in his study entitled "A Study on the Problem of bus transport in Dhaka City" presented the major problems of bus transport in Dhaka city and made some suggestions about the improvement of this service.

### 1.7 Organization of the Study

The study has been divided into six chapters. Chapter-I introduces the problems that motivated this research along with the objectives of the study and a literature review. Chapter-II describes the important features of public transportation in the country and the overall transport situation in Dhaka city. This chapter also illustrates the organization of field survey and problems encountered in the field.

Chapter-III deals with the survey findings. It presents operating characteristics and socio-economic correlates of autotempo use in Dhaka. This chapter is mainly designed to study the different flow characteristics of autotempo and various problems faced by the travellers and their opinion about the existing role of autotempo.

Chapter-IV deals with of financial as well as managerial aspects while chapter-V includes the findings of service standard of autotempo and other modes and ultimately represents a comparative analysis between these modes.

Chapter-VI deals with the summary of all findings and conclusion of the study. This chapter ends with some broad recommendations on the role of autotempo in Dhaka city.

## CHAPTER- II

### PUBLIC TRANSPORTATION IN DHAKA CITY

#### 2.1 Review of the Road Transportation Service in Bangladesh

Bangladesh has 4,827 km. of paved arterial and feeder roads, 2,892 km. of railways and 4,827 km. perennial waterways ( Planning Commission, 1985 ) The riverine character of the country with annual monsoon floods makes the terrain difficult for construction and maintenance of the roads and railways and it's deltaic formation overladen by millions of tons of silts carried by the Ganges and the Jamuna makes it equally difficult to keep the waterways open. Their high cost of construction and maintenance together with resources constraint makes Bangladesh one of the least developed in terms of infrastructure for transportation. There are only 7.45 km. of paved roads per 100 square km. of area against 16.76 km. in the developing countries of the South-east Asia region (Planning Commission, 1985).

##### 2.1.1 Road Transportation in the Public Sector

Road transportation is provided by both the public and private sectors and consists of both mechanized vehicles and non-mechanized modes like carts and paddle rickshaws. The latter modes are of local importance but contribute a

significant proportion (60% of passenger-Kilometers and 36% of freight-ton kilometers) of road transportation ( Planning Commission, 1985 ).

In the public sector, Bangladesh Road Transport Corporation (BRTC) is the lone operator. It has been mentioned in the Third Five Year Plan that BRTC has a Bus Division which was having an active fleet of 465 buses and a Truck Division which was having an active fleet of 168 trucks in 1984-85. It provides services mainly in the cities of Dhaka and Chittagong and on some inter-district routes. It operates services from 12 depots, 9 sub-depots and 11 stations located all over the country. Because of inherent management and operation problems BRTC, at no stage could operate on a commercial basis. The percentage of off-road buses during the Second five Year Plan Period was, on an average, 29.

The comparative fleet position of Bangladesh Road-Transport Corporation's buses and trucks as on June, 1980 and June, 1985 is shown below in Table-2.1

TABLE-2.1

**BRTC FLEET POSITION ( 1980-1985 )**

Type of vehicles	Total fleets (active)		Road worthy		Average on road(%)	
	1979-80	1984-85	1979-80	1984-85	1979-80	1984-85
Bus	675	465	373	331	55%	71%
Truck	110	168	97	155	88%	92%
<b>Total:</b>	<b>785</b>	<b>633</b>	<b>470</b>	<b>486</b>	<b>71.5%</b>	<b>77%</b>

Source . BRIC.

2.1.2 Road Transportation in the Private Sector

As private sector dominates the road sector, share of the private sector in terms of mechanised road transport vehicles was about 86% in 1984-85. Then again in the private sector the role of the non-mechanized mode is overwhelmingly larger than that of the mechanized sector.

A comparative statement of the various road transport vehicles in the country, both mechanized and non-mechanized for 1979-80 and 1984-85 is shown in Table-2.2.

TABLE-2.2

GROWTH OF ROAD TRANSPORT IN BANGLADESH (1980-1985)

(Figures in number)

Category of vehicle	1979-80	1984-85	1988-89
<b>I. <u>Mechanized(on road).</u></b>			
Bus	10,294	9,365	11,250
Truck	16,118	17,270	19,321
Minibus	370	6,165	9,287
Car(Private)	19,848	40,000	49,000
Jeep	8,321	9,000	9,000
Taxi Car	1,113	1,817	3,000
Auto-rickshaw	10,632	17,806	18,000
Truck Tractor	1,815	3,402	3,500
Motor Cycle	38,778	70,767	111,000
Other	1,602	2,282	25,000
Truck trailer	939	2,050	2,100
<b>II. <u>Non Mechanized</u></b>			
Rickshaw	1,63,000	2,00,000	300,000
Bullock Cart	2,16,043	2,76,000	figure not found

Source : Transport Survey wing, Planning Commission, provided information for the year of 1979-80 and 1984-85, while Autotempo owner's

Association estimated figures for the year 1988-89.

It appears from the above table that the mechanized and non-mechanized vehicles increased by 70% and 26% respectively over the plan period and the ratio between mechanized and non-mechanized vehicles in 1984-85 had been 27:73

as against 22:78 in 1979-80. This increase in the share of the mechanized forms was due to the incentives provided by the Government towards private investment in the mechanized mode. Shares of the non-mechanized forms in transporting passenger and freight were 60% and 35% respectively in 1984-85 against 59% and 39% respectively in 1979-80

## 2.2 Development Programmes in Road Transportation

The transport system suffered heavily during the War of Liberation. Therefore, the periods of the First Five Year Plan and the Two Year Plan (1973-80) was largely the period of rehabilitation except for such marginal improvements as a newly independent state urgently needed to handle increased import traffics. Among others these improvement consisted of pavement of 804.5 km. of road.

In view of the critical role of the transport sector in modern economic development the Second Five Year Plan allocated Tk. 1819.00 crore (1983 price) to the Transport Sector. Actual utilization slightly exceeded it (Tk. 1,943.99 crore) due to increased allocation for higher absorption capacity of the road sub-sector.

During the Second Plan Period major emphasis of road programme was laid on upgrading and improvement of existing arterial road system. This was done mainly for capacity increase commensurate with the increasing volume of road traffic and the heavier axle load and construction of missing links such as roads

and bridges on the arterial system together with feeder roads connecting upazilas to the nearest arterial road system. The plan allocated Tk. 690 crore which was fully utilized.

A total of 669 km. of paved roads were added during the plan period, bringing the total kilometer of paved roads to 4827 km; besides this, another 512 km of roads were upgraded and 531 km of roads were paved with brick/gravel. Total length of bridges/culverts constructed was 7,528 metres including 3,302 metres of profitable steel bridges (Baily bridges) raising the total length of bridges and culverts to approximately 76, 220 metres.

In spite of all efforts made over the last few plans, transport facilities largely remain inadequate to meet the need of a growing economy. The increase of paved roads by 669 km to 4827 km still means 3.03 km of paved road per 100 sq. km of area. Hence the Third Five Year Plan targets the following development (Table 2.3) in the road transport sector.



TABLE-2.3

DEVELOPMENT TARGET FOR ROAD TRANSPORT SECTOR  
IN THE THIRD FIVE YEAR PLAN

Sector	Units	Position in 1979- 80.	Position in June, 1985.	Target for TFYP	Expected position in 1990.	Percentage change
<u>Roads and Highways</u>						
Paved Roads(R&H)	km	4112	4830	3220	6118	26.7
Bridge & Culvert	Metre	64024	76220	17073	91464	20.0
<u>Road Transport</u>						
Public bus	Nos	675	465	275	465	-
Private bus	Nos	10294	8900	2729	10610	21.5
Public Truck	Nos	110	168	-	168	-
Private Truck	Nos	16118	17102	5889	20930	22.4
Auto Rickshaw	Nos	15188	16585	3591	19099	15.2

Source: Third Five Year Plan (1985-90), Planning Commission, Ministry of Planning.  
P. 308

#### 2.2.1 Public Transportation

The private sector would continue to play an increasingly important role in road transport services under the policy of privatization. Therefore, no expansion of the fleet strength of the BRTC is proposed during the Third Five Year Plan. Only replacement of its old and condemned buses will be undertaken in a programmed manner. For this purpose a sum of Tk. 40.00 crore is proposed which will enable replacement of as many as 362 buses.

## 2.2.2 Private Transportation

In response to government policy towards privatization in a larger scale, larger investment has been reflected during the Second Five Year Plan period. As the same policy will continue during the Third Five Year Plan period also. It is envisaged that the private sector investment during the plan period will be about Tk. 955.00 crore.

## 2.3 Public Transport in Dhaka

The population in Dhaka has been increasing steadily. But transport facilities particularly private buses, are not increasing in number. Rather due to wear and tear a number of buses are breaking down for good every year. For want of adequate buses on the city routes tens of thousands of city travellers are travelling alternatively by minibus, autotempo, rickshaw and autorickshaw at a much higher cost.

Dhaka is the capital city of Bangladesh, now contains the central offices of most government ministries and is the financial and commercial centre of the country. It is served by an international airport near Tongi, a river port at Sadarghat, and an extensive inter-urban rail and highway networks. The existing infra-structure provides a firm base of further expansion. According to a study (Hossain, 1987) the population of Dhaka was about 35 lakhs in an area of 171 square mile with average density of 27580 persons per square mile. The population

growth rate in Dhaka city in the last intercensal has been found to be approximately 9.94% per annum (Islam, Et.Al. 1984).

In a recent Television interview (Samakal, 1987) the representatives of the bus owner's associations mentioned that there are requirements of 4000 buses for the 40 lakhs population (1000 persons/bus). But in a study (Bus Owners Association, 1987) it was seen that there are only 50 buses provided by the public sector operator BRTC, and about 200 buses provided by the private sector. So there is a need of 3750 buses for a smooth urban bus transportation system.

Since well-integrated, efficient and economic forms of mass transport facilities are generally lacking in Dhaka. So people go in for individual form of transport such as cars, autotempos, autorickshaws, rickshaws, motorcycles and bicycles. This, in fact, has been mainly responsible for mixed traffic. In the absence of proper segregation, both the fast and slow moving vehicles compete for the same carriageway, leading to many undesirable situations.

In Dhaka, autotempo occupies a unique position among the different modes of transportation. Besides being better flow characteristics of autotempo, lack of reasonable public transportation system within the city has made autotempo to be an acceptable mode of transportation to the urban travellers of Dhaka.

Among other modes of public transport, the minibus is also a very popular mode of transportation to the city dwellers. Although, the minibus is a popular mode of transportation in Dhaka, but the journey by minibus in Dhaka city has

become really troublesome in these days (Ishaque, 1987). The problem is so much aggravated that the minibus with its low roof and no standing provision carry a lot of standing passengers to the utmost inconvenience of the passengers.

Like many other Asian cities, Dhaka's traffic is a combination of cars, buses, three-wheelers, two-wheelers, animal-driven carts and ofcourse pedestrians. Whereas in most Asian cities non-motorised transport has either been eliminated or substantially reduced in the recent times. Dhaka has continued to see increasing numbers of human driven three wheelers locally known as the 'rickshaw'. An official source (Autotempo Owners Association, 1988) estimates the total number of rickshaws at over 100,000 (One lakh). A rough estimate of the total growth of road transport in Dhaka City between 1980-87 may be described as follows (Table-2.4) (Autotempo Owners Association, 1988).

**TABLE-2.4****GROWTH OF ROAD TRANSPORT IN DHAKA CITY (1980-1987)**

(Figure in number)

Category of vehicle	1979-80	1984-85	1988-89
I. <u>Mechanized(on road).</u>			
Bus	500	350	250
Truck	1500	3500	5000
Minibus	121	380	534
Car(Private)	9000	21000	30,000
Jeep	1700	9000	10,000
Taxi Car	400	754	1000
Auto-rickshaw	1000	4000	5000
Truck Tractor	322	500	600
Motor Cycle	7500	17000	27,616

Source: Autotempo owner's Association Dhulaikhal, 1988.

Interms of traffic management the rickshaw has always been regarded as the major contributor to traffic jams (Hossain, 1987 ). Because of it's slow speed and comparatively unstable structure, it has been identified as the most problematic mode of transport. Thousands of rickshaws occupy most of the road space most of the time, forcing the other mechanized traffic to follow their speed. Many times the authorities have considered increasing the efficiency of traffic flow by completely withdrawing the rickshaw from Dhaka's roads. But, this would be very difficult and possibly impractical decision, because, in contrast with other Asian cities, the rickshaw is the most popular mode of transport in Dhaka.

An analytical framework for discussing transport services in Dhaka city is shown in Figure-3. This figure has been adapted from Rimmer (1986). It shows both

the public and private sectors in Dhaka. The public sector is characterized by bureaucratic management and large-scale organization, motorized and modern technology, set rates, fixed rates and fiscal schedules. BRTC is an example of the public sector. In contrast, the private sector displays continua in management, scale, vehicle type, routing and scheduling - continua being shown by wavy lines; it also has two types of propulsion and set and negotiated fares.

ANALYTICAL FRAMEWORK FOR DISCUSSING  
TRANSPORT SERVICES IN DHAKA CITY

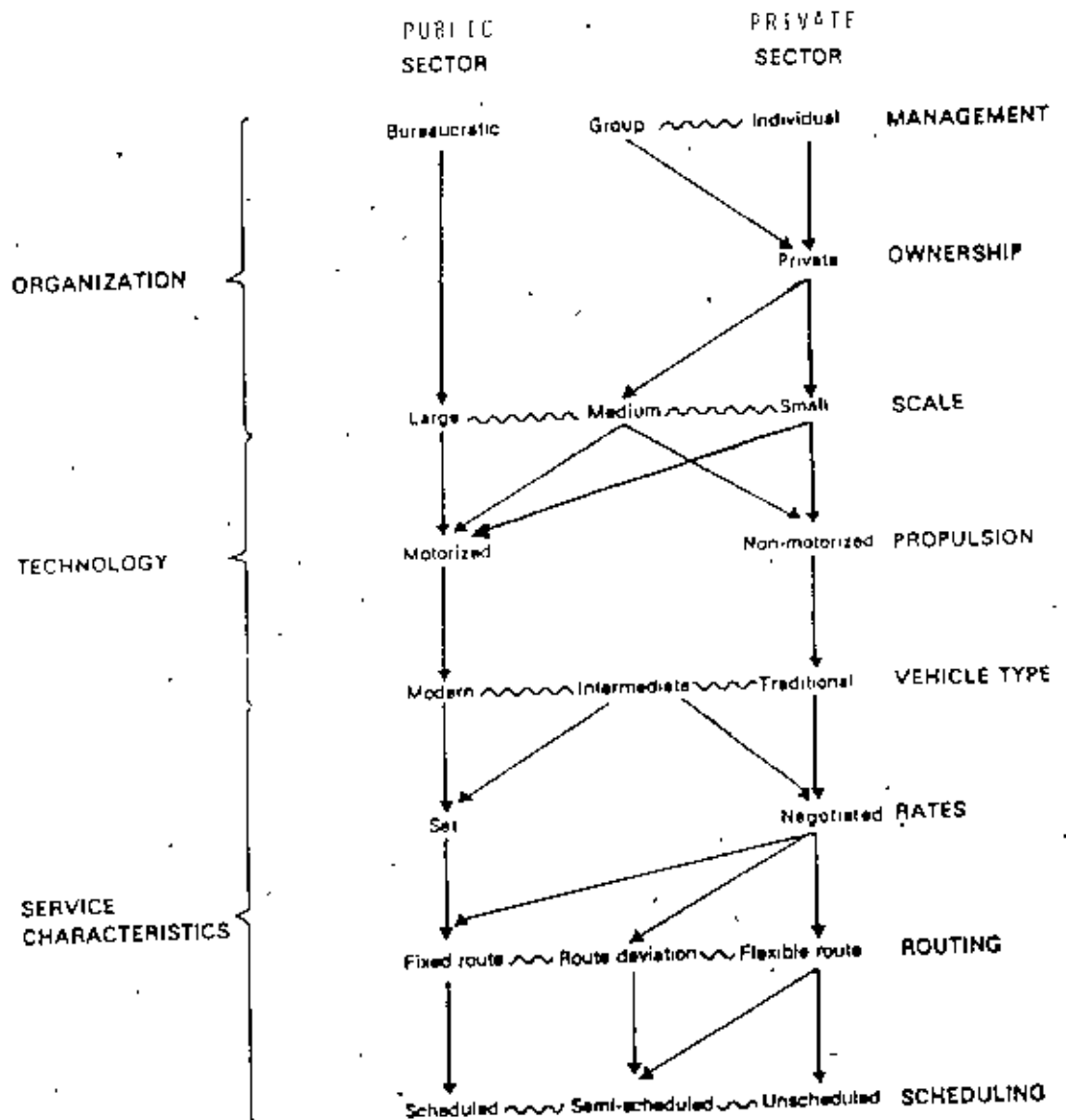


Figure-3

Source: Adapted from Rimmer (1986, P.285)

## 2.4 Past Development of Autotempo

The autotempo transportation service in the city was first introduced by the private autotempo owners in early 1978. However, the exact date could not be known. Uptil now, autotempo services are provided by the private sector only.

Dhaka Metropolitan Police (DMP) ( Traffic and Registration ) provided information on the different existing routes of the city. According to DMP, since the beginning of autotempo services there were 9 routes. These were as follows:

- 1) Gulistan- Mirpur
- 2) New Market- Gulistan
- 3) Gulistan- Sadarghat
- 4) Chalkbazar- Mohammedpur
- 5) Sadarghat- Hazaribagh
- 6) Gulistan- Rampur
- 7) New Market- Pallabi
- 8) Azimpur- Bazaribagh
- 9) Gulistan- Bashabon

Later in July 1987 a proposal was submitted by the autotempo owner's association to increase the number of routes. On the basis of that proposal the authority of DMP (Traffic) increased the number of routes from 9 to 16 which are now existing. The routes are as follows:

- 1) Gulistan-Mirpur via Farmgate
- 2) Gulistan- Postagola via Zatrabari
- 3) Gulistan- New Market via Mahakhali
- 4) Gulistan-Demra via Konapara
- 5) Bangladesh Bank-Mohammedpur via Zikatola
- 6) Bangladesh Bank-Hazaribagh via Azimpur
- 7) Sadarghat-Budda via Rampura
- 8) Sadarghat-Balughat via Farmgate
- 9) Chalkbazar-Mirpur via Gabtali
- 10) Kamlapur-Mirpur via Agargaon
- 11) Sadarghat-Madartak via Police Hospital
- 12) Chankherpool-Mahakhali via Farmgate



- 13) Killar Moor-Bangladesh Bank via Dhaka Medical College Hospital
- 14) Gulistan-Gulshan(2) via Maghbazar
- 15) Gulistan-Shipahi bagh
- 16) Gulistan-Bashaboo.

In the route survey it is found that there are some dissimilarities between the DMP (Traffic) approved routes and the existing routes where autotempos are operating. Besides, it is found that some DMP approved route like Kamlapur-Mirpur, Chalkbazar-Mirpur and Sadarghat-Madartak do not exist.

## 2.5 Growth of Autotempo.

From the statistics, it is found that the number of autotempos has been increasing very rapidly. In the last two or three years it's growth was remarkable. From DMP (traffic) source it is seen that there was no existence of autotempo before 1978. But an official source informed that there were autotempos before 1978 (Autotempo Owners Association, 1987). According to them autotempo started plying in 1972. However, that source couldn't provide any information regarding number of autotempos and routes.

In 1978, autotempos were plying in only nine routes with a total number of 48. In 1979, the number raised to 100 and route was 11. From 1980, there has been more than 14 routes where autotempos are plying. The number increased in response to the ever increasing travel demand. In the recent years, it's growth is very high and it seems that this trend will continue in the near future.

In Tables 2.5, and 2.6 number of autotempos in different routes in different years and their respective percentage of growth has been described.

TABLE-2.5  
NUMBERS OF AUTOTEMPO ON DIFFERENT ROUTES  
IN DIFFERENT YEARS

No	Name of Routes	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1	Sadarghat-Gulistan	11	12	38	38	36	42	49	57	82	131
2	Farmgate-Balughat		5	21	21	20	24	28	33	49	80
3	Farmgate-Gulshan(2)	9	11	34	34	32	37	44	50	72	116
4	Farmgate-Mirpur		15	38	38	36	41	47	54	76	120
5	Gab tali-Farmgate			21	21	20	24	30	36	55	94
6	Gulistan-Postagola		7	33	33	32	37	45	52	77	127
7	Gulistan-Maotail		7	38	38	36	43	52	60	90	149
8	Gulistan-Bashabo	5	8	21	21	20	23	26	30	42	67
9	Malibagh-Farmgate	8	9	25	25	24	28	32	37	52	83
10	Gulistan-Newmarket	8	15	38	38	36	41	47	54	76	120
11	Newmarket-Zikatola	7	9	22	22	21	24	27	31	43	68
12	Newmarket-Farmgate			21	21	20	24	30	36	55	94
13	Gulistan-Chaikbazar			16	16	16	19	24	28	44	75
14	Chankherpool-Farmgate		2	15	15	14	17	21	24	37	61
Total		48	100	383	383	365	424	502	582	850	1385

Source: Dhaka Metropolitan Police (Traffic and Registration) informed about the total number of autotempo in each year while the Autotempo Owners Association at Dhulaikhal and Tejgaon, Dhaka (1987), roughly estimated the number of autotempo in each route respectively.

TABLE-2.6

AVERAGE PERCENTAGE OF GROWTH OF AUTOTEMPO  
OVER THE YEAR

No	Name of Routes	1979	1980	1981	1982	1983	1984	1985	1986	1987
1	Sadarghat-Gulistan	9.1	219.5		-5.26	16.6	16.6	16.3	44	61.1
2	Farmgate-Balughat		328.5		-4.76	20.0	16.6	21.4	48	63.9
3	Farmgate-Gulshan(2)	22.2	211.1		-5.88	15.6	18.9	13.6	44	60.7
4	Farmgate-Mirpur		154.8		-5.26	13.8	14.6	14.8	40.7	57.8
5	Gabtali-Farmgate				-4.76	20.0	25.9	20.0	52.7	70.6
6	Gulistan-Postagola		376.3		-8.91	15.6	21.6	15.5	-	64.7
7	Gulistan-Maotail		445		-5.26	19.4	20.9	23.0	48.9	65.6
8	Gulistan-Bashabo	60	162.8		-4.76	15.0	13.0	23.3	41.2	58.3
9	Malibagh-Farmgate	12.5	182.5		-4.0	16.6	14.2	15.6	42.4	59.4
10	Gulistan-Newmarket	87.5	154.8		-5.26	13.8	14.6	14.8	40.7	57.8
11	Newmarket-Zikatola	28.6	144.7		-4.76	33.3	12.5	14.8	40	57.1
12	Newmarket-Farmgate				-4.76	20.0	25.0	20.0	54.7	70.6
13	Gulistan-Chaikbazar					18.7	26.3	16.6	54.7	70.6
14	Chankherpool-Farmgate		651.4		-6.67	21.4	17.6	14.2	50.6	67.1
Total		108.3	283	7.8	-4.70	16.2	18.4	15.9	46	62.9

Note: -Negative Growth

Source: Calculated from the figure presented in Table-2.5 at page 31

It is evident from the above Table-2.6 that autotempo suddenly increased in 1980. This figure was 283 percent higher than the previous year. So far, this is the highest rate of growth. On the other hand this number decreased in the following year. Again from 1982 it's growth is quite steady except 1987 where this number increased again abruptly.

An estimated autotempo growth for the near future is presented in Table-2.7.

TABLE-2.7

ESTIMATEO AUTOTEMPO GROWTH

Year	1988	1990	1992	1994
*Estimated Growth of Autotempo(nos)	615	938	1317	1751
Year	1988	1990	1992	1994
**Estimated Population of Autotempo(nos)	5637	6575	7892	9643

Note: Newton's Forward Formula for Extrapolation is used in estimating the number of autotempo.

\*Number of autotempo that will be increased over the year.

\*\*Number of autotempo population estimated for the year.

Furthermore, it may be mentioned here that the bus and minibus are also operating in majority of the 14 autotempo routes. It has been observed that other than the Gulistan-Bashabo, Gulistan-Chalkbazar and Chankherpool-Farmgate route bus and minibus are available in the rest 11 routes.

## 2.6 Conclusion

In Dhaka the road transportation is provided by both the public and private sectors and consists of both mechanized and non-mechanized vehicles. The non-mechanized vehicles are of local importance but contribute a significant proportion.

Although various measures have been taken for the development of transportation sector but in spite of all efforts made over the last few years,

transport facilities largely remain inadequate to meet the need of a growing economy.

Autotempo came into being in early 1978 and growing very fast. Statistics show that autotempo travels in almost all the major routes of Dhaka city. The recent growth of autotempo is quite significant and it appears that this trend of growth will continue in the near future.

## CHAPTER- III

### OPERATING CHARACTERISTICS AND SOCIO-ECONOMIC CORRELATES OF AUTOTEMPO USE IN DRAKA

#### 3.1 Operating Characteristics

The autotempo is a three wheeled scooter chassis having two banks of four to five seats at the back facing each other and is able to carry eight to twelve passengers. Autotempo generally travels on specific routes. The style of operation is that they ply between two important nodal points along a defined route and provide a point to point demand activated service between these points. The fares are graduated according to the demand rather than the distance travelled. Various operational and flow characteristics of autotempo within the city area are summarised in the following sections.

##### 3.1.1 Volume Study

A study is conducted in all the fourteen routes to find the volume of autotempo passing over a section from early morning to late night (6 A.M. to 10 P.M.). After 8 P.M. frequency gradually decreases and at about 11 P.M. it becomes virtually nil. Hence, for this study the period is chosen from 6 A.M. to 10 P.M. However, there are autotempos plying till midnight in some of the routes. Efforts are given to detail investigations on operational and flow characteristics of

autotempo in all the the selected routes. During the 16 hours ( 06:00 A.M to 10:00 P.M. ) period of survey attempts are made to record the number of autotempos, autotempo passengers passing through some selected sections.

It is found that all the routes are provided with both the small and medium size autotempos loading passengers from 6 to 12 in each trip. It is also noticed that during peak period most of the autotempos are overloaded and carried passengers more than 12 per trip. In addition to the total number of autotempos in each route, attempts are made to record the length of route, time required for journey etc. Details of survey findings are given in Annexure-A.

### 3.1.2 Trip Analysis

In Table 3.1 the name of the routes, length, time required for trip, number of autotempos available in each route and the respective number of trips per day made by each autotempo has been shown. Also the fare per person per trip is given here.

**TABLE-3.1****ROUTE CHARACTERISTICS**

No	Name of Routes	Distance in(KM)	Time reqd. for journey (MIN)	Fare per person (Tk)	Fare per person per km (Tk)	No. of Tempos availa- ble(NOS)	No of est. Trips per Tempo/day (NOS)
1	Sadarghat-Gulistan	3	10	2.0	0.66	80	25-30
2	Farmgate-Balughat	6	20	3.0	0.50	50	25-30
3	Farmgate-Gulshan(2)	6	20	3.0	0.50	70	20-25
4	Farmgate-Mirpur	6	25	3.0	0.50	70	20-25
5	Gabkali-Farmgate	6	20	3.0	0.50	60	30-35
6	Gulistan-Postagola	4.5	15	2.0	0.45	80	35-40
7	Gulistan-Maotail	6	25	3.0	0.50	95	25-30
8	Gulistan-Bashabo	4	20	2.0	0.50	40	25-30
9	Malibagh-Farmgate	3	15	2.0	0.66	50	20-25
10	Gulistan-Newmarket	3	10	2.0	0.66	70	30-35
11	Newmarket-Zikatola	2.5	10	1.0	0.40	40	30-35
12	Newmarket-Farmgate	3	8	2.0	0.66	60	35-40
13	Gulistan-Chalkbazar	3	10	2.0	0.66	50	25-30
14	Chankherpool-Farmgate	5	25	2.0	0.40	40	30-35
Average:		4.36			0.54		30

From Table-3.1, it is evident that the length of the routes are within the range of 2.5 to 8 km. In most of the cases the length is about 4 to 5 km. Highest number of autotempos are found in the Gulistan-Maotail route while Gulistan-Bashaboo, Newmarket-Zikatola, Chankerpool-Farmgte had the lowest.

It is very difficult to get information exactly how many trips are made by each autotempo per day. Every owner/driver/helper answered about a range of trip. Hence, in case of number of trip analysis, always a range is used.



Trip frequency of different route per hour has been studied and shown in Table 3.2. It is found that Newmarket-Farmgate route has the highest number of trips per hour while Gabtali-Farmgate has the lowest.

TABLE-3.2

TRIP ANALYSIS

No	Name of Routes	Average no. of Tempo/ day	Average no of trips per hr	Highest no of trips per hr	Time of highest no of trips	Lowest no of trips per hr	Time of lowest no of trip
1	Sadarghat-Gulistan	80	53.9	75	1-2 pm	36	9-10 pm
2	Farmgate-Balughat	50	49.4	61	8-9 am	36	9-10 pm
3	Farmgate-Gulshan(2)	70	44.4	62	7-8 am	29	9-10 pm
4	Farmgate-Mirpur	70	37.8	55	9-10 am	35	4-5 pm
5	Gabtali-Farmgate	60	15.1	20	7-8 am	7	6-7 am
6	Gulistan-Postagola	80	43.3	55	7-8 am	33	12-1 pm
7	Gulistan-Maotail	95	42.2	67	6-7 am	29	11-12 pm
8	Gulistan-Bashabo	40	38.0	48	9-10 am	28	12-1 pm
9	Malibagh-Farmgate	50	35.9	58	1-2 pm	7	6-7 am
10	Gulistan-Newmarket	70	37.6	53	9-10 am	23	6-7 am
11	Newmarket-Zikatola	40	34.6	50	7-8 am	23	9-10 pm
12	Newmarket-Farmgate	60	70.8	91	7-8 am	61	8-9 pm
13	Gulistan-Chalkbazar	50	41.9	51	6-7 am	34	9-10 pm
14	Chankherpool-Farmgate	40	40.4	55	5-6 am	7	6-7 pm

3.1.3 Travel Analysis

Observations are made on the highest, lowest and average number of travellers per day, per hour and the respective time of the incident. It is very important to observe that except a few, all the routes are having more or less similar traffic flow with respect to time. Other than a few, the majority of the routes experienced highest number of travellers in the morning hours and lowest in the afternoon. It is also observed that during the morning hours there are a

pressure from the office going passengers and school going children. The same pressure again comes to effect in the afternoon from the same group of passengers. Again the petty businessman are noticed to rush for an autotempo mostly in the early morning and late night. Therefore, those routes mainly linked with the commercial areas are seen carrying highest passengers in the early morning and late night. Table 3.3 illustrates it clearly.

TABLE-3.3

TRAVEL PATTERN

No	Name of Routes	No of travlrs per day (16 hrs)	Average no of travlrs per hr	Highest no of travlrs per hr	Time of highest no of travlrs	Lowest no of travlrs per hr	Time of lowest no of travlrs
1	Sadarghat-Gulistan	8204	512.8	684	12-1 pm	336	9-10 pm
2	Farmgate-Balughat	7672	479.5	586	4-5 pm	347	9-10 pm
3	Farmgate-Gulshan(2)	6246	390.4	577	7-8 am	178	3-4 pm
4	Farmgate-Mirpur	5466	341.6	582	6-7 pm	57	6-7 am
5	Gabtail-Farmgate	2006	125.5	192	7-8 pm	52	6-7 am
6	Gulistan-Postagola	5168	323.0	439	6-7 am	251	12-1 pm
7	Gulistan-Maotail	4666	291.6	573	6-7 am	183	11-12 pm
8	Gulistan-Bashabo	4700	293.8	402	6-7 am	222	12-1 pm
9	Malibagh-Farmgate	4513	282.1	471	5-6 pm	8	6-7 am
10	Gulistan-Newmarket	4499	281.2	397	12-1 pm	191	9-10 pm
11	Newmarket-Zikatola	4483	280.2	393	7-8 am	200	3-4 pm
12	Newmarket-Farmgate	7754	484.6	639	7-8 am	314	9-10 am
13	Gulistan-Chalkbazar	6258	391.1	596	6-7 am	258	9-10 pm
14	Chankherpool-Farmgate	5885	367.8	509	9-10 am	7	6-7 pm

### 3.1.4 Passenger Kilometer

Attempt has been made to show the total passenger kilometer per day per route. It is observed that Gulistan-Maotail route experiences highest passenger kilometer per day while Gulistan-Chalkbazar route gives the lowest. Figures are given in Table-3.4

TABLE-3.4

#### PASSENGER KILOMETER PER DAY PER ROUTE

No	Name of Routes	Average loading per trip (a)	Routes distance in KM (b)	Av.No of trips per Tempo/day (c)	Passenger Km/day/ Tempo/route (axbxc)	No of Tempo per route (d)	Total passenger KM/ day (axbxcxd)
1	Sadarghat-Gulistan	9.5	3.0	27.5	522.5	80	0.42 lac
2	Farmgate-Balughat	9.7	6.0	27.5	1333.7	50	0.67 lac
3	Farmgate-Gulshan(2)	8.8	6.0	22.5	792.0	70	0.55 lac
4	Farmgate-Mirpur	9.0	6.0	22.5	1620.0	70	1.13 lac
5	Gabtalil-Farmgate	8.3	6.0	32.5	1618.5	60	0.97 lac
6	Gulistan-Postagola	7.4	4.5	37.5	1387.5	80	1.11 lac
7	Gulistan-Maotail	6.9	6.0	27.5	1518.0	95	1.44 lac
8	Gulistan-Bashabo	7.7	4.0	27.5	1482.3	40	0.59 lac
9	Malibagh-Farmgate	7.8	3.0	22.5	702.0	50	0.35 lac
10	Gulistan-Newmarket	7.4	3.0	32.5	962.0	70	0.67 lac
11	Newmarket-Zikatola	8.0	2.5	32.5	650.0	40	0.26 lac
12	Newmarket-Farmgate	6.8	3.0	45.0	892.5	60	0.53 lac
13	Gulistan-Chalkbazar	9.3	3.0	27.5	383.6	50	0.19 lac
14	Chankherpool-Farmgate	9.1	5.0	32.5	1478.8	40	0.59 lac

### 3.2 Socio-Economic Correlates

This study has been made to examine the nature and importance of the associated socio-economic aspects of the urban travellers using available public transport in Dhaka city. With this objective in view a questionnaire survey is

conducted among the travellers of autotempo in the different routes of Dhaka city. The main reason of this survey is to study the autotempo travellers and their understanding about the different aspects of the existing role of autotempos and other transportation modes. Details of the sample questionnaire is given in Annexure-B.

For the purpose of this study five major routes out of the total fourteen routes are taken into consideration. These five routes are taken from different parts of Dhaka city so that the survey reflects the true characteristics of the autotempo users. A total of 500 autotempo passengers are interviewed. As a very negligible number of woman travels autotempo regularly and because of social hindings it is very difficult to interview them. Hence, for this study all the interviewee taken are male.

These five routes and the respective number of interviewee are given in Table-3.5

TABLE-3.5

RESPONDENTS IN DIFFERENT ROUTES

No.	Route Name	No of interviewee
1.	Sadarghat-Gulistan	125
4.	Farmgate-Mirpur	113
7	Gulistan-Maotail	100
9.	Malibagh-Farmgate	82
10.	Gulistan-Newmarket	80

3.2.1 Distribution of Travellers By Time

It has been found from the study (Table 3.6 ) that the majority of the travellers are travelling autotempo regularly for more than 3 years. More than half of the total respondent passengers in different routes are travelling autotempo regularly, while only one third of the total passengers are travelling for less than a year. Besides, 56.8 percent regular travellers, there are also a large number of casual travellers those who take autotempo if other modes of transport are not available. It is very important to note that the majority of the travellers are enjoying home-based trip. In Table 3.6 the survey findings are given.

TABLE-3.6

## DISTRIBUTION OF TRAVELLERS BY TIME

No.Route Name	Years of Use			Type of Users		Type of Base	
	0-1 year	1-3 years	Above 3 years	Regu- lar	Casual	Home- based	Non home based
1 Sadarghat-Gulistan	26.5	53	22.5	57.5	42.5	63.7	36.3
4 Farmgate-Mirpur	28	52	22.4	58.4	41.6	71.2	28.8
7 Gulistan-Maotail	27.5	52.5	18.7	50	37.5	72.5	27.5
9 Malibagh-Farmgate	28	53.6	8.4	58.5	41.5	78	22
10 Gulistan-Newmarket	27	52	20	60	40	74	26
	27.4	52.62	18.4	58.88	40.6	71.88	28.12

(Note: All figures are in percentage)

## 3.2.2 Combination of Autotempo and Other Modes

One of the most important characteristics of autotempo operation is that the services are provided between two nodal points of high travel density. There is very little scope of stage carriage service in autotempo operation. The present autotempo network is neither extensive nor integrative in nature. Under these circumstances, it is likely that an autotempo-trip may not completely fulfill a particular travel need. To study this, attempts are made to ascertain the combination of autotempo and other available modes. It is found that any considerable distance could be travelled either by a suitable single mode or by a combination of number of modes. There are combination of autotempo and other modes when the distance is too long and mostly those trips are non-homebased. Observations also suggest that longer the distance a person travels lesser is the

use of slow moving vehicles like rickshaws and cycles. Details of the study results are given in Table 3.7

TABLE-3.7

COMBINATION OF AUTOTEMPO AND OTHER MODES

No.Route Name	Autotempo +Walking	Autotempo +Rickshaw	Autotempo +Minibus	Autotempo +Bus	Autotempo Alone
1 Sadarghat-Gulistan	6.2	11.5	28.3	19.5	34.5
4 Farmgate-Mirpur	5.6	12	28	21.6	32.8
7 Gulistan-Maotail	6.3	12.5	25	20	36.3
9 Malibagh-Farmgate	6	14.7	31.7	20.8	26.8
10 Gulistan-Newmarket	6	14	30	18	32
Total:	6.02	12.9	28.6	19.9	32.48

(Note: All figures are in percentage)

The above figure describes it clearly that autotempo itself not capable enough to make a full trip. At present it is taking only one third of the total autotempo travellers alone while the rest two third is being carried by a combination of autotempo and other modes. A combination of autotempo and minibus has been plying a significant role for the city dwellers. A considerable percent of autotempo passengers are taking bus and rickshaws to reach their destination while a negligible percent walks a while before taking autotempo or after finishing the same.

### 3.2.3 Reasons of Mode Choice

Attempts are made to find the reasons of how autotempo is so successful to attract passengers from other modes. The majority (58.6 percent) of the passengers answered that they use autotempo because it takes comparatively less time for a journey. A considerable number (about 17.9 percent) of travellers mentioned since other services are not satisfactory, so finding no other way they are travelling by autotempo. Autotempo is not considered as a cheaper mode of transportation by the travellers. Some passengers take autotempo as they are the captive travellers and others stated that they do not have to wait long for an autotempo. Results of the survey are presented in Table 3.8.

TABLE-3.8

#### REASONS OF USING AUTOTEMPO

No.Route Name	Change in income	Less journ- time	Less waiting time	Easily avail- able	Cheaper mode	Unavail- ability of other modes	Other services are not good
1 Sadarghat-Gulistan	1.7	61.9	11.5	7.95	0.88	2.6	13.3
4 Farmgate-Mirpur	2.4	58.4	11.2	8	0.8	3.2	16
7 Gulistan-Maotail	1.2	52.5	11.2	7.5	nil	3.7	23.4
9 Mallibagh-Farmgate	1.2	58.5	14.6	4.9	1.2	2.4	17.1
10 Gulistan-Newmarket	1	62	9	5	1	2	20
	1.5	58.6	11.5	6.6	0.78	2.8	17.9

(Note. All figures are in percentage)



### 3.2.4 Purpose of Use

There are many purposes behind a trip. In the following table (Table 3.9) distribution of purposes of the autotempo travellers are given.

TABLE-3.9

#### PURPOSE OF USE

No.	Route Name	Work	Education	Shopping	Social
1	Sadarghat-Gulistan	44.2	26.5	21.2	8
4	Farmgate-Mirpur	40	25.6	18.4	16
7	Gulistan-Maotail	35	25	21.2	18.8
9	Malibagh-Farmgate	46.3	26.8	10.9	15.9
10	Gulistan-Newmarket	44	29	15	12
TOTAL		42.1	26.5	17.3	14.1

(Note: All figures are in percentage)

It is evident from the table that a significant number of the travellers are travelling autotempo to reach their work place while a small section of passengers are travelling autotempo for social and recreation only. A considerable number of travellers are travelling autotempo for education and shopping purpose.

### 3.2.5 Reasons of Mode Change

It is a matter of fact that at present, a considerable number of travellers are taking autotempo as their mode of transportation. It is important to observe that how people have changed their mode of transportation to autotempo. On the

other hand it may be stated that how successful autotempo is in attracting passengers of other modes of transportation. In Table 3.10 the findings of the survey are presented.

TABLE-3.10

CONVERSION TO AUTOTEMPO FROM OTHER MODES

No.	Route Name	Modes			
		Bus	Mini Bus	Rickshaw	Others
1	Sadarghat-Gulistan	43.4	36.3	20.3	
4	Farmgate-Mirpur	42.4	39.2	15.2	3.2
7	Gulistan-Maotail	37.5	37.5	25	
9	Malibagh-Farmgate	29.2	20.7	48.8	1.2
10	Gulistan-Newmarket	23	21	56	
		35.1	30.9	33.0	4.1

(Note: All figures are in percentage)

From Table-3.10 it is clear that the passengers of autotempo are mostly coming from bus (35%), minibus (30.9%) and rickshaw (33%). Autotempo has been almost equally successful to attract passengers from the bus, minibus and rickshaw. About one third of the present autotempo passengers are previously rickshaw passengers. This indicates significant increase in number of autotempo could help curb the number of rickshaw on the roads of Dhaka city. A negligible portion of the total passengers are newly generated.

### 3.2.6 Travellers Occupation

Distribution of the autotempo travellers by their occupation is shown in Table 3.11

TABLE-3.11

#### OCCUPATION OF THE TRAVELLERS

No.Route Name	Stud-ent	Servi-ce(lo-wer class)	Service (Cleri-cal)	Serv-vice (Upp-er)	Petty busi-ness man	Busi-ness man	Unem-loyed	Oth-ers
1 Sadarghat-Gulistan	26.5	24.7	7.9	1.8	13.3	7	7.9	10.6
4 Farmgate-Mirpur	25.6	25.6	8	4.8	12.8	7.2	8	8
7 Gulistan-Maotail	25	28.75	10	2.5	12.5	8.75	8.75	3.75
9 Malibagh-Farmgate	26.8	21.9	6	9.7	9.7	4.9	3.6	17
10 Gulistan-Newmarket	30	22	8	2	13	7	6	12
	26.7	24.5	7.9	4.2	12.2	6.9	6.8	10.2

(Note: All figures are in percentage)

It is found from Table 3.11 that except a few, all the autotempo passengers belongs to the lower income group. Among the passengers there are large number of students and some unemployed persons virtually they are from the lower income group too. The nature of occupation of the travellers are more or less identical in all the five routes.

On the other hand autotempo has been carrying a considerable number of petty businessmen. About one fifth of the total passengers are petty businessmen which includes a large number of shopkeepers, wholesalers etc. This is followed by a small section of businessmen who travels autotempo occasionally.

### 3.3 Physical and Mechanical Characteristics of Different Types of Autotempo

A comparative statement of the physical and mechanical characteristics of different types of most commonly used autotempo in Dhaka city is presented in Table-3.12. Photographs of some of the autotempo types are shown in Annexure-D.

TABLE-3.12

**CHARACTERISTICS OF DIFFERENT TYPES OF  
AUTOTEMPO USED IN DHAKA CITY**

Attributes	<u>B R A N D N A M E</u>		
	WJ-020 Motor Tricycle (Made in China) (1)	Vespa Tricycle (Made in Italy) (2)	API Tricycle (Made in India) (3)
Overall Length(mm)	3200	3000	3400
Overall Width(mm)	1250	1490	1400
Rickshaw Body Length(mm)	1780	1730	1800
Overall Height(mm)	1780	1695	1750
Net Weight(kg)	420	600	800
Maxm. Speed(km/hr)	65	65	61
Econ. Speed(km/hr)	40	40	40
Fuel Consumption	4 lit/100 km	4.5 lit/100 km	3.8 lit/100km
Fuel Tank Capacity	15litre	15 litre	11.5 litre
Cylinder Volume	248.2 cu.cm	175.0 cu.cm	175.0 cu.cm
Engine Type	2-Stroke with crankcase	2-Stroke, One Cylinder	2-Stroke, One Cylinder
Normal Loading Capacity	8 nos/tempo	8 nos/tempo	8 nos/tempo
Observed Loading	10 nos/tempo	10 nos/tempo	10 nos/tempo
Seating Space Per Person	0.168 sqm	0.160 sqm	0.170 sqm

Note: For calculating area of seat/person, an average width of 508 mm per seat is estimated

Source:

- (1) Catalogue of Wangjiang Machinery Plant, Chongqing, China
- (2) Information from the Bangladesh Autocars Limited
- (3) Catalogue of API India Limited, Bombay, India.

#### 3.4 Conclusion

Autotempo operates on an average 16 hours per day. The rush is quite significant in the early morning and afternoon. Total passenger kilometer travelled by autotempo in the fourteen routes of Dhaka city has been found to be about 10 lac. Besides, regular travellers there are a large number of casual travellers.

It is very important to note that autotempo provides services between two fixed nodal points of high travel density. The present network is neither extensive nor integrative in nature. Hence an autotempo trip can not always completely fulfill a particular travel need. If the distance is a considerable factor, a combination of autotempo and other modes are very common to meet the travel demand.

There are many reasons behind the choice of this mode of transportation, but observations revealed less journey time to be the most important factor for its recent growth in the urban transportation stream of Dhaka city.

Except a few, all the autotempo passengers are coming from other modes. This negligible portion mainly includes newly generated passengers. Bus, minibus and rickshaws are equally losing passengers to the autotempo. This indicates that significant increase in number of autotempo could help curb the number of rickshaw on the roads of Dhaka city.

## CHAPTER- IV

### FINANCIAL ANALYSIS AND MANAGEMENT ASPECTS

It is very difficult to calculate the life span of autotempo as it is dependent on various operational and maintenance factors. It also varies from country to country depending upon the climatic, environmental and mode of operation and management. For an example it may be stated here that in Kuala Lumpur the life span of autotempo has been found to be only 5 to 6 years, whereas the life span of similar vehicles is about 10 years in Europe (Jemison & Partners, 1981 )

For this purpose detail discussions are made with the autotempo owner's and manufacturer's associations. Considering various factors, they estimated that the life span of autotempo in Dhaka city may be taken as 8 years on an average. Hence, for this study, the life span of autotempo is considered as 8 years. Several discussions are made with the autotempo drivers, helpers and other associated personnel in this regard. They considered the estimation to be quite reasonable.

Information on cost of operation and maintenance revenue and profit is obtained from interviews with various operators and is supported by the findings of the field survey. According to the taxation rule, the government requires the annual balance sheet to be submitted. But this provision of franchise has not

been enforced. Three sets of cost figures represent the prevailing pattern of business structure of autotempo in Dhaka city, namely:

- i) Licensee, who owns and operates the autotempo
- ii) Licensee, who owns the autotempo but rents it to an operator
- iii) Licensee, who rents franchise to an autotempo owner/operator

The itemised cost remain the same and revenue is assumed to be equal for each pattern. In practice some routes are easier to operate, some drivers work longer hours and there are other variable factors which lead to a wide variation in profitability between individual licensees and operators, but this study illustrates an average financial implication of the structure.

#### 4.1 Operating Cost

The operating cost of autotempo has been found through a direct field survey, asking questions to the autotempo owners, drivers and helpers. Three group discussions are made with the autotempo owner's and employee's associations at Farmgate, Hatkhola and Zatrabari. Some selected questions are asked to them and on the basis of those interviews the operating cost has been found out. Details of the sample questionnaire is given in Annexure-C.

**TABLE-4.1****OPERATING COST ANALYSIS**

	<u>T a k a</u>		
	Per year	Per day	Per km.
i) Operating cost			
a) Fuel @ 8.4 litre daily @ Tk. 13.65 per litre.			0.88
b) Engine oil @ 1/2 litre per month @ Tk. 360 per litre.			0.04
c) Tyre Wear: 4 Tyres on 90 days life @ Tk. 600/- per tyre equals to 2400/ per 4 tyre.			0.20
d) Minor maintenance and Repair		30.00	0.23
ii) Time Cost			
a) Crew wage for 300 day operation @ Tk. 120/- per day and 130 Km operation.	36000	120.00	0.92
b) Garage @ Tk. 300/- per month (30 days per month on an average).		10.00	0.07
c) Interest @ 12% on chassis, body (Tk. 100,000) and 130 km. operation.	12,000	40.00	0.30
d) Insurance @ 300 days operation.	500	1.66	0.01
e) Major Maintenance (Yearly)	8,580	28.6	0.22
f) Cost Tk. 100,000/- Life of body- 8 years. Operation-300 days per year. Per day Operation- 130 km.	12,500	41.6	0.32
g) Fees & Taxes(Registration).	500	1.66	0.01
h) Subscriptions	3000	10.00	0.07
			3.27

Note: Calculations are made on the basis of 130 km operation per day per autotempo.



#### 4.2 Rate of Return

From observation it is found that the fare of autotempo per passenger is not fixed. It varies according to the demand rather than the distance travelled. Because of variation of transportation demand on the different routes of Dhaka city autotempo owners/operators are charging higher fare per person per kilometer in the high demand area and lower in the low demand area. In the following Table-4.2 rate of return in terms of highest, average and lowest fare per person per kilometer, are presented.

**TABLE-4.2**  
**RATE OF RETURN OF RESPECTIVE FARE**

	Based on Highest fare per person per km (1)	Based on Average fare per person per km (2)	Based on Lowest fare per person per km (3)
Cost Per Kilometer (Tk)	3.27	3.27	3.27
Revenue Per Kilometer(Tk)	5.47	4.48	3.32
Profit Per Kilometer(Tk)	2.2	1.21	0.05
Daily Profit(Tk) *	286	157.3	6.5
Yearly Profit(Tk) **	85,800	47,190	1950
Rate of Return(Tk)	67.2%	37%	1.5%

(1)- Highest Fare Tk. 0.66/km, (2)-Average Fare Tk. 0.54/km

(3)-Lowest Fare Tk. 0.40/km (Ref: Table-3.1).

\* Calculated on the basis of daily operation of autotempo as 130 km

\*\* Calculated on the basis of yearly operation as 300 days

From the above Table 4.2, it is clear that difference of the highest and lowest rate of return is quite significant. This is because of the reason that those expensive routes are in the high demand areas, supply of passengers are always more than the supply of autotempos. On the other hand, because of lack of demand from the users side fare per person per kilometer is very low in some of the routes. Other than those exceptions, all the routes are having similar fare structure. It is also observed that the rate of return is very low in some of the routes. But still the number of autotempo in those routes are quite reasonable. It is due to the reason that there is always competition for a queue in the high demand area. Because of lack of good management procedure and some operational and maintenance problems, it is sometimes seen that some of the autotempos cannot avail the chance to get queue in those high demand roads. In that case they go to the low demand areas and accept the low rate of return for the time being. This is mostly applicable for the newly registered autotempos which are waiting for the approval of the owner's association of the respective routes. On the other hand it is also seen that some of the autotempos after fulfilling their quota in the high demand area go to the low demand area. This operation is not for profit-making but to maintain the interest of the crew who gets daily allowances if the vehicle operates daily.

#### 4.3 Organisation of Autotempo Operation

The operation of the autotempo in the different routes of Dhaka city is controlled by government regulations and franchise given to each licensee. Vehicles must be approved by and licenced by the Dhaka Metropolitan Police

(Traffic) and are subject to inspection for road worthiness every year. Drivers are required to have 'public service vehicle operators' licence and all autotempos are subject to normal traffic and transport ordinances. The franchise grants the licensee the right to operate an autotempo on a specific route and includes general terms and conditions of operation.

The autotempo operators are essentially 'small businessman' operating on low overheads. Their organizational structures takes several forms. The main organizational structures may be summarised as follows:

i) The licensee/driver/operator hires employees and services and maintains his vehicles. If he has a number of licences he may have his own small repair shop and retain inspectors to check on the operation of his autotempos. In case of hired drivers and conductors, it is common to pay a basic wage plus bonuses for high revenue.

ii) The licensee/owner of autotempo, the most common form, leases autotempo on a weekly or daily basis for a deposit. The charge may vary slightly according to the age of autotempo, vehicle model and route being operated. The licensee is required to perform the major maintenance of the vehicle.

Many associations of the autotempo owner's are formed, but some of them have no formal status as an administrative or managerial body. Associations are formed on area-basis, each area containing more than one route. Individual route groups have also been formed to deal with more detailed aspects of operation.

Besides playing a principal role for the operation and management of autotempo, association also try to exercise their rights within the community and bargain with the government if necessary.

#### 4.4 Problems in Operation and Management

The investors are generally interested in profit maximization from the investment. In order to achieve such a target of output, the managerial and maintenance problems are relatively important. The private investors engage in dealing with the managerial and maintenance aspects efficiently but, still their problems are quite common. Some of the management and maintenance aspects of private autotempo operation and management are discussed in the following paragraphs.

#### 4.4.1 Managerial Aspects

The managerial and maintenance skills are considerably less important in case of autotempo operation. Autotempo owner's associations plays a vital role in managing the operation of autotempo within the city area. The main function of the association is to allocate the number of trips that will be made by each of the autotempos daily and the serial number of vehicle for a particular day. The association, therefore, have full control over the operation and management of autotempo.

#### 4.4.2 Breakdown

Autotempos are plying in the city area are subject to frequent breakdown due to traffic congestion and poor road management system. A few autotempo introduced in any route runs without major trouble for more than one year, after which they start giving trouble to the engines. For next two years it runs with some minor trouble. Beyond that period, trouble to engine is very common and the breakdown is quite frequent. Therefore, it becomes necessary for the autotempo owners to overhaul the engine each year which increases the cost of operation. The investigation revealed that autotempo travels for 25 days on an average per month. Servicing is required once a month. For this purpose it takes about two days. Normally the remaining three days are taken as leave by the drivers or they operate the vehicle in the low demand areas as mentioned in the earlier section.

#### 4.4.3 Maintenance and Problems of Spares

There is no workshop or service centre for the autotempos in Dhaka city. No attempt has yet been taken by the private as well as by the public sector to create such a service centre. Therefore, the owners and the operators maintain their autotempos by using small motor workshop and keep them always on the road. However, one of the most common and major problem with this sector is the non-availability of spare parts in the open market. Generally the most commonly used spares are not available in the open market and the autotempo owners usually procure the spares from different unauthorised sources at considerably higher prices which increases the cost of operation. It is expected that Bangladesh Steel & Engineering Corporation and different small engineering workshop at Dulaikhal are going to play a pioneer role in manufacturing important spare parts.

#### 4.4.4 Terminal Problem

The terminal facilities for the operation and management of autotempos are quite inadequate. Except the minor parking facilities there is no terminal building. It is found that there are only three officially recommended autotempo parking place in Dhaka city. These are at Farmgate, Chalkbazar and Gullistan. But observation made it clear that these spaces are quite insufficient to accommodate all the waiting autotempos. Therefore, the waiting autotempos remain parked on the roadside reducing the effective width of the carriageway. Besides, it is observed that autotempos are parked on the roadside in all the nodal points and

creates congestion, jam and problems to the pedestrians as well as vehicular traffic operation.

#### 4.5 Operational Constraints

One of the major objectives of the present chapter is to examine the supply constraints of autotempos in the city routes. Autotempos plying in the city routes are subject to longer operation period due to traffic jams.

The traffic movement in the city route begins from 6 A.M. in the morning and their operation continues till 10 P.M. at night. The period of operation is sixteen hours. Autotempos in the city routes ply on shorter distances and generally ply through congested roads and are subject to frequent stopping and starting. Therefore, the durability of the engine and tyres are less and fuel consumption is considerably higher because of frequent stopping and starting of autotempos in the city routes. In such case the depreciation and fuel consumption is a considerable factor.

#### 4.6 Conclusion

From financial point of view the rate of return of investment on autotempo has been found to be quite satisfactory. Although, in some of the routes the return is very poor but it does not effect much on the net profit of the autotempo operation. It is because that the vehicles only after fulfilling their quota in the high demand area operates in the low demand area. No vehicles are

exclusively operated in the low profit making routes. Also because of some temporary operational and maintenance problems this may operate in the low demand area too. Hence the average rate of return is much higher than other mode of transportation. As there is no autotempo in the public sector, therefore, the private sector is in the advantageous position in creating a monopoly business. Moreover, there is no control over the fixation of fare from the Government.

The organisations of the autotempo have been playing a vital role to organize the operation and movement of autotempo both interms of local and national level. It is their responsibility to bargain and prepare the framework regarding the interest of the owners as well as the operators and other issues with the authorities.

Like the other modes of transportation autotempo has some problems in operation and management too. Frequent breakdown and lack of spares are some of the important problems for autotempo operation. Besides lack of terminal facility is an other important issue. Due to absence of these facilities autotempos are found parked here and there in a most haphazard manner which ultimately decreases the efficiency of autotempo and creates problem for a safe and easy movement of vehicular as well as pedestrian traffic.



## CHAPTER- V

### SERVICE STANDARD OF AUTOTEMPO AND OTHER MODES

Autotempo has been operating as an intermediate mode of public transport between bus and conventional rickshaw. The recent growth of autotempo is phenomenal. The main reason behind the growth of autotempo in the transportation stream of Dhaka city is that the number of mechanized vehicles is quite meagre to meet the demand of the urban travellers. In the absence of adequate number of mechanized vehicles like the bus or any other suitable mode of transportation in the urban areas, autotempo is gradually taking a reasonable shape to fulfill that transportation demand. This trend is thereby leading to increase the number of autotempo within Dhaka city.

Different operating characteristics of autotempos in the routes of Dhaka city have been discussed in the previous chapters. In this Chapter, a summary of the overall activity of the different modes of public transport available in Dhaka city will be discussed so that it becomes possible to make a comparative assessment on service performance between autotempo and other modes of transportation.

## 5.1 Travel by Different Modes

The bus is the cheapest means of public transportation operating in the city routes. In addition to the services offered by the bus, different other transportation modes have been playing important role in the urban areas of Dhaka city since the middle of the present century. The present pattern of public transportation services in the city consists of both high and slow speed vehicles. The rickshaw is treated as the slow speed vehicle because it is manually driven and the average speed of it is 6 miles per hour (Shankland & Cox, 1979). Apart from the rickshaw all others are motorised vehicles and they operate at higher speed than the rickshaw and also for longer distance. The autorickshaw is motorised three seater vehicles which is used for door to door services but are the costliest of all public transportation modes except the taxi-cab. Although autotempo has similar engines like the autorickshaw but it has two banks of seats at the back and carries eight passengers on an average. In terms of operation, autotempo makes a journey between two fixed nodal points. The minibus is smaller version of buses having capacity to accommodate about 25 passengers on an average. But the fare per person is higher than that of buses and lower than other modes.

The characteristic features and the pattern of services of these vehicles are discussed in the following paragraphs.

## 5.2 Rickshaw

The rickshaw is a three wheeled cycle called cycle rickshaw. Body of the rickshaw is generally made of wood, manufactured locally with the coir seats and bamboo hood so as to secure the passengers from rain and sunlight. It is manually operated giving door to door services to the passengers. The rickshaw has carrying capacity of two passengers.

Because of the smallness of their sizes, rickshaw can easily operate on lanes and bylanes of the city. As they are manually operated, therefore, the speed of the rickshaw is not very high which is about 9 Kilometer per hour, and the trip length is 2.5 km on an average. Rickshaws are in demand, generally in the narrow roads, lanes and bylanes as these roads are not suitable for bigger vehicles such as the bus, minibus etc. Rickshaws are mostly operated in the vicinity of the old city which does not have many wider roads and give useful services to the population of the old part of Dhaka city. As the rickshaw generally operate on the trip lengths of 1.5 to 4 km. therefore, the main advantage of travelling by a rickshaw is that it serves passengers travelling on short distances and also that it is able to provide demand activated door to door personalized service. Although rickshaws are having carrying capacity of two persons, but very often they carry only one person. In a study the average number of persons carried by rickshaws are found to be 1.5 and the trip frequency was 30-40 per day (Ferdous, 1984).

Official estimates of rickshaws in 1969 was 4,204 and it increased to 21,000 in 1980 (Official Record on licence of Rickshaws, 1980) including Gulshan and Mirpur Purashavas. But in practice it is found from different sources that the number of rickshaws are much higher. One source estimated the number of rickshaws in 1979 in Dhaka city to be 50,000 (Shankland & Cox, 1979) while another source estimated it to be around 85,000 (Alam, 1979). The Rickshaw Chalak Samity estimated the present number of rickshaws in Dhaka city to be 100,000 (one lac ). Out of these, the figure 100,000 rickshaws at present seems to be more reliable and hence taken into consideration for this study. Detail service performance of the rickshaw is given in Table 5.1.

### 5.3 Auto-Rickshaw

The autorickshaw is popularly known as the baby taxi. It is a three wheeled mechanically operated vehicle, whose body is generally manufactured locally but the chassis along with the engine is imported. These are generally imported from the Bajaj Company of India and the Vespa Company of Italy. Like the rickshaw, the autorickshaw has the carrying capacity of two persons at the back and the driver at the front. Autorickshaws are mechanically operated and can run on short and long hauls, with an average speed of 20 km/hr. The average trip length of autorickshaws is 8 km (Shankland & Cox, 1979). They are able to provide door to door demand activated service and can ply on narrow lanes and bylanes. It is found that auto-rickshaw began to ply in Dhaka city from the 1960's. Generally autorickshaws serve the whole city. However, their use and importance did not increase very much until recently because they are comparatively more expensive

form of the public transportation. There was an official fare structure set by the Dhaka Metropolitan Police. But in practice it has been found that those fixation of fares does not exist any more rather the drivers charge much higher fare. As the autorickshaw are mechanically operated and can give door to door demand activated service, therefore, people who are in need of urgent travel on long distance are benefitted by travelling on an auto-rickshaw although the cost is much higher. From direct field investigation it has been found that the present fare of autorickshaw is about Tk. 5.00 per kilometer per trip. Travelling pattern, trip frequency, trip distance, average loading and passenger kilometer of the autorickshaw is given in Table 5.1 (Nasreen, 1979).

#### 5.4 Minibus

The minibus is a smaller version of bus and has got an average seating capacity of 24 persons. It is operated by both diesel and petrol engine. The minibus have appeared only recently in Dhaka city. They operate on some specific routes. The minibus generally operate like the bus. As the number of buses are less, so travellers who fails to travel by bus may find a better access to travel by minibus, but at a slightly higher fare. The trip frequency, average loading and passenger kilometer per day as reported by 'Minibus Chalak Samity' are shown in Table 5.1

## 5.5 Bus

The bus is the cheapest means of public transportation operating in the city routes and they carry a large number of passengers from one corner of the city to the other corner. In Dhaka, buses are being operated in both the public and private sectors. It has been found from field observation and discussion with the BRIC and private bus owners that BRTC, the public sector operator is operating about 50 buses while the private sector is operating about 100 buses in the different routes of the city.

Although the bus services are operated by both the public and private sectors but services provided by the public sector are considered to be meagre. Overloading on buses in the city is a regular phenomenon. People always seem to struggle for a place in the foothold of the bus. Most of the bus have an average capacity of 62 passengers (52 seats+10 standing) (Shankland Cox, 1979). However, BRTC provided to a standard of 66 persons per bus. For the present study, 62 passengers has been assumed as normal capacity.

Some comparative data on alternative road based public transport modes as described in the above paragraphs have been shown in Table 5.1. From Table 5.1 it is evident that out of the total passengers-kilometer travelled in Dhaka city, maximum is carried by the rickshaw and next by bus.

**TABLE-5.1**

**COMPARATIVE DATA ON ALTERNATIVE ROAD BASED  
PUBLIC TRANSPORT MODES IN DHAKA**

No	Name of modes	Average speed (km/hr)	Average trip length (km)	Average load- ing nos	Trip per- vehl per/ day	No of vchic- les in operat. nos	Average passen- ger KM	Total passen KM/day	% of Total passen KM/day
		(a)	(b)	(c)	(d)	(e)	A=bxcd	T=Axe	per mode
1.	Autotempo	20	4.3	8.3	29.8	855	1063.5	9.09	3.9
2.	Bus	30	15	62	17	200	15810	31.62	13.6
3.	Mini-Bus	30	15	24	20	430	7200	30.96	13.3
4.	Rickshaw	9	2.5	1.5	40	100,000	150	150.0	64.6
5.	Auto-Rickshaw	20	8	2.0	25	2560	400	10.2	4.3

Note: From discussion with Autotempo Owners Association, Dhulaikhal. Availability factor of 0.8 is assumed for each of the modes, except rickshaw.

**5.6 Others**

Besides the modes of transport already described, Taxi-Cab and Mishuk are two new modes growing reasonably in Dhaka city. These are mostly in the private sector. The mode of operation of Taxi-Cab is somewhat like the private car i.e. they provide demand activated service. This is the most expensive mode of transportation. On the other hand the mode of operation of Mishuk is like the autorickshaw but it is less expensive than autorickshaw.

Other than the public and private transportation there is another sector which is operating in Dhaka city. A large number of travellers are travelling in this sector. This is neither public nor fully privately owned and hence having the nature like the quasi public transport. Different office vehicles like the bus, minibus, microbus, jeep and taxi-car are within these category. The flow

characteristics is somewhat like other public and private bus. During office hour they carry passengers from some selected points to the office and drop them in the same place after the office. They usually travel through the major routes of the city. Other than the taxi-car all office vehicles have similar flow characteristics. In case of taxi-car, the user have more flexibility and hence it provides a demand activated service.

### 5.7 Roadway Capacity

It is a common practice to express the roadway capacity in terms of passenger car units (PCU). Level of service is associated with different operating conditions that occur on a facility when it accommodates various traffic volumes. It is a quantitative measure of the effect of a number of factors that include speed and travel time, traffic interruptions, freedom to manoeuvre, drivers comfort and convenience etc.

Indian Roads congress has tentatively suggested the equivalent factors of PCU for open section excluding intersections. The following Table-5.2 represents the PCU of different vehicles and their passenger capacity per unit PCU.



TABLE-5.2

PASSENGER CAR UNITS

Sl. No	Vehicle Type	Equivalence Factor (PCU)	Passenger Capacity/PCU unit	Desirability interms of rickshaw	Desirability interms of autotempo
		(1)	(2)	(3)	(4)
1.	Autotempo	1.0	8.3	8.3	1
2	Autorickshaw	1.0	2.0	2.0	0.25
3.	Cycle. Motor Cycle	0.5	2.0, 3.0	2.0, 3.0,	0.25, 0.36
4.	Cycle Rickshaw	1.5	1.0	1	0.12
5.	Bus	3.0	20.6	20.6	2.5
6.	Minibus	2.0	12.0	12.0	1.45

SOURCE: (1)- The Indian Road Congress, Vol-6, 1976

(2) to (4) Calculated value interms of PCU and average loading per vehicles (Ref: Table-5.1)

From Table 5.2 it is evident that the equivalent passenger carrying capacity of autotempo is much higher than that of the rickshaw but significantly lower than the bus and minibus. Considering passenger capacity, a bus is about 3 times more desirable than an autotempo. On the other hand a minibus is 1.5 times more desirable than an autotempo. Hence, interms of desirability, an autotempo is 8 times and a bus is 20 times more desirable than a rickshaw. This indicates that with respect to rickshaw, increase of autotempo will minimise the traffic load on the roads. On the other hand, compared to autotempo, an increase of bus and minibus will minimise the traffic load on the roads.

## 5.8 Effect of Autotempo Over Other modes

A comparative service characteristics of the different modes of public transportation is shown in the Table-5.3. Different measures are shown in relative as well as nominal scale.

**TABLE-5.3**  
RELATIVE SERVICE CHARACTERISTICS OF DIFFERENT MODES

Types of vehicle	Attributes					
	PCU	Time of Journey per Km (min.)	Cost of Journey/ person/ Km (fk.)	Equivalent passenger capacity	Short term haul journey	Long term long haul journey
	1	2	3	4	5	6
Autotempo	4(1)	2(5)	3(0.54)	3(8.3)	1	3
Rickshaw	3(1.5)	5(15)	4(1.6)	5(1)	3	5
Bus	1(3)	3(7)	1(0.3)	1(20.6)	5	1
Minibus	2(2)	4(8)	2(0.4)	2(12)	4	2
Autorickshaw	4(1)	1(4)	5(5)	4(2)	2	4

SOURCE: Col-1, Table-5.2

Col-2 to 6, Figures for bus, minibus and rickshaws are roughly estimated.

NOTE: Figures in parenthesis are in nominal scale

When comparing the services offered by the rickshaw, minibus, bus, autorickshaw and autotempo, it is seen that the autotempo passengers benefit in a number of ways. Along the principal major roads autotempo frequencies are higher than the comparable bus and minibus service and therefore, average waiting time is lowest. Usually the autotempo is not overloaded and they generally operate at a reasonable speed. Since it provides, generally point to point service, therefore journey time of autotempo is comparable to bus and minibus, if not lower. In

addition to the central area, autotempo also penetrates further into the secondary roads which ultimately ensures an access to the final destination and are facilitated by a good route pattern. For a typical journey to the central area, an autotempo can save a considerable time compared to the bus, minibus and rickshaw. Findings of the study reveals autotempo to be a suitable mode of transportation in providing short and medium run as well as short and medium haul journeys. This is, because, the short and medium run and haul provides high density point to point corridor service. Due to higher passenger carrying capacity autotempo can substitute a significant number of rickshaws. As rickshaws are considered to be the most dominant mode of public transportation on the primary road network of the city, hence increase of autotempo in a large scale would significantly substitute the number of rickshaws on the streets of the city. On the other hand because of higher passenger carrying capacity of the bus and minibus, these modes can substitute a significant number of autotempos on the primary routes of Dhaka city. This will ultimately ensure least traffic load on the roadway which also minimize the generalized cost of transportation. It is observed that in some of the roads where stage bus service are in very limited scale, autotempos are playing the role of supplementary mode of transportation to buses. In addition to that it provides a complementary service in some of the roads where there is no stage bus service.

On the basis of the analytical framework discussed in chapter-II (Fig.-2), the comparative analysis of the service attributes of the different available modes may be described in Table 5.4.

TABLE-5.4

FRAMEWORK FOR SERVICE ANALYSIS OF DIFFERENT MODES

Modes	Autotempo	Bus	Minibus	Autorickshaw	Rickshaw
Management	Individual	Group	Group	Individual/ Group	Individual
Ownership	Private	Private/ Public	Private	Private	Private
Scale	Small	Small/large	Small	Small	Small
Propulsion	Motorized	Motorized	Motorized	Motorized	Non-motorized
Vehicle Type	Modern	Modern	Modern	Modern	Traditional
Rates	Fixed/negotiated	Fixed	fixed	Negotiated	Negotiated
Routing	Fixed/Route deviation	Fixed	Fixed	Flexible	Flexible
Scheduling	Semi-scheduled	Scheduled	Scheduled	Unscheduled	Unscheduled

Autotempo seems not suitable in giving long run and long haul service. Because of its lower passenger carrying capacity than the bus and minibus and higher out of pocket cost it is not suitable for serving the high density corridors. For the same reason, autotempo is not suitable to provide long haul service also.

When autotempos are operating as a seated service, passenger comfort is better than competing buses and minibuses. However, when standing passengers are accepted, there are additional risks, because accident insurance liability is limited to seated passengers.

It is observed that the supply of autotempo can successfully meet the demand of the market. From the study it is seen that the number of autotempo increased over the years. Study also reveals that the trend of growth will continue in the near future. Moreover the government policy, at present, stress the need of adequate supply of autotempos. In this regard two autotempo manufacturing industries has already been developed in the private and public sectors respectively. Both the industries has already started giving output to the market. These policies ensure that there is a great possibility of having adequate number of autotempos in the near future.

#### 5.9 Conclusion

It is evident from the study that till now the non-mechanized mode is dominating the urban transportation stream of Dhaka city. More than two third of the total passenger kilometer per day is being carried by this mode. The rest one third passenger kilometer per day is taken by mechanized modes like the bus, minibus, autorickshaw and autotempo. The number of mechanized mode of transport with respect to the non-mechanized mode is quite meagre.

Among the mechanized modes, the bus has a very important role to play for the urban travellers. But in practice it has been found that the service is inadequate to meet the demand of the travellers. Due to the supply constraints of buses, it is taking only 1/3rd of the total passenger kilometer per day of the mechanized modes.

Because of higher passenger carrying capacity and less journey time than the rickshaw and comparable to bus and minibus, autotempo has already been successful to attract a significantly portion of passengers from the bus, minibus and rickshaw. As there is no stage service in the secondary roads, thereby an increase of autotempo will help minimize the number of rickshaws significantly on the roads of Dhaka city. This will also decrease the traffic load on the carriageway. On the other hand an increase of the bus and minibus will stiff the development of autotempo in the primary routes, which will also minimize the traffic load on the roads too. Both the trend leads to lower generalized transportation cost.

As the passenger carrying capacity of autotempo is comparatively lower than the bus and minibus and cost of travel by autotempo is higher, it is not suitable for serving the high density corridors and for travelling long distances. Because of these reasons autotempo is not suitable for long-haul service.

On the other hand the estimated autotempo growth as presented in Table-2.7 has been found to be quite significant. As the autotempo is not able to provide a service like the other transit modes, hence, the growth of autotempo should be restricted to certain roads and purposes. Therefore, necessary measures are to be taken to help check the unplanned growth of autotempo in the primary roads. Otherwise in future the primary roads will get congested and have a hazardous environment.

## CHAPTER- VI

### SUMMARY AND RECOMMENDATIONS

#### 6.1 Summary of the Findings

##### 6.1.1 The Users Point of View

Autotempo transport is one of the intermediate mode of transportations available in Dhaka city. It came into operation in the late 1970s and growing very fast. It travels along almost all the major routes in Dhaka city. It is expected that the present trend of growth of autotempo will continue in the foreseeable future due to favourable condition in the demand and supply sides.

Autotempo offers advantages over the conventional stage bus, minibus and other modes in terms of shorter waiting time and greater penetration into the central areas. Nevertheless, when account is taken of the cost of travel using standard economic comparisons, it is found to be significantly lower than the rickshaw and autorickshaw but higher than the other available transit modes. However, choice is made only if transit modes are either not available or not possible to get such service. It is observed that autotempo operates between two fixed points of high travel density. The present route network in Dhaka city is neither extensive nor integrative in nature. Hence, an autotempo services can not fulfill all the travel need. If the distance is considerable, a combination of

autotempo and other modes are very common to meet the travel demand. Besides, it is very convenient and popular for short-to-medium length journeys.

The major problems that are faced by the autotempo passengers are overloading, long walking distance, unserved area, inadequacy and absence of facilities at the terminal. From the observation it has been seen that autotempo transport is subject to overloading during the peak hour. Sometimes the magnitude of overloading in some of the routes is very severe. Also there are few routes where overloading is not at all a considerable factor.

Long walking distance is another problem faced by the autotempo users. Like the bus passengers, the majority of the autotempo travellers have to walk a considerable distance to reach an autotempo stop.

Unserved area is another problem for the travellers. The forty-four square miles area of Dhaka city is served roughly by only 20 routes. Dhaka Metropolitan police recommended 16 routes out of which 14 routes are considered for this study.

Lack of stop facilities is another problem faced by the travellers. At most of the stops, there is no passenger shed which can offer protection against the environmental elements. This is particularly important in view of the long waiting time. Even where such sheds exist in most of the places these are not usable for various reasons. Besides, lack of standard of fare charge and tariffs is another problem commonly faced by the travellers.



### 6.1.2 The Operators Point of View

Autotempos are, however, a free enterprise transport system with their operators able to choose to operate on those corridors which are most profitable. This sector is of less capital intensive and technology is conventional. Steady supply of adequate number of autotempos is another big advantage for the operators.

On the other hand, private and public bus enterprises in Dhaka city are obliged by their franchise to provide the service at a rate which does not appear to be reasonable in the present market. In terms of service, the main shortcoming of autotempo is that there is no service standard with regard to the types of services to be offered; vehicle standard including types; condition of vehicles; passenger capacity; performance of the driver etc.

Major problems faced in the operation of the autotempo services may be categorised as managerial, operational, repair and maintenance. From the analysis it has been found that the existing bureaucratic procedures in obtaining registration and road permit is one of the major operational problems for the autotempo owners. Present congested traffic system also increase the cost of operation for the autotempo owners.

Repair and maintenance of the autotempos are serious problems to operators and do not have their own repair and maintenance facility. For these

services they depend on the private workshops. In general the system may be considered to be efficient. However, the main problems is that the spares are not readily available or may only be procured at a very high cost. These problems of spares reduces the availability of the fleet significantly.

Modern management practice of public transport operation are almost non-existent in Dhaka city. In case of autotempo operation, the operators, most of them are small and not very formally organized. Besides, they have very negligible terminal facility.

### 6.1.3 The Planning Point of View

So far discussion has concentrated on the usage of intermediate modes of public transport within the settlements in Dhaka city. In areas of Dhaka, autotempo operates on fixed route schedule except in some cases where it operates a flexible route schedule. During peak period they concentrate their services along high demand routes and as a whole they do not usually operate on uneconomic routes except in some unavoidable circumstances. It has been found from the survey that in terms of passengers kilometer per day, performance of autotempo is quite considerable. It is also observed that the autotempo takes a shorter waiting time at the stops. However, waiting time for different modes varies greatly depending on different routes, time of the day and day of the week. On the other hand, because of higher passenger carrying capacity and less generalized transportation cost an autotempo is much more desirable than a

rickshaw on the secondary roadway and less desirable than bus and minibus on the primary roadway.

## 6.2 Recommendations

In Dhaka the road transportation is provided by both the public and private sectors and consists of both mechanized and non mechanized vehicles. Although the non mechanized vehicles are of local importance, but contribute a significant proportion. Autotempo travels a significant portion of the total journey length. Besides regular, there are huge number of casual travellers of autotempo. It provides service between two fixed nodal points of high travel density and the network is neither extensive nor integrative in nature. It is less expensive than the rickshaw and autorickshaw. Comparatively lower journey time than other modes of transportations are the important factors that popularized autotempo among the travellers of the city.

The planning, development, operation and management of public transport system of Dhaka city is beset with innumerable problems and constraints. Inadequate and delay in obtaining proper assistance from the authority, uneconomic fare structure, unsuitable urban form, unhealthy traffic pattern (spatial and temporal), poor infrastructure, absence of skills and a general environment of indifference and benign neglect have all contributed to the low image of our public transport system.

Public transport include a large family of modes of differing characteristics and capabilities. These modes offer a spectrum of transport services ranging from highly flexible service of a taxi to the rigid fixed route, fixed-schedule service of rail rapid transit system. The science and art of transport planning, particularly public transport planning lies in enabling a balanced mix of these modes to achieve the desired objectives. Besides filling the gap left by inadequate transport, the intermediate modes also serve those travel needs that a public transit system can not effectively meet. Hence, they may be recognised as the bridge between personal travel modes and the conventional transit systems.

In the planning of transport service for an urban area what is important to appreciate is that no one mode can effectively and efficiently meet the varying needs of urban travel. The objective is to identify and develop a balanced public transport system consisting of a mix of modes some of which are complementing the other and the total system providing the desired level of service in the most optimal manner. On the basis of above analysis the following broad recommendations are made.

#### 6.2.1 Organizational Aspects

It is a matter of fact that in Dhaka there is no transport authority solely authorised to look after the planning, operation and management of transport. Dhaka Metropolitan Police is responsible for maintaining traffic regulations as well as registration of vehicles, licencing etc. On the other hand Rajdhani

Unnayan Kartipakha and the Dhaka Municipal Corporation is taking care of construction and repairing of roads. Due to the lack of technical personnel and coordination among these institutions the procedure of vehicle operation, development of route network in the proper phase could not be possible. Hence, it is may be recommended that there must be a single authority to coordinate, supervise the overall activities of planning, operation and management of transportation system of Dhaka city.

#### 6.2.2 Operational Model

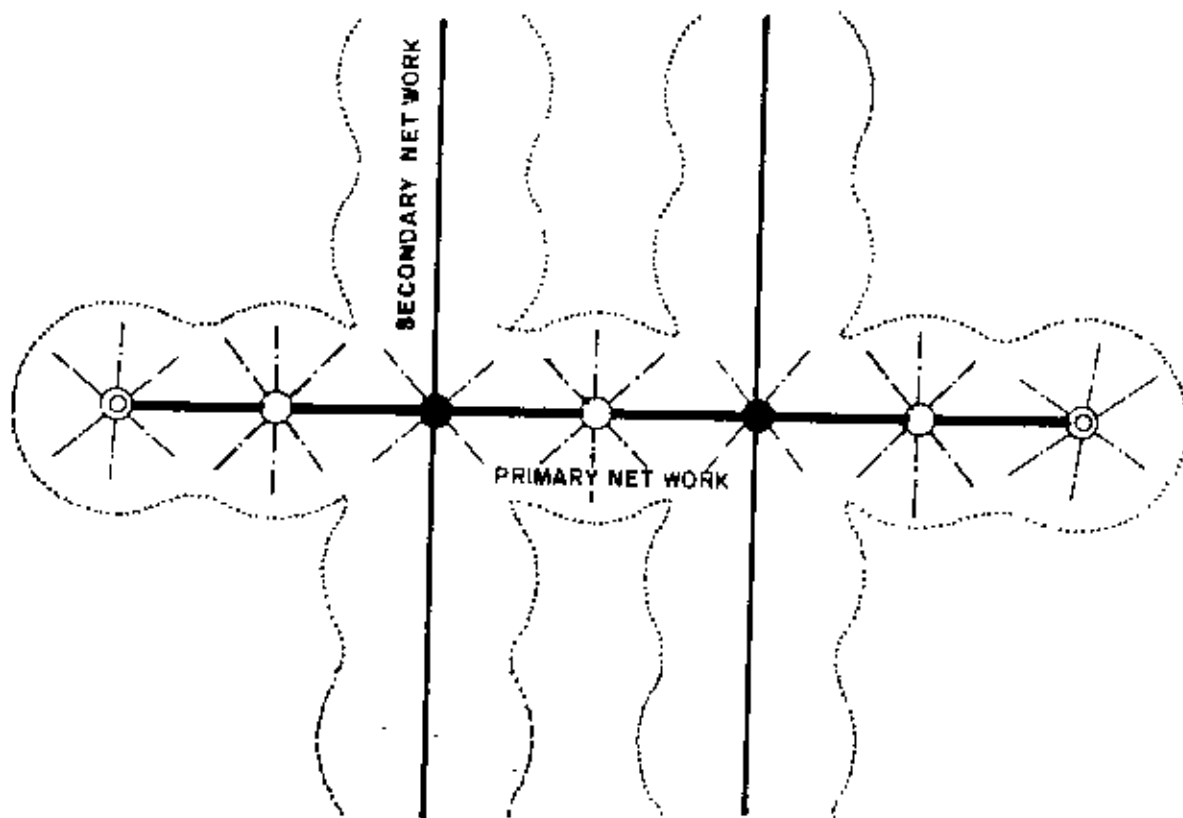
Simultaneously with the improvement of planning of this transportation authority, the present network with slight improvement could be used in the areas where there is high demand for conventional public transport services, as is the case in most high density areas; It can be used to serve as feeder system to complement the services of conventional public transport systems; In areas where conventional Urban public transport systems are either inadequate or non-existent, autotempo as an intermediate mode of public transportation could serve as a stop gaps until the former are either improved or introduced.

In the context of autotempo operation within the urban stream of Dhaka city, an operational model as described in figure-4(a) and 4(b) may be proposed. According to it, autotempo is best to operate as a feeder service to other transit modes like the bus, minibus etc. Along the main bus route there will be stop over at some selected fixed nodal points and autotempo will carry passengers from the

secondary routes to those points. The role of autotempo will be rather complementary in nature in the primary roads.

On the other hand, autotempo should be encouraged to play a supplementary role in the secondary roads. There will be some selected stop over along the autotempo route. Those stations must be well linked with the branched roads. Autotempo, thus, can carry the pedestrians coming from different branched roads and reach them to the available transit modes.

MODEL OF AUTOTEMPO OPERATION  
IN PRIMARY ROUTES

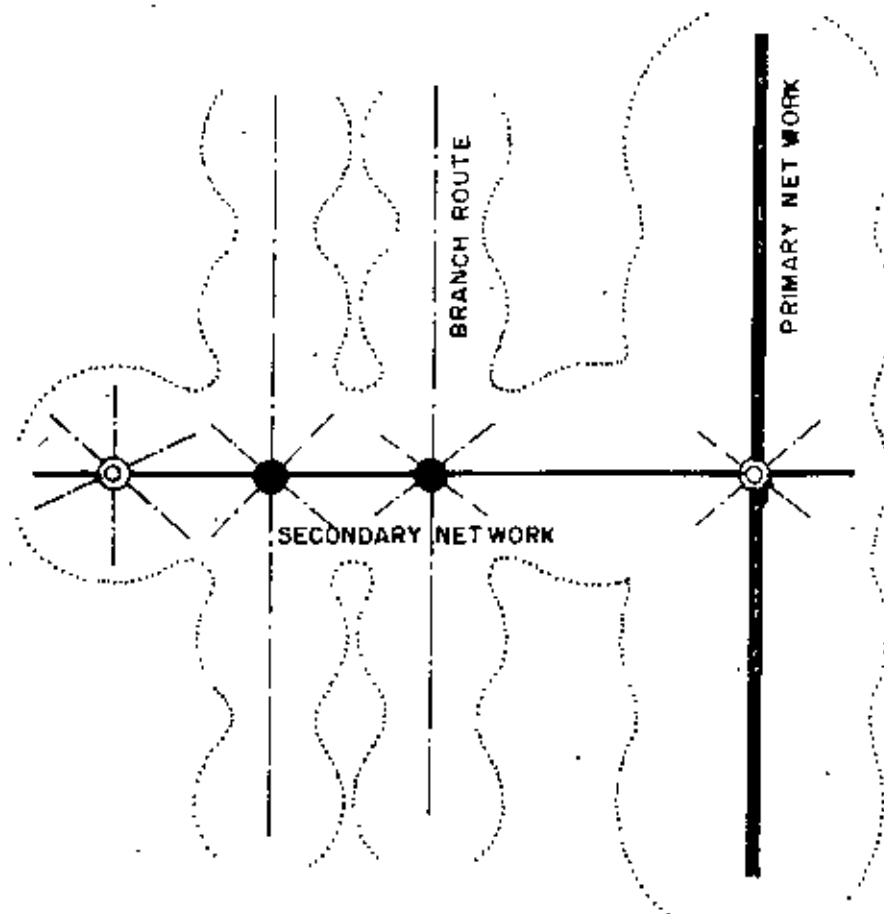


LEGEND

- |    |                          |       |       |
|----|--------------------------|-------|-------|
| 1. | Autofempe Route          | ..... | ————— |
| 2. | Bus / Transit Route      | ..... | ————— |
| 3. | Pedestrians              | ..... | ————— |
| 4. | Bus Stop                 | ..... | ○     |
| 5. | End Point / Local Centre | ..... | ⊙     |
| 6. | Important Nodal Point    | ..... | ●     |

FIG.- 4(a)

MODEL OF AUTOTEMPO OPERATION  
IN SECONDARY ROUTES



LEGEND

- |    |                         |       |       |
|----|-------------------------|-------|-------|
| 1. | Autotemp Route          | ..... | ————— |
| 2. | Bus/Transit Route       | ..... | ————— |
| 3. | Pedestrians             | ..... | ————— |
| 4. | End Point/ Local Centre | ..... | ⊙     |
| 5. | Important Nodal Point   | ..... | ●     |

FIG.— 4(b)



### 6.2.3 Others

As it is time to recognize the positive role of autotempo, so necessary measures should be taken by both the public and private entrepreneurs to ensure a better loan facility in this sector. Policies regarding secondary service industries for manufacturing spares should be brought to the attention of the Government. Locally unavailable spares should be imported from abroad. In addition to that there must be a safe and sound policy so that the supply of autotempo can always fulfill the demand of market.

### 6.2.4 Conclusion

The intermediate modes form the backbone of transportation systems in Dhaka city. However, due to non-appreciation of the role of autotempo and other para transit modes and potential, absence of favourable policies (planning, fiscal, legal) and absence of an articulated group to present and promote their interest have all contributed to stifle their development. Although, as an intermediate mode of public transportation in Dhaka city, the autotempo have many problems as regards their planning, operation and management, but it has been rendering useful service to the public in various ways. Hence, it is necessary to recognise the positive role of autotempo for now and the foreseeable future. It is important to include them in the planning process and provide them a share and responsibility in a complementary manner.

ANNEXURE-A  
RESULTS OF VOLUME COUNT STUDY

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : SADARGHAT  
 Destination : GULISTAN

Station : A  
 Route No : 1

Period(hrs)	TO DESTINATION		NO OF TEMPOS (a+b)	INTER VAL (min)	NO OF TRAVLRS A	* TO ORIGIN		NO OF TEMPOS (c+d)	INTER VAL (min)	NO OF TRAVLRS B	* TOTAL NO OF TEMPOS =a+b+c+d (A+B)	TOTAL NO OF TRAVLRS
	Med(a)	Small(b)				Med(c)	Small(d)					
5.00-7.00	11	11	22	3.0	201	11	10	21	2.8	203	43	404
7.01-8.00	16	15	31	2.2	271	16	13	29	2.1	279	60	550
8.01-9.00	17	14	31	2.1	257	17	16	33	1.9	263	64	520
9.01-10.00	10	8	18	2.6	169	9	9	18	2.2	198	36	337
10.01-11.00	15	12	27	2.7	273	16	11	27	2.5	293	54	566
11.01-12.00	17	14	31	1.8	313	17	16	33	1.5	297	64	606
12.01-13.00	19	16	35	1.7	356	18	19	37	1.3	328	72	664
13.01-14.00	18	15	33	1.4	366	20	22	42	1.3	345	75	531
14.01-15.00	20	13	33	1.2	307	16	13	29	2.0	277	62	584
15.01-16.00	12	15	27	1.2	284	15	15	30	2.2	341	57	625
16.01-17.00	7	8	15	4.0	198	8	11	19	4.0	188	34	366
17.01-18.00	12	13	25	2.2	254	9	17	22	3.0	193	47	447
18.01-19.00	13	11	24	3.0	298	6	17	23	2.3	225	47	515
19.01-20.00	11	15	26	2.2	239	8	18	26	3.0	276	52	565
20.01-21.00	11	9	20	5.3	251	8	16	24	4.4	237	44	466
21.01-22.00	11	9	21	7.6	222	6	12	18	6.1	190	36	402
<b>TOTAL:</b>	<b>221</b>	<b>198</b>	<b>420</b>	<b>43.6</b>	<b>4331</b>	<b>196</b>	<b>235</b>	<b>431</b>	<b>42.6</b>	<b>3903</b>	<b>860</b>	<b>6204</b>
<b>AVERAGE:</b>	<b>13.8</b>	<b>12.4</b>	<b>27.3</b>	<b>2.7</b>	<b>268.8</b>	<b>12.3</b>	<b>14.7</b>	<b>26.9</b>	<b>2.7</b>	<b>243.9</b>	<b>53.9</b>	<b>512.6</b>

REMARKS( If any ):

- 1) Nos of travel from 06.00 AM to 10.00 PM--- 25-30
- 2) Fare per person: Tk.2.00
- 3) Distance: 3 km
- 4) Time reqd for this journey: 10 min

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : FARMGATE Station : B  
 Destination : BALUGHAT Route No : 2

Period(hrs)	TO DESTINATION		NO OF TEMPOS (a+b)	INTER VAL (min)	NO OF TRAVELRS	* TO ORIGIN		NO OF TEMPOS (c+d)	INTER VAL (min)	NO OF TRAVELRS	* TOTAL NO OF TEMPOS (a+b+c+d) (A+B)	TOTAL NO OF TRAVELRS
	Med(a)	Small(b)				Med(c)	Small(d)					
6.00-7.00	15	10	25	2.4	269	10	5	15	4.0	143	40	412
7.01-8.00	14	16	30	2.0	302	16	15	31	1.9	344	61	646
8.01-9.00	16	15	31	1.9	311	17	13	30	2.0	405	61	796
9.01-10.00	9	8	17	3.5	158	9	10	19	3.2	189	36	347
10.01-11.00	19	12	30	2.0	256	13	11	24	2.5	231	54	459
11.01-12.00	11	15	26	2.3	254	13	10	23	2.6	256	47	512
12.01-13.00	16	11	27	2.2	286	15	15	30	2.0	295	57	561
13.01-14.00	11	15	26	2.3	186	11	10	21	2.9	169	47	357
14.01-15.00	16	12	28	2.1	257	15	14	29	2.1	201	57	458
15.01-16.00	10	17	27	2.2	211	12	10	22	2.7	143	49	354
16.01-17.00	14	13	27	2.2	265	16	13	29	2.1	301	56	686
17.01-18.00	12	15	27	2.2	233	11	11	22	2.7	167	47	420
18.01-19.00	15	20	25	1.9	264	13	15	28	2.1	255	40	549
19.01-20.00	11	11	22	2.7	237	12	14	26	2.3	221	49	458
20.01-21.00	10	9	19	3.2	227	8	16	24	2.5	163	43	396
21.01-22.00	10	7	17	3.5	219	8	11	19	3.2	126	35	347
TOTAL:	208	215	425	37.5	3981	199	193	392	40.5	3691	793	7672
AVERAGE:	13.0	13.4	26.6	2.3	248.8	12.4	12.1	24.5	2.5	230.7	49.4	475.3

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 08:00 PM--- 25-30
- 2) Fare per person: Tk 3.00
- 3) Distance: 6 Km
- 4) Time reqd for this journey: 20

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : FARMGATE  
 Destination : GULSHAN-2

Station : B  
 Route No : 3

Period(hrs)	TO DESTINATION					TO ORIGIN					TOTAL NO OF TEMPOS	TOTAL NO OF TRAVELRS
	Med(a)	Small(b)	(atb)	(min)	A	Med(c)	Small(d)	(ctd)	(min)	B		
6.00-7.00	18	16	34	1.8	265	15	13	28	2.1	166	62	433
7.01-8.00	16	17	33	1.8	267	15	14	29	2.1	310	62	577
8.01-9.00	15	15	30	2.0	242	13	14	27	2.2	243	57	489
9.01-10.00	13	14	27	2.2	238	11	13	24	2.5	203	51	441
10.01-11.00	10	12	22	2.7	150	10	9	19	3.2	125	41	275
11.01-12.00	10	10	20	3.0	158	9	9	18	3.3	136	39	296
12.01-13.00	11	12	23	2.6	185	10	10	20	3.0	168	43	353
13.01-14.00	10	10	20	3.0	157	6	9	17	3.5	127	37	284
14.01-15.00	7	9	16	3.8	125	6	8	14	4.3	131	30	256
15.01-16.00	6	8	14	4.3	110	6	6	12	5.0	67	26	179
16.01-17.00	14	15	29	2.1	262	5	22	27	2.2	271	56	553
17.01-18.00	14	13	27	2.2	255	13	8	21	2.9	156	48	413
18.01-19.00	11	15	26	2.3	256	10	13	23	2.6	208	49	475
19.01-20.00	10	14	24	2.5	237	10	11	21	2.9	221	45	458
20.01-21.00	8	11	19	3.2	221	9	8	17	3.5	178	36	400
21.01-22.00	7	9	16	3.8	201	11	2	13	4.6	168	29	369
TOTAL:	180	200	380	43.2	3343	161	169	330	49.9	2903	710	6246
AVERAGE:	11.3	12.5	23.8	2.7	206.9	10.1	10.6	20.6	3.1	181.4	44.4	390.4

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 08:00 PM--- 20-25
- 2) Fare per person: Tk. 3.00
- 3) Distance: 6 km
- 4) Time reqd for this journey: 20 min

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : FARMGATE Station : C  
 Destination : MIRPUR Route No : A

Period(hrs)	TO DESTINATION					TO ORIGIN					TOTAL NO OF TEMPOS	TOTAL NO OF TRAVLRS (A+B)
	Med(a)	Small(b)	(a+b)	INTER VAL (a/c)	NO OF TRAVLRS	Med(c)	Small(d)	(c+d)	INTER VAL (a/c)	NO OF TRAVLRS		
6.00-7.00	3	4	7	3.0	29	5	4	9	2.8	28	56	57
7.01-8.00	7	14	21	2.2	205	6	14	20	2.1	196	41	395
8.01-9.00	8	9	17	2.1	149	8	9	17	1.9	172	34	340
9.01-10.00	8	17	25	2.6	243	11	19	30	2.2	257	55	500
9.01-10.00	10	11	21	2.7	123	8	13	21	2.5	119	42	242
11.01-12.00	9	14	23	1.8	216	8	11	19	1.5	202	42	420
12.01-13.00	3	6	9	1.7	87	3	6	9	1.3	87	18	174
13.01-14.00	7	9	16	1.4	152	7	9	16	1.3	137	32	289
14.01-15.00	6	8	14	1.2	133	6	7	13	2.0	126	27	261
15.01-16.00	11	13	24	1.2	235	10	14	24	2.2	252	48	490
16.01-17.00	6	9	15	1.0	128	9	11	20	1.0	131	30	259
17.01-18.00	4	5	9	2.2	94	4	7	11	3.0	82	20	174
18.01-19.00	13	16	29	3.0	295	11	12	23	2.5	287	52	562
19.01-20.00	12	12	24	2.2	297	13	13	26	3.0	270	50	567
20.01-21.00	11	17	28	3.3	206	13	12	25	1.4	192	53	400
21.01-22.00	9	10	19	7.0	152	11	9	20	6.1	163	39	315
<b>TOTAL:</b>	<b>127</b>	<b>174</b>	<b>301</b>	<b>43.6</b>	<b>2770</b>	<b>133</b>	<b>170</b>	<b>303</b>	<b>42.6</b>	<b>2877</b>	<b>604</b>	<b>5467</b>
<b>AVERAGE:</b>	<b>7.9</b>	<b>10.9</b>	<b>16.8</b>	<b>2.7</b>	<b>173.1</b>	<b>8.3</b>	<b>10.6</b>	<b>18.9</b>	<b>2.7</b>	<b>168.6</b>	<b>37.6</b>	<b>341.7</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM --- 20-25
- 2) Fare per person: Tk. 3.00
- 3) Distance: 6 km
- 4) Time reqd for this journey: 25 min

AUTO-TEMPO VOLUME STUDY

Date : 26.09.67  
 Origin : GABTALI Station : C  
 Destination : FARMGATE Route No : 5

Period(hrs)	TO DESTINATION					TO ORIGIN					TOTAL	TOTAL
	Med(a)	Small(b)	(a+b)	INTER VAL (min)	NO OF TRAVLRS A	Med(c)	Small(d)	(c+d)	INTER VAL (min)	NO OF TRAVLRS B	NO OF TEMPOS (A+B)	NO OF TRAVLRS (A+B)
6.00-7.00	1	3	4	3.0	25	1	2	3	2.8	25	7	52
7.01-8.00	5	5	10	2.2	100	2	8	10	2.1	92	20	192
8.01-9.00	3	7	10	2.1	90	2	6	9	1.9	82	20	172
9.01-10.00	2	7	9	2.6	80	2	7	9	2.2	64	18	144
10.01-11.00	2	6	8	2.7	40	3	6	9	2.5	64	17	104
11.01-12.00	1	5	6	1.8	42	3	5	8	1.5	51	14	93
12.01-13.00	1	4	5	1.7	36	3	4	7	1.3	51	12	97
13.01-14.00	1	4	5	1.4	72	2	4	6	1.3	72	11	144
14.01-15.00	2	6	8	1.2	68	2	6	8	2.0	75	16	144
15.01-16.00	3	7	10	1.2	36	1	5	6	2.2	42	15	78
16.01-17.00	1	3	4	4.0	52	2	3	5	4.0	54	9	126
17.01-18.00	2	4	6	2.2	72	3	5	8	3.0	95	14	168
18.01-19.00	2	6	8	3.0	92	4	7	11	2.3	100	19	192
19.01-20.00	3	8	11	2.2	92	2	4	6	3.0	72	17	164
20.01-21.00	6	6	12	5.3	48	3	4	7	4.4	35	19	84
21.01-22.00	3	3	6	7.0	25	3	4	7	5.1	25	13	52
<b>TOTAL:</b>	<b>39</b>	<b>84</b>	<b>122</b>	<b>43.6</b>	<b>932</b>	<b>38</b>	<b>82</b>	<b>118</b>	<b>42.5</b>	<b>1024</b>	<b>242</b>	<b>2086</b>
<b>AVERAGE:</b>	<b>2.4</b>	<b>5.3</b>	<b>7.6</b>	<b>2.7</b>	<b>61.4</b>	<b>2.4</b>	<b>5.1</b>	<b>7.4</b>	<b>2.7</b>	<b>64.5</b>	<b>15.1</b>	<b>125.4</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 30-35
- 2) Fare per person: Tk. 3.00
- 3) Distance: 6 km
- 4) Time reqd for this journey: 20 min

AUTO-TEMPO VOLUME STUDY

---

Date : 26.09.87  
 Origin : GULSHAN  
 Destination : POSTAGOLA

Station : D  
 Route No : 6

Period(hrs)	TO DESTINATION		NO OF TEMPOS (a+b)	ENTER VAL (min)	NO OF TRAVELRS Δ	* TO ORIGIN		NO OF TEMPOS (c+d)	ENTER VAL (min)	NO OF TRAVELRS Σ	* TOTAL NO OF TEMPOS =a+b+c+d (A+B)	TOTAL NO OF TRAVELRS (A+B)
	Med(a)	Small(b)				Med(c)	Small(d)					
6.00-7.00	10	11	21	3.0	165	12	11	23	2.8	254	44	439
7.01-8.00	16	17	33	2.2	222	10	12	22	2.1	151	55	373
8.01-9.00	10	12	22	2.3	179	10	8	18	2.2	142	40	341
9.01-10.00	14	14	28	2.2	205	11	10	21	2.5	170	49	375
9.01-10.00	17	16	33	3.0	178	12	9	21	3.0	149	54	326
11.01-12.00	8	11	19	3.0	123	11	10	21	2.5	152	40	275
12.01-13.00	7	10	17	3.2	127	8	8	16	2.5	124	33	251
13.01-14.00	10	11	21	2.5	194	8	5	13	3.2	161	34	355
14.01-15.00	9	10	19	3.0	152	12	12	24	3.0	189	43	329
15.01-16.00	12	11	23	2.0	154	11	10	21	2.3	137	44	341
16.01-17.00	13	15	28	3.0	236	14	11	25	4.0	168	53	384
17.01-18.00	9	10	21	2.5	154	13	13	26	3.0	142	47	296
18.01-19.00	10	13	23	2.3	143	10	12	22	2.3	162	45	305
19.01-20.00	11	13	24	4.0	99	9	11	20	3.0	151	44	256
20.01-21.00	6	9	15	5.3	75	11	8	19	4.4	174	34	252
21.01-22.00	7	8	15	7.0	55	10	9	19	6.1	159	34	255
TOTAL:	169	193	362	50.5	2524	172	159	331	46.9	2514	693	5138
AVERAGE:	10.6	12.1	22.6	3.2	157.8	16.8	9.9	20.7	3.1	163.4	43.3	321.1

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 35-40
- 2) Fare per person: Tk.2.00
- 3) Distance: 4.5 km
- 4) Time reqd for this journey: 15 min



AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : GULISTAN  
 Destination : NASTAIL

Station : D  
 Route No : 7

Period(Hrs)	TO DESTINATION					* TO ORIGIN					* TOTAL	
	Med(a)	Small(b)	NO OF TEMPOS (a+b)	INTER VAL (min)	NO OF TRAVLRS A	Med(c)	Small(d)	NO OF TEMPOS (c+d)	INTER VAL (min)	NO OF TRAVLRS B	NO OF TEMPOS (A+B)	NO OF TRAVLRS
6.00-7.00	16	11	27	2.0	271	21	19	40	1.3	302	67	573
7.01-8.00	10	8	8	2.2	143	7	10	17	2.0	115	35	258
8.01-9.00	9	9	18	2.4	225	14	13	27	2.0	236	45	461
9.01-10.00	10	10	20	2.6	113	11	10	21	3.2	130	41	243
9.01-10.00	11	12	23	2.5	130	10	8	18	2.5	112	41	242
11.01-12.00	8	6	16	2.4	87	7	6	13	1.5	98	29	183
12.01-13.00	15	13	28	2.1	148	10	8	18	1.3	67	46	235
13.01-14.00	8	10	18	3.0	83	11	10	21	1.9	169	39	272
14.01-15.00	10	8	16	3.5	148	10	8	18	2.0	193	36	341
15.01-16.00	7	10	19	4.0	97	9	6	15	2.2	93	34	190
16.01-17.00	11	6	17	2.6	100	10	10	20	4.0	144	37	244
17.01-18.00	13	15	28	2.2	189	13	10	23	3.1	192	51	371
18.01-19.00	12	13	25	3.0	160	10	12	22	2.3	137	47	297
19.01-20.00	14	12	26	2.2	156	15	8	23	3.0	120	49	278
20.01-21.00	11	9	20	2.7	120	11	9	20	2.1	128	40	248
21.01-22.00	9	9	18	3.2	116	9	11	20	3.2	114	38	230
<b>TOTAL:</b>	<b>176</b>	<b>163</b>	<b>329</b>	<b>42.3</b>	<b>2288</b>	<b>178</b>	<b>158</b>	<b>336</b>	<b>37.6</b>	<b>2376</b>	<b>675</b>	<b>4666</b>
<b>AVERAGE:</b>	<b>11.0</b>	<b>10.2</b>	<b>20.6</b>	<b>2.6</b>	<b>143.0</b>	<b>11.1</b>	<b>9.9</b>	<b>21.0</b>	<b>2.4</b>	<b>146.6</b>	<b>42.2</b>	<b>291.6</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 25-30
- 2) Fare per person: Tk. 3.00
- 3) Distance: 6 km
- 4) Time reqd for this journey: 25 min

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : GULISTAN  
 Destination : BASHABOO

Station : 0  
 Route No : 6

Period(hrs)	TO DESTINATION		NO OF TEMPOS (a+b)	INTER VAL (min)	NO OF TRAVLRS A	TO ORIGIN		NO OF TEMPOS (c+d)	INTER VAL (min)	NO OF TRAVLRS B	TOTAL NO OF TEMPOS (a+b+c+d)	TOTAL NO OF TRAVLRS (A+B)
	Med(a)	Snail(b)				Med(c)	Snail(d)					
6.00-7.00	12	11	23	2.0	190	13	12	25	1.3	212	48	402
7.01-8.00	9	8	17	2.2	143	8	10	18	2.0	115	35	258
8.01-9.00	9	9	18	2.4	225	12	9	21	2.0	236	39	461
9.01-10.00	7	10	17	2.6	113	11	9	20	3.2	133	37	243
9.01-10.00	11	12	23	2.5	130	7	9	16	2.5	112	37	242
11.01-12.00	8	6	14	2.4	87	7	6	13	1.5	96	29	163
12.01-13.00	8	7	15	2.1	135	7	6	13	1.3	87	28	222
13.01-14.00	8	10	18	3.0	138	11	10	21	1.9	201	37	339
14.01-15.00	10	8	18	3.0	148	10	8	18	2.0	193	36	361
15.01-16.00	9	10	19	4.0	126	9	8	17	2.2	143	34	274
16.01-17.00	11	6	17	2.8	136	10	10	20	4.0	114	37	280
17.01-18.00	14	12	26	2.2	189	11	10	21	3.1	180	47	371
18.01-19.00	10	13	23	3.0	171	10	12	22	2.3	137	45	308
19.01-20.00	14	10	24	2.2	158	9	8	17	3.0	120	43	276
20.01-21.00	11	9	20	2.7	120	11	9	20	2.1	108	40	248
21.01-22.00	9	9	18	3.2	116	9	11	20	3.2	114	38	230
<b>TOTAL:</b>	<b>140</b>	<b>154</b>	<b>294</b>	<b>42.3</b>	<b>2345</b>	<b>155</b>	<b>145</b>	<b>300</b>	<b>37.6</b>	<b>2355</b>	<b>614</b>	<b>4790</b>
<b>AVERAGE:</b>	<b>10.0</b>	<b>9.6</b>	<b>19.1</b>	<b>2.6</b>	<b>146.6</b>	<b>9.7</b>	<b>9.1</b>	<b>18.8</b>	<b>2.4</b>	<b>147.2</b>	<b>39.4</b>	<b>293.8</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 25-30
- 2) Fare per person: Tk. 2.00
- 3) Distance: 4 km
- 4) Time reqd for this journey: 20 min

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : MALIBAGH  
 Destination : FARMGATE

Station : F  
 Route No : 9

Period(hrs)	TO DESTINATION		NO OF TEMPOS (a+b)	INTER VAL (min)	NO OF TRAVLRS A	TO ORIGIN		INTER VAL (min)	NO OF TRAVLRS B	TOTAL NO OF TEMPOS (a+b+c+d)	TOTAL NO OF TRAVLRS (A+B)	
	Med(a)	Small(b)				Med(c)	Small(d)					
6.00-7.00	1	2	3	2.0	4	2	2	4	1.3	4	7	8
7.01-8.00	9	5	6	2.2	35	4	7	11	2.0	90	25	125
8.01-9.00	9	6	7	2.4	48	9	9	18	2.0	168	33	216
9.01-10.00	7	10	17	2.6	112	11	9	20	3.2	140	37	253
9.01-10.00	11	12	23	2.5	151	7	9	16	2.5	127	39	278
11.01-12.00	8	8	16	2.4	111	7	6	13	1.5	132	29	243
12.01-13.00	8	7	15	2.1	135	7	6	13	1.3	131	26	266
13.01-14.00	16	14	30	3.0	227	14	14	28	1.9	227	58	454
14.01-15.00	10	8	18	3.0	168	10	8	18	2.0	180	36	348
15.01-16.00	9	10	19	4.0	167	9	6	15	2.2	146	34	315
16.01-17.00	11	6	17	2.3	168	10	10	20	4.8	163	37	336
17.01-18.00	14	12	26	2.2	273	11	10	21	3.1	251	47	471
18.01-19.00	10	13	23	3.0	176	10	12	22	2.3	197	45	363
19.01-20.00	14	12	26	2.2	168	9	6	17	3.0	120	43	278
20.01-21.00	11	9	20	2.7	167	10	9	19	2.1	145	37	332
21.01-22.00	9	9	18	3.2	116	9	11	20	3.2	111	35	227
TOTAL	157	147	304	2.6	2034	137	103	275	37.8	2078	476	4815
AVERAGE:	9.8	8.9	17.8	2.6	139.6	8.7	8.5	17.2	2.4	142.4	39.7	282.1

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 20-25
- 2) Fare per person: Tk. 2.00
- 3) Distance: 3 km
- 4) Time reqd for this journey: 15 min

AUTO-TEMPD VOLUME STUDY

Date : 26.09.87  
 Origin : BULLISTAN  
 Destination : NEWARK  
 Station :  
 Route No : 10

\* TO DESTINATION NO OF INTER VAL TRAVELS \* TO ORIGIN NO OF INTER VAL TRAVELS \*  
 \* Period(hrs) Med(a) Sma11(b) (a+b) (min) A \* Medic Sma11(d) (c+d) (min) B \*  
 \* TEMPOS TRAVELS \* NO OF TEMPOS TRAVELS \*  
 \* TOTAL TOTAL \* TOTAL TOTAL \*  
 \* attributed (A+B) \*

6.00-7.00	7.00-8.00	8.00-9.00	9.00-10.00	10.00-11.00	11.00-12.00	12.00-13.00	13.00-14.00	14.00-15.00	15.00-16.00	16.00-17.00	17.00-18.00	18.00-19.00	19.00-20.00	20.00-21.00	21.00-22.00
6	9	9	13	9	16	15	16	13	8	11	10	10	11	9	9
6	5	6	7	7	7	7	7	7	8	6	6	6	6	7	9
12	2.2	35	48	11	14	14	14	14	17	16	16	16	16	16	16
2.0	2.4	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
2209	42.3	296	151	161	150	166	177	166	150	161	170	176	159	167	123
143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
2291	37.6	208	145	145	145	145	145	145	145	145	145	145	145	145	145
2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499	4499
37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2	201.2

REMARKS (if any) :

1) Nos of travel from 06:00 AM to 10:30 PM--- 30-35

2) Fare per person: Tk. 2.00

3) Distance: 3 km

4) Time reqd for this journey: 10 min

AUTO-TEMPO VOLUME STUDY

---

Date : 26.09.87  
 Origin : NEWMRKT  
 Destination : ZIGAFOLA

Station : 6  
 Route No : 11

Period(hrs)	TO DESTINATION		NO OF TEMPOS	INTER VAL (min)	NO OF TRAVLRS	TO ORIGIN		NO OF TEMPOS	INTER VAL (min)	NO OF TRAVLRS	TOTAL NO OF TEMPOS	TOTAL NO OF TRAVLRS
	Med(a)	Small(b)				Med(c)	Small(d)					
6.00-7.00	6	6	12	2.0	4	8	7	15	1.3	4	27	8
7.01-8.00	12	10	22	2.2	210	15	13	28	2.0	182	50	393
8.01-9.00	9	6	15	2.4	48	11	9	20	2.0	166	35	216
9.01-10.00	6	6	12	2.6	113	4	7	11	3.2	140	23	253
10.01-11.00	9	7	16	2.5	97	7	6	13	2.5	92	29	191
11.01-12.00	6	6	12	2.4	131	7	9	16	1.5	152	32	263
12.01-13.00	11	12	23	2.1	190	6	9	17	1.3	168	40	358
13.01-14.00	8	11	19	3.0	150	10	8	18	1.9	148	37	316
14.01-15.00	11	11	22	3.0	168	9	6	15	2.0	188	37	348
15.01-16.00	6	7	13	4.0	121	5	8	13	2.2	77	26	200
16.01-17.00	11	8	19	2.8	161	6	8	14	4.0	168	35	329
17.01-18.00	9	11	20	2.2	172	9	8	17	3.1	178	37	348
18.01-19.00	10	11	21	3.0	176	10	9	19	2.3	167	40	363
19.01-20.00	11	12	23	2.2	158	6	5	11	3.0	142	34	300
20.01-21.00	9	11	20	2.7	167	7	9	16	2.1	145	36	332
21.01-22.00	7	9	16	3.2	123	9	10	19	3.2	128	35	243
<b>TOTAL</b>	<b>143</b>	<b>146</b>	<b>289</b>	<b>42.3</b>	<b>2209</b>	<b>133</b>	<b>131</b>	<b>264</b>	<b>37.6</b>	<b>2274</b>	<b>553</b>	<b>4463</b>
<b>AVERAGE</b>	<b>8.9</b>	<b>9.1</b>	<b>16.1</b>	<b>2.6</b>	<b>138.1</b>	<b>8.3</b>	<b>8.2</b>	<b>16.5</b>	<b>2.4</b>	<b>142.1</b>	<b>34.6</b>	<b>260.2</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM--- 30-35
- 2) Fare per person: Tk. 1.00
- 3) Distance: 2.5 km
- 4) Time reqd for this journey: 10 km

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : NEWMRKT Station : 6  
 Destination : FARMGATE Route No : 12

Period(hrs)	TO DESTINATION					* TO ORIGIN					TOTAL NO OF TEMPOS	TOTAL NO OF TRAVELS
	Med(a)	Small(b)	(atb)	(min)	A	Med(c)	Small(d)	(ctd)	(min)	B		
6.00-7.00	18	16	34	1.8	255	22	16	40	1.5	268	74	533
7.01-8.00	21	23	44	1.4	310	23	24	47	1.3	327	91	639
8.01-9.00	16	15	31	1.9	242	15	15	30	2.0	243	61	485
9.01-10.00	16	17	33	1.8	261	15	14	29	2.1	267	62	528
10.01-11.00	21	21	42	1.4	310	19	19	38	1.6	222	80	532
11.01-12.00	20	20	40	1.5	287	16	17	33	1.8	231	73	518
12.01-13.00	19	18	37	1.6	190	15	16	31	1.9	208	66	390
13.01-14.00	19	17	36	1.7	230	19	17	36	1.7	202	72	452
14.01-15.00	14	19	34	1.8	210	19	19	37	1.6	157	71	397
15.01-16.00	16	14	30	2.0	176	18	20	38	1.6	157	68	463
16.01-17.00	19	15	37	1.6	232	19	21	40	1.5	211	77	553
17.01-18.00	19	19	38	1.6	255	19	17	36	1.7	218	74	470
18.01-19.00	17	19	36	1.7	227	17	16	33	1.8	221	69	512
19.01-20.00	16	17	33	1.6	237	19	17	36	1.7	221	69	458
20.01-21.00	16	17	33	1.8	221	16	17	33	1.8	191	66	412
21.01-22.00	16	15	31	1.9	222	14	13	27	2.2	153	58	412
TOTAL:	285	284	569	27.3	3965	285	279	564	27.7	3769	1133	7754
AVERAGE:	17.8	17.8	35.6	1.7	249.4	17.8	17.4	35.3	1.7	235.6	70.8	484.6

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 08:00 PM--- 35-40
- 2) Fare per person: Tk. 2.00
- 3) Distance: 3.0 km
- 4) Time reqd for this journey: 8 km

AUTO-TEMPO VOLUME STUDY

---

Date : 26.09.67  
 Origin : GULISTAN  
 Destination : CHALKBAZAR

Station : H  
 Route No : 13

Period(hrs)	TO DESTINATION					TO ORIGIN					TOTAL NO OF TEMPOS	TOTAL NO OF TRAVLRS
	Med(a)	Small(b)	(a+b)	INTER VAL (min)	NO OF TRAVLRS A	Med(c)	Small(d)	(c+d)	INTER VAL (min)	B		
6.00-7.00	11	11	22	2.7	286	15	14	29	2.1	316	51	596
7.01-8.00	11	12	23	2.6	267	11	13	24	2.5	310	47	577
8.01-9.00	11	12	23	2.6	242	13	14	27	2.2	243	50	485
9.01-10.00	8	9	17	3.5	132	8	9	17	3.5	126	34	256
9.01-10.00	13	13	26	2.3	210	10	9	19	3.2	191	45	401
11.01-12.00	11	10	21	2.9	222	9	9	18	3.3	200	39	422
12.01-13.00	11	12	23	2.6	210	10	10	20	3.0	187	43	397
13.01-14.00	10	10	20	3.0	169	8	9	17	3.5	166	37	337
14.01-15.00	10	9	19	3.2	168	11	12	23	2.6	176	42	344
15.01-16.00	9	8	17	3.5	110	9	10	19	3.2	188	36	298
16.01-17.00	12	15	27	2.2	167	9	11	20	3.0	200	47	367
17.01-18.00	11	13	24	2.5	210	13	8	21	2.9	187	45	397
18.01-19.00	11	12	23	2.6	198	10	13	23	2.6	215	46	414
19.01-20.00	10	9	19	3.2	178	10	11	21	2.9	193	40	368
20.01-21.00	8	11	19	3.2	150	9	8	17	3.5	175	36	325
21.01-22.00	7	9	16	3.6	134	9	8	17	3.5	163	33	302
TOTAL:	164	175	339	46.3	3053	164	168	332	47.5	3205	671	6258
AVERAGE:	10.3	10.9	21.2	2.9	190.8	10.3	10.5	20.8	3.0	200.3	41.9	391.4

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 08:00 PM--- 25-30
- 2) Fare per person: Tk. 2.00
- 3) Distance: 3.0 km
- 4) Time reqd for this journey: 10 km

AUTO-TEMPO VOLUME STUDY

Date : 26.09.87  
 Origin : CHANKERPOOL Station : K  
 Destination : FARMGATE Route No : 14

Period(hrs)	TO DESTINATION		NO OF TEMPOS	INTER VAL	NO OF TRAVLRS	* TO ORIGIN		INTER VAL	NO OF TRAVLRS	* TOTAL NO OF TEMPOS	TOTAL NO OF TRAVLRS	
	Med(a)	Small(b)				Med(c)	Small(d)					
	(a+b)	(a+b)	(min)	A	* Med(c)	Small(d)	(c+d)	(min)	B	* a+b+c+d (A+B)		
6.00-7.00	9	11	20	3.0	124	8	9	17	2.8	137	37	261
7.01-8.00	15	14	29	2.2	205	12	14	26	2.1	190	55	395
8.01-9.00	8	9	17	2.1	168	9	9	17	1.9	172	34	340
9.01-10.00	13	14	27	2.6	239	15	13	28	2.2	270	55	509
9.01-10.00	8	17	25	2.7	242	11	19	30	2.5	257	55	499
11.01-12.00	9	14	23	1.8	218	8	11	19	1.5	202	42	420
12.01-13.00	3	6	9	1.7	87	3	6	9	1.3	97	18	174
13.01-14.00	7	9	16	1.4	152	7	9	16	1.3	145	32	297
14.01-15.00	6	6	14	1.2	133	6	7	13	2.0	128	27	261
15.01-16.00	11	13	24	1.2	236	10	14	24	2.2	252	45	490
16.01-17.00	6	7	13	4.0	128	6	8	14	4.0	131	27	259
17.01-18.00	2	2	4	2.2	3	1	2	3	3.0	4	7	7
18.01-19.00	13	16	29	3.0	238	11	12	23	2.3	342	50	590
19.01-20.00	12	16	28	2.2	242	13	17	30	3.0	300	58	542
20.01-21.00	11	17	28	5.3	267	15	12	25	4.4	245	53	512
21.01-22.00	7	10	19	7.0	152	11	9	20	6.1	187	35	339
<b>TOTAL:</b>	<b>142</b>	<b>183</b>	<b>325</b>	<b>43.6</b>	<b>2836</b>	<b>143</b>	<b>171</b>	<b>314</b>	<b>42.6</b>	<b>3049</b>	<b>639</b>	<b>5885</b>
<b>AVERAGE:</b>	<b>8.9</b>	<b>11.4</b>	<b>20.3</b>	<b>2.7</b>	<b>177.3</b>	<b>8.9</b>	<b>10.7</b>	<b>19.6</b>	<b>2.7</b>	<b>190.6</b>	<b>39.9</b>	<b>367.8</b>

REMARKS( If any ):

- 1) Nos of travel from 06:00 AM to 10:00 PM --- 30-35
- 2) Fare per person: Tk. 2.00
- 3) Distance: 5 km
- 4) Time reqd for this journey: 25 min



ANNEXURE-B

QUESTIONNAIRE TO SURVEY THE AUTOTEMPO OPERATORS

QUESTIONNAIRE SURVEY

A)

TRIP STUDY

1. Number of trip per day :
2. Number of trip per week :
3. Number of trip per month :

B)

PASSENGER STUDY

1. Number of passengers travelled per trip :
2. Number of passengers travelled per day :
3. Fare (Tk) per passenger :
4. Distance (KM) :
5. Time required for the journey ( to ) :

C)

OPERATION COST (LABOUR)

- 1) Manpower required :
- 2) Salary of Driver :
- 3) Salary of Helper :
- 4) Tempo Association fee :
- 5) Subscription fee (if any) :

D.

OPERATION COST (OTHERS)

1. Cost of TEMPO (present) :
2. Model & brand name :
3. Cost of TEMPO (past) :

4. Approximate date of purchase :
5. Fuel consumption :
6. Tyre longevity :
7. Tyre cost (Different brand  
name and price) :
8. Cost of spare parts (monthly/  
yearly/others) :
9. Other maintainance cost :
10. Registration fee :
11. Toll (if any) :
12. Any other thing that creates  
regular cost to the owners :

E) ACCIDENT STUDY

1. Were there any major accident :
2. Accident cost :
3. Any minor accident :
4. Accident cost :

F) SERVICE STUDY

1. Service required (daily/weekly  
/monthly/yearly) :
2. Time required to repair faults :

G)

OVERALL ASSESSMENT

1. Tempo travels for how many days

a month

:

2. Why not 30 days

:

H)

REMARKS (IF ANY)

ANNEXURE-C

QUESTIONNAIRE TO SURVEY THE AUTOTEMPO USERS



Taxi: Auto-Rickshaw:

Mishuk: Conventional Rickshaw:

Others:

08) If a better Bus/Minibus/Other public transport facilities are provided, would you still like to continue travelling Autotempo?

Yes: No:

If yes or no state reasons:

09) What problems do you face while travelling Autotempo?

Congestion: Delay: Pollution:

Excess fair: Others:

10) Would you please state your status?

a) Student: b) Service (Worker):

c) Service(Clerk): d) Service (Executive):

e) Petty businessman: f) Business:

g) Unemployed: h) Others:

11) Finally what suggestions you would have to improve the environment for better and safer movement of Autotempo?

ANNEXURE-D

PHOTOGRAPHS OF MOST COMMONLY USED  
AUTOTEMPO IN DHAKA CITY



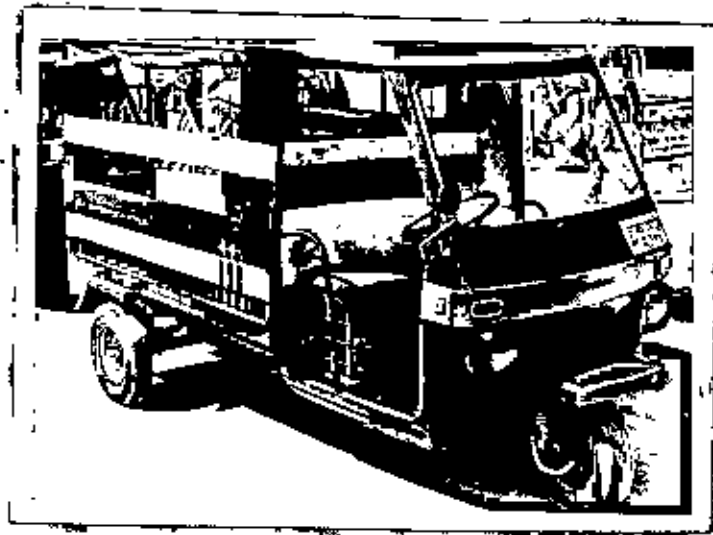


MODEL WS - C20, ( Made in China )



MODEL VESPA Z7A, ( Made in Italy )

MODEL AFI 175, ( Made in India )



MODEL KISHAN 28A (Made in Bangladesh)

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