

PROJECT JAANKARI

SESSION 2020-2021



**PERFORMANCE ASSESSMENT
OF DTC BUSES**



The Economics Society, SRCC





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INTRODUCTION



ABOUT DELHI TRANSPORT CORPORATION

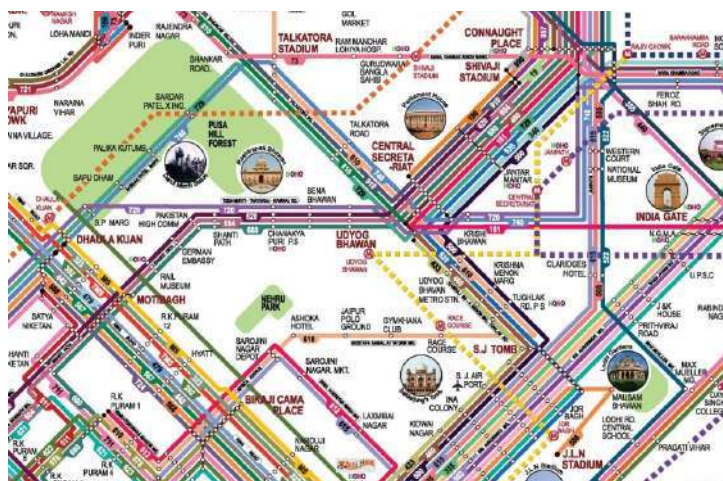
The Government of India set up the Delhi Transport Corporation on 2nd November, 1971 under section 3 of the Road Corporations Act, 1950 to provide an efficient and affordable public transportation service to the people of Delhi. The management and control of the corporation along with the fleet of 2,636 buses and 30,779 employees was handed over to the Government of Delhi on 5th August, 1996. Ever since, DTC has been operating as an agency of the Delhi transport department and has become the primary mode of transportation for people in Delhi.

In section 22 of the Road Transport Corporation Act of 1950, following objectives are laid down for DTC:

- To provide or secure or promote an efficient, economical, reliable and properly coordinated system of road transport in the Union Territory of Delhi and any extended area while acting on its business principles.
- To achieve a high level operational efficiency.
- To attain financial self-sufficiency.

DTC'S FLEET: IN NUMBERS

With 3,762 buses on road and more than 30,000 employees, the Delhi Transport Corporation is one of the biggest employers in the field of transportation in the country. It is a herculean task to effectively manage a system which is operating on more than a thousand routes. To counter this problem, the entire city of Delhi is subdivided into regions to enable better management of the same. The city is divided into eight regions, each headed by a regional manager. The daily operations are managed through 35 depots, out of which 34 depots are in Delhi and one is in Noida. A Depot Manager is in charge of the affairs under each depot.



The number of major Bus Terminals (Time Keeping booths) with boundaries are 20 while the Bus Terminals without boundaries are 7. This serves almost two-thirds of the urban population of Delhi, which is also 97.5% of the total population, as a means of public transportation for regular commuting. Approximately 3.3 million people use DTC as their primary mode of transportation on a daily basis, making it a lifeline for the general populace.

Even with such an inelastic market, DTC had to cut down its fleet from 5,223 in 2013-14 to 3,468 in 2019-20. 318 buses were scrapped annually in this period as they were rendered unserviceable, having fallen prey to frequent breakdowns. The corporation was incurring heavy losses and thought that it was best to scrap these buses. The Chief Minister of Delhi, Mr. Arvind Kejriwal announced that 1,000 new low floor buses will be added to the fleet by September 2021, at a time when the corporation had incurred more than 6,000 crores as accumulated losses.

EXPANSION GOALS

The corporation has an extravagant plan of action for the future in order to fulfil its expansionary ambitions. It not only seeks to increase the number of buses for better convenience, but has also been looking into the qualitative aspects for the improvement of customer experience. It aims to automate the Passenger Information System on a real-time basis to make its operations more efficient and convenient.

One of its major goals has been to implement a multi-modal interface wherein passengers will be provided with directions from stop 'A' to stop 'B' in real time, with filter options like cost and time. It also intends to use a depot tool to input and visualize data of buses, which are outshedded and inshedded on a real time basis, and generate summary reports.





MAJOR UNDERTAKINGS OF DTC

1. To promote diversity and introduce a variety of services for fulfilling the specific needs of different segments of society. The corporation currently operates AC, Non-AC and Standard floor buses for the commuters of Delhi.
2. To equip all its buses with GPS based Automatic Vehicle Tracking System (AVTS) in order to optimize availability of buses through realistic scheduling, facilitate the quick replacement of buses (in case of break-down en-route) and provide immediate help to both the crew as well as commuters in case of an accident through an Ambulance (Stationed at Road Safety Cell, Pragati Maidan, New Delhi). AVTS has already been fitted in a large number of buses on an experimental basis. AVTS, through Satellite Aided Monitoring, helps in ensuring that the buses strictly adhere to their schedule & are stopped properly on bus stands by the crew.
3. To equip all DTC buses with 'Speed Control Governors' to make travelling safer for commuters and other road users.
4. To provide a neater look to the city, the corporation has constructed Bus Queue Shelters with a modern design all over the city. Further, DTC Terminals, Time-Keeper Booths & other DTC establishments too are in the process of renovation.

POLICY REVIEW

This section includes many policies and initiatives that have been undertaken by the Delhi Transport Corporation to achieve the objectives of the DTC laid down in section 22 of the Road Transport Corporation Act, 1950.

- One of the major goals for the DTC has been to provide 'clean' transportation services to all. DTC is the first transport authority in the country to induct CNG Buses to its city fleet (CNG reduces Carbon Monoxide emissions by roughly 80% as well as decreases the emission of hydrocarbons by 44% in comparison to gasoline-powered vehicles). Additionally, having replaced its entire city fleet with CNG buses, the corporation is the world's largest Eco-friendly CNG fleet operator. It has pride in its active contribution towards cleaning the heavily polluted environment of the city.
- In addition to this, the corporation also has a full-fledged Pollution Control Cell which is entirely dedicated to ensuring that buses plying on the roads do not contribute to pollution. The buses found emitting excess smoke are immediately withdrawn from the road and put back only after necessary rectifications.
- To promote contactless ticketing, during the pandemic, the corporation has promoted a mobile application named the 'Chartr App'. The app provides services including purchase of e-tickets, display of bus routes, live tracking of buses etc. However, it is currently not in the optimum phase as the contactless ticketing facility is available only in about 700 DTC and cluster buses.



- Delhi Transport Corporation (DTC) promotes free travel for female passengers, through the issuance of free 'pink tickets'. The service offered is optional and women commuters may choose not to avail it. The government proposes to give Rs.10 to public transport operators for every 'pink ticket' issued to a woman commuter.

The government proposes to spend around Rs.140 crores on the scheme. This can be an efficient method to boost the female participation in public transportation, but it is financially not viable currently and can become a burden to the government and the corporation. There are a few alternatives that can be explored to further make the program financially sustainable. Some untapped ideas can be used to enhance the model.

- For improving accessibility for the elderly and people with disability including those using wheelchairs and walkers, the Delhi Transportation Corporation introduced low-floor buses for the first time in 2007. Low-floor buses are the ones which have no step between the ground and the floor of the bus. After almost a decade since the introduction of these buses, in 2019-20, the Delhi Government procured a new batch of these buses. Furthermore, the standard buses have also been fixed with mechanical ramps to make them accessible.



- Seats in the DTC buses are specifically marked for female passengers as well as elderly citizens to ensure that they can use them while travelling. The scheme for seat reservation was introduced in 2009 for all the low-floor buses. Prior to this, only 2 seats were reserved in general buses for senior citizens.

As of 2015, the government ordered to reserve four seats in the front side of the buses, on the conductor's side for senior citizens in all buses including metro feeders, cluster, DTC and mini buses. For female passengers, the scheme of reserving seats is done with the aim of ensuring more safety and comfort, thus increase the number of female travelers. As of 2009, only four seats were reserved for female passengers in the low-floor buses. In 2013, the seats for females, which were earlier marked with stickers, were painted pink to help in easy identification and to increase compliance among passengers.

Furthermore, the number of seats reserved was increased and was extended to other types of buses also. As of 2013, 25 per cent of all the seats were reserved for female passengers. This meant that, the number of reserved seats in 35-seat low-floor buses increased to 9 from 6 seats, while 42-seat standard-floor buses had 11 seats reserved from the initial 8 seats, after 2013. Apart from senior citizens and female passengers, 2 seats are also reserved for disabled citizens and one seat behind the driver is marked for blind passengers.





- The Department of Transport in association with the Indraprastha Institute of Information Technology, Delhi (IIIT Delhi) publishes its transit datasets online on a portal called 'Open Transit Data'. This website mainly includes two major subtypes of data, Static Data and Real-Time Data. Static Data includes the data regarding the number of active stops, average stop times of the buses, number of trips etc. Real-Time Data is an on-demand service that is provided on the portal, accessible by sending in a request through the website, making everything very centralised. The drawback to this data is the lack of accuracy in arrival and departure times as the site utilizes a rough estimate generated by assuming a constant speed of travel which, in a city like Delhi, is rarely found due to hour-long waits in traffic.
- DTC provides a Lost Property Section to help people who may have misplaced their belongings while commuting via DTC services. There are different telephone helplines available for different zones of the National Capital Region.

- DTC also has different modes of ticketing in its buses:
 - Green Card: DTC issues Green Card for multiple journeys upon prior payment. It can be used for travelling in all DTC City bus services except Palam Coach and Tourist services. The fare is Rs. 40/- on non-AC buses and Rs.50/- on AC buses.
 - Contactless ticketing: DTC bus commuters can book tickets by scanning QR codes through the 'Chartr' app. There are QR codes on the back of each seat to enable commuters to make payment for their ticket.
 - E-ticket: It refers to a seat reservation booked on the DTC website, for which the customer prints out an Electronic Reservation Slip along with the concerned authorized peel identification, in lieu of the regular ticket on standard Stationery.
 - Common Mobility Card: Delhi commuters can even use their metro cards for travelling in DTC buses. Along with DTC buses, these metro cards can also be used in cluster buses and are called 'Common Mobility Cards'. Smart cards can be presented to the conductor who swipes them on his device. One can also use a paper ticket bearing the serial number of your metro card and the remaining balance will be then issued.
 - Conventional ticketing: This refers to the traditional mode of ticketing where you board the bus and the conductor issues you a ticket.



THE BUS MARSHAL SCHEME

Bus Marshal scheme was introduced in 2015 to improve women's safety in public buses in Delhi. Bus marshals deputed in DTC buses are Civil Defense Volunteers (CDV) and Home Guards (HG) recruited respectively by the Department of Revenue and the Directorate General of Home Guards.

As of July 2019, there were 3,356 marshals, of which HGs constitute only 4.5% and CDVs constitute the rest.

CDVs and HGs differ in the way they are recruited and the onboarding process they go through. The HGs have a more structured and multi-staged recruitment process as compared to CDVs. This includes an examination and a physical test followed by a 2-month training period. On successful completion of the training, a second physical test is conducted, after which a medical test is conducted.

A Civil Defense Volunteer on the other hand gets recruited through the following steps - submission of the application form online, police verification, 7-day training (focusing on first-aid, managing disaster in the bus etc.) followed by a test (focusing on the learnings during the training).

The major roles and responsibilities of these bus marshals are - facilitating seats to the reserved passengers (women, disabled and senior citizens) during peak hours, keeping a check on theft, pickpockets and streamlining the crowd during peak hours. Occasionally, they also deal with drunkards and offenders against women and young girls.



3,762

DTC BUSES

35

DEPOTS

33.31 lakhs

DAILY AVERAGE PASSENGERS

6.21 cr.

KILOMETRES OPERATED PER DAY

9,394 cr.

BUDGETARY ALLOCATION FOR
TRANSPORT SECTOR

118

ACCIDENTS IN 2019-20

METHODOLOGY

This study has utilised primary survey as the technique for data collection. A detailed questionnaire involving both qualitative and quantitative questions was prepared. The drivers and conductors employed in DTC, and commuters in DTC buses were chosen as the sample space. The variables studied for the two sections of the sample space were different, and hence the questionnaire was separate for the conductors & drivers and the general public. This was further segregated into specific questions for commuters and non-commuters respectively. While the questions for the bus drivers and conductors aimed to understand their working conditions and duties as DTC employees, the ones for the commuters and non-commuters were to understand their satisfaction, experience and grievances. The table on the next page highlights the broad categories of questions asked from each of the parties.

A team of 3-5 students was sent to each bus stop, where they conducted the interviews with the respondents. A conversational approach was utilised to obtain accurate answers.



COMMUTERS

BASIC DETAILS:

- Frequency and purpose of their travel
- Various types of travel passes available and process of getting the same

NETWORK:

- System of connection and convenience of the live-bus tracking facility on the Open Data Transit Portal
- Awareness of the bus routes, proximity of the stations to their homes and availability of buses to various destinations

FACILITIES:

- Comfort & Cleanliness

POLICIES:

- Marshal scheme and its effectiveness
- Provisions for the disabled

MISCELLANEOUS:

- The process to lodge a complaint, recover a lost good and behaviour of fellow passengers
- Any suggestions or additional feedback

DRIVERS/CONDUCTORS

WORKING CONDITIONS:

- Salary, social security benefits and the frequency of breaks
- The process of lodging a complaint in case of any grievance and how it gets addressed

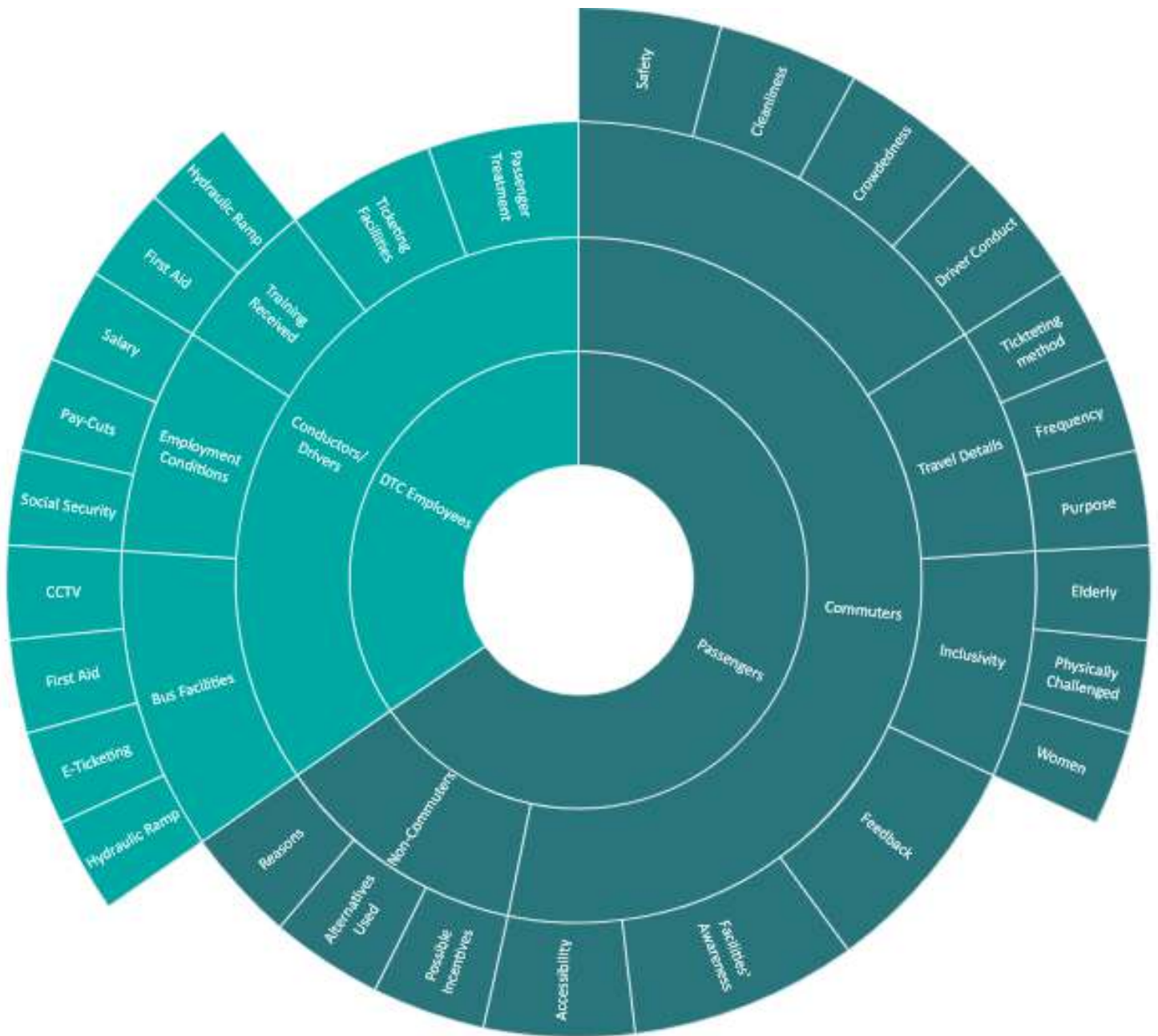
BUS SERVICING:

- Frequency of bus breakdowns and their response to that
- Frequency of servicing and the maintenance and cleanliness of the buses

DUTIES AND TRAINING:

- Training in driving buses and providing first aid
- Adherence to SOPs, protocols and rules & regulations in duty

The following sun-burst diagram helps represent the broad categories of interviewees and the variables studied under these categories through the questionnaire:



A total of 321 responses were garnered from 23 bus stops in 8 zones of Delhi. This included 20 employees and 301 commuters. Interviewees' consent was taken for using their answers and pictures in this report. Necessary precautions, owing to the current scenario, such as social-distancing and wearing of masks were taken during data collection.

For analysing the collected data, a structure was built wherein the data was analysed in four ways. The questions asked in singularity to DTC employees and commuters/non-commuters was studied as Single Variable Analysis, to better understand the parties in view. Under Multivariate Analysis, an internal relationship was established among the indicators under each category. Under Inter-Head Analysis, we compared the responses of drivers and conductors with that of commuters and non-commuters and tried to find a relation between the two. Lastly, under Zonal Analysis, the eight identified zones were compared on the basis of certain indicators.

SINGLE VARIABLE ANALYSIS

First, we interpreted individual questions asked to both, drivers & conductors and commuters & non-commuters to get a better understanding of the demographic of the respondents and their views. Under this, we covered questions pertaining to the age and gender of interviewees, and their purpose and objectives in DTC.

MULTIVARIATE ANALYSIS

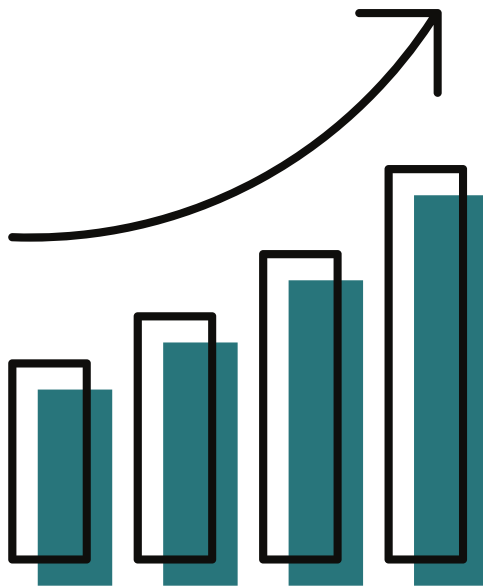
In this segment, we tried to study two or more variables to establish a relationship among them and understand the correlation between them. For example, when we compared the duration of drivers' breaks and their job satisfaction, we found that those who are satisfied with their job usually took 30 minutes to 1-hour breaks.

INTER-HEAD ANALYSIS

For Inter-Head Analysis, we identified questions asked to drivers & conductors and commuters & non-commuters, that pointed towards a single indicator. Then we studied the variations in their answers. For example, a correlation was derived between how often the buses are cleaned and how often the passengers found the buses to be clean.

ZONAL ANALYSIS

Under Zonal Analysis, we identified eight zones for the city from where the data was collected and studied how these zones performed based on four broad indicators- availability and convenience, safety, cleanliness, and miscellaneous. We then found the combined scores of the four indicators to arrive at the overall rankings of the zones.



ANALYSIS & INTERPRETATION

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COMMUTER PROFILE

59.29% of all commuters use DTC buses everyday

62.30% of sample commuters were Males

69.32% commuters use a one time ticket

79.82% passengers rely on word of mouth to understand routes of DTC buses

48.49% passengers wait for more than 20 minutes to get a bus

76.43% passengers find the buses to be clean

56.43% of all commuters take buses for employment related purposes

33.68% passengers always find a seat while travelling in buses



DRIVER PROFILE

45% received monthly salary without any delays

45.45% are trained to operate hydraulic lifts/ramps

An average employee has **5.8** years of experience

Receive only **18.4** minutes of break, on average, during work hours

Only **12.5%** are fully satisfied with their work environment

81.25% find bus pass to be the most convenient form of ticketing

68.42% received training in first-aid

22.91% passengers report that drivers do not obey traffic rules



SINGLE VARIABLE ANALYSIS



5 in 24 passengers travel for more than 15 minutes to reach the nearest bus stop from their home



20 in 24 passengers are unaware of the live bus-tracking facility on the Open Transit Data portal



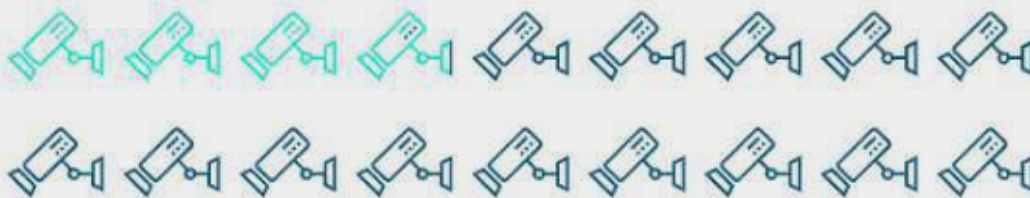
1 in 3 commuters feel unsafe while travelling in the bus



3 in 25 people find the bus stops to be crowded



5 in 18 Buses breakdown weekly



4 in 18 Buses do not have working CCTV cameras



2 out of 16 Buses are not sent for cleaning purposes on a daily basis



6 out of 12 complaints are not addressed by DTC within a few days

MULTI VARIATE ANALYSIS

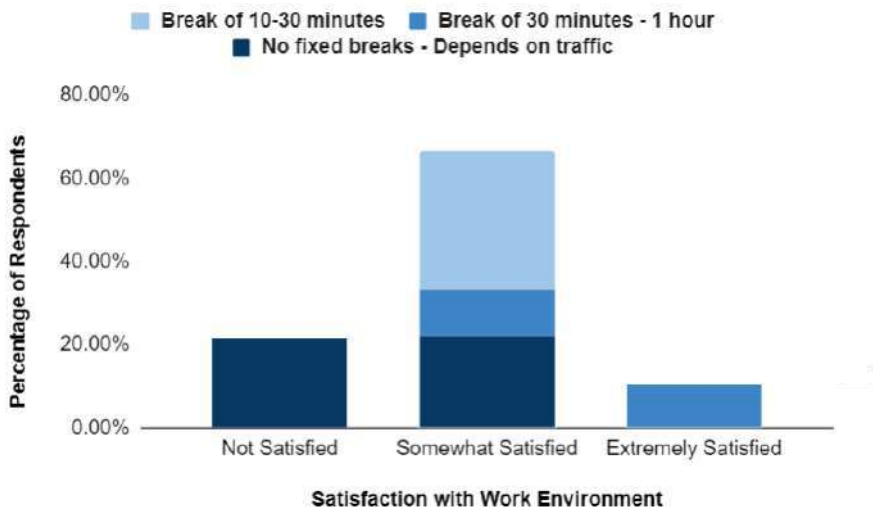


Figure 1: Employees' breaks and job satisfaction chart

The adjacent diagram illustrates the Job satisfaction of DTC employees distributed against the duration of breaks they get.

Figure 2: Employee training and comfort in using Hydraulic Ramps

The adjacent diagram illustrates the comfort in using hydraulic ramps/lifts and the training received in operating the same for the conductors and drivers

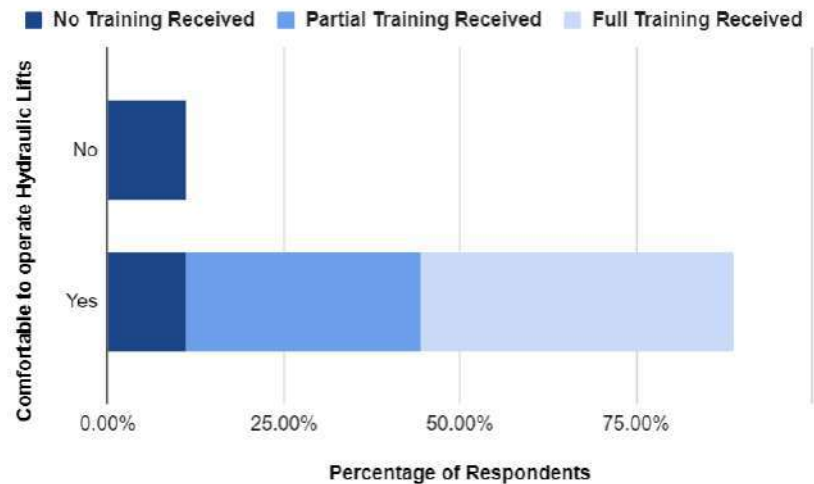
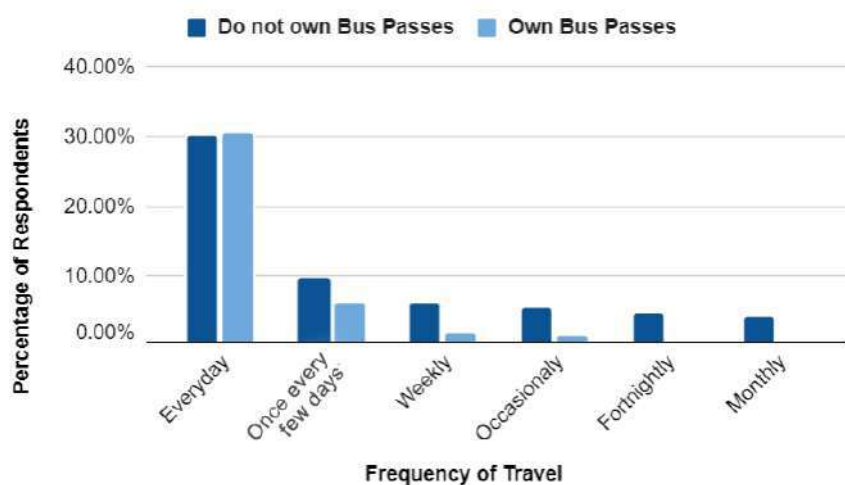


Figure 3: Ownership of bus passes and frequency of travel

The adjacent diagram illustrates a relationship between the ownership of bus passes by commuters and the frequency of their travel in DTC buses



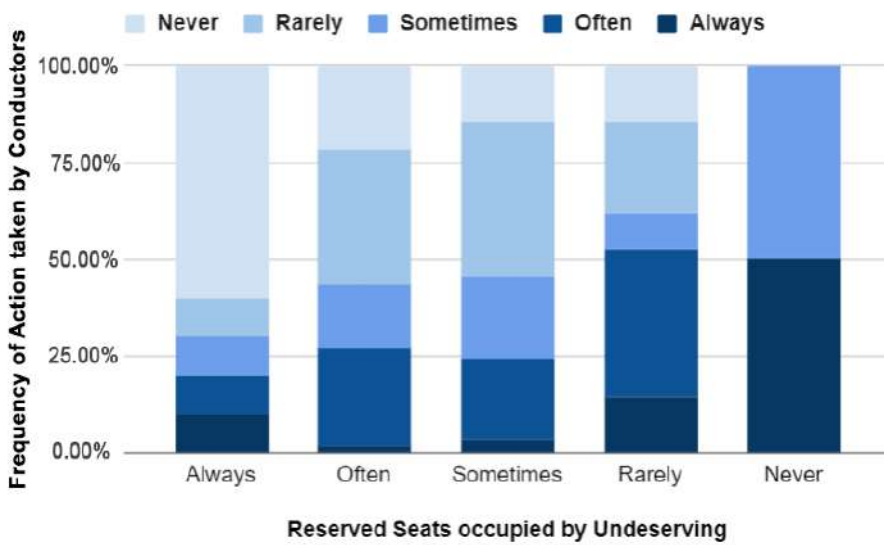


Figure 4: Reservation of seats and conductor's reaction

The diagram illustrates passengers' observation of reserved seats being occupied by the undeserving and the response of conductors in ensuring that such seats benefit the deserving

Figure 5: Passengers' perception on safety and Bus Marshal scheme

The adjacent diagram illustrates the perception of passengers on safety while travelling and their opinion on the effectiveness of Bus Marshal Scheme

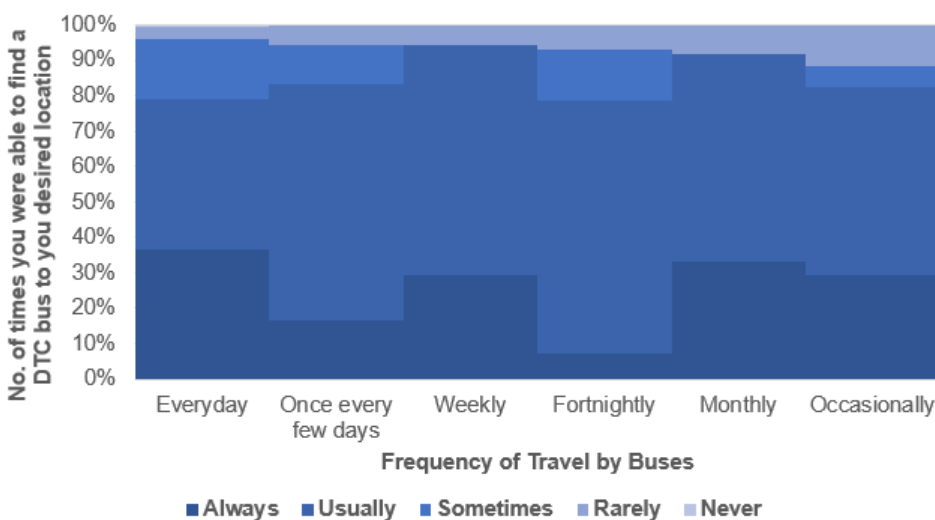
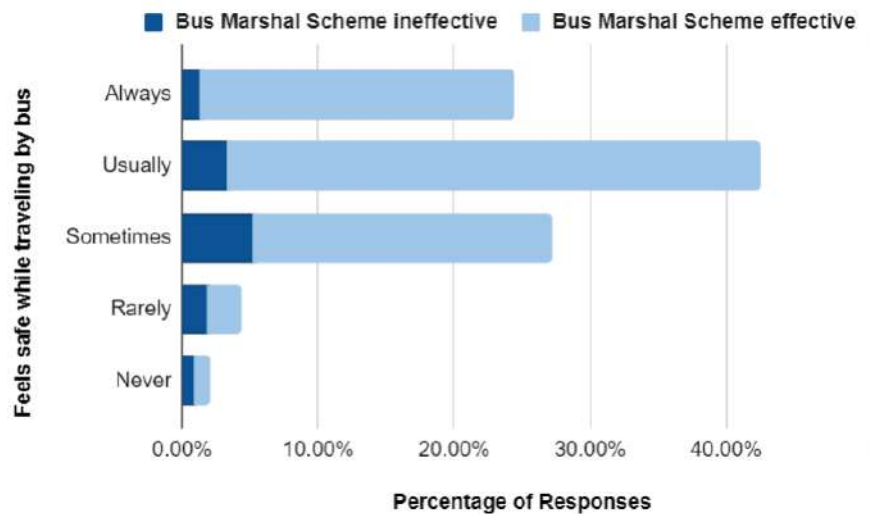


Figure 6: Frequency of travel and finding bus

The adjacent mosaic chart illustrates a relation between frequency of travel by the respondents and the frequency of finding a bus to their desired location

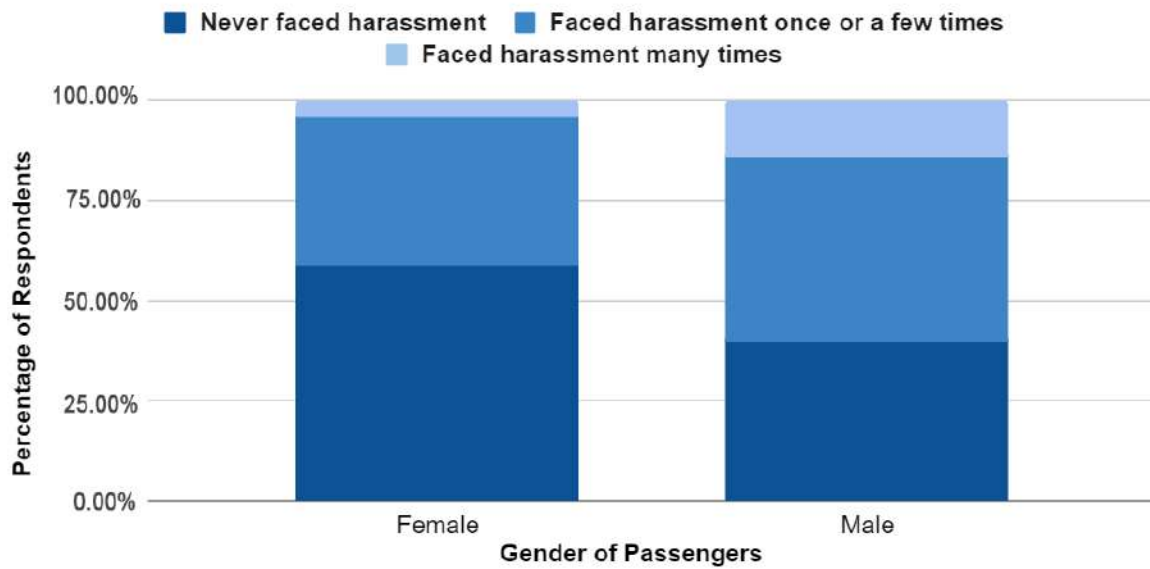


Figure 7: Harrassment faced by passengers

The above diagram illustrates the gender-wise distribution of harassments/ misbehavior faced by the passengers

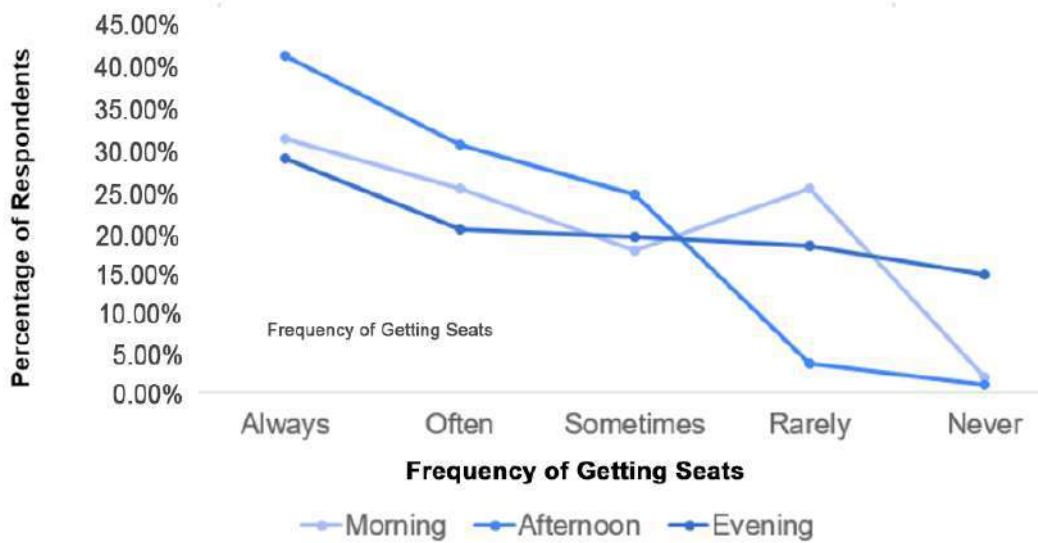


Figure 8: Passengers able to find seats

The adjacent graph illustrates the ability of passengers to find seats while travelling at different times of the day

INTER-HEAD ANALYSIS



Conductors' action in ensuring that the deserving get access to Reserved Seats

The employees responded that the same was always ensured, but the passengers felt that it was ensured by the drivers and conductors only sometimes.

Cleanliness of Buses

There was a consensus between the passengers and drivers about the maintenance of cleanliness in the buses as most of them responded "yes" when asked about cleanliness maintained in the buses.



Use of Hydraulic Lifts/Ramps

The drivers in average responded that ramps are used sometimes, while the commuters' responses leaned more towards "no" when asked the same question.





Working of E-Ticketing Machines

There was a consensus between passengers and conductors about the working of e-ticketing machines in the buses. However, the conductors added that these machines malfunctioned sometimes.

First Aid Availability

There exists a mismatch between the responses of conductors and passengers. While the former was in support, the latter disagreed to the widespread availability of the same.



Quality of Driving

Most citizens felt that the drivers sometimes drove buses recklessly. However, nearly all of the drivers responded that they have received training in driving the buses safely.



ZONAL ANALYSIS

1. AVAILABILITY & CONVENIENCE

| Indicator | North | North-East | East | South-East | South | South-West | West | North-West | Weights |
|------------------------|-------|------------|------|------------|-------|------------|------|------------|---------|
| Proximity to Bus Stop | 6 | 7 | 2 | 3 | 4 | 5 | 1 | 8 | 3 |
| Waiting Time for Buses | 2 | 1 | 7 | 6 | 3 | 5 | 8 | 4 | 3 |
| Crowd at Bus Stops | 5 | 6 | 2 | 1 | 7 | 3 | 8 | 4 | 1.5 |
| Occupancy of Buses | 3 | 2 | 4 | 1 | 6 | 5 | 8 | 7 | 2.5 |

The first basis of comparison for the eight zones is Accessibility and Convenience. The same was judged through four parameters, namely proximity to the bus stop, waiting time for the buses, crowd at the bus stops and the general occupancy of the buses. These were derived from a string of questions centered around the personal experiences of the commuters with respect to their comfort, ease of access, and other similar factors while traveling. The said measures were given their respective weights and the zones were accordingly ranked thereafter. Post survey and analysis, it was inferred that while some zones performed exceptionally well in some areas, they did not manifest satisfactorily in the others. There was mostly a balanced performance by all zones, with the North Zone leading overall and the West Zone being the last one in the ranking. The overall rankings are indicative of the performance of each zone based on the four indicators and their respective weights.

RANKINGS ON THE BASIS OF 'ACCESSIBILITY AND CONVENIENCE'



2. SAFETY

| Indicator | North | North-East | East | South-East | South | South-West | West | North-West | Weights |
|-----------------------------|-------|------------|------|------------|-------|------------|------|------------|---------|
| Drivers obey traffic rules | 3 | 2 | 6 | 1 | 7 | 5 | 8 | 4 | 3 |
| Passengers feel safe | 6 | 4 | 5 | 1 | 2 | 3 | 8 | 7 | 4 |
| No misbehaviour experienced | 4 | 3 | 6 | 2 | 1 | 8 | 5 | 7 | 3 |

The second basis of comparison for the eight zones is Safety as experienced by the commuters. This was judged in three regards: drivers obeying traffic rules, passengers feeling safe and misbehavior experienced by the commuters. This measure takes into account the variables pertaining to driver's traffic obligations and commuter's sense of safety as reported by the interviewees. A weighted average of the said measures was calculated and the zones were accordingly ranked thereafter. The supporting table, rankings and insights from the surveys engender continuing obligation of the co-passengers and the bus staff to ensure that all commuters have a sense of requisite safety. The South-East Zone was the forerunner here with the West Zone ranking eighth. The rankings below are indicative of the performance of each zone based on the three indicators and their respective weights.

RANKINGS ON THE BASIS OF 'SAFETY'



3. CLEANLINESS

| Indicator | North | North-East | East | South-East | South | South-West | West | North-West | Weights |
|----------------------|-------|------------|------|------------|-------|------------|------|------------|---------|
| Cleanliness of Buses | 2 | 3 | 7 | 5 | 8 | 6 | 1 | 4 | 6 |
| Hygiene of Buses | 3 | 2 | 8 | 5 | 6 | 7 | 1 | 4 | 4 |

The third basis of inter-zonal comparison is the Cleanliness maintained in buses and at bus stops. This was judged in two regards, namely cleanliness in the buses and hygiene at the bus stops as perceived by the commuters. The measure is to account for the hygiene at the bus stops and to check on the cleanliness maintained in the buses. The measures were given their respective weights, and a weighted arithmetic mean was calculated thereafter. It was inferred that the cleanliness and hygiene maintained was not satisfactory and that there was a need for tangible changes to be brought in this regard. The West Zone leads here with the East Zone ranking last. The rankings below are indicative of the performance of each zone based on the two indicators and their respective weights.

RANKINGS ON THE BASIS OF 'CLEANLINESS'



4. MISCELLANEOUS

| Indicator | North | North-East | East | South-East | South | South-West | West | North-West | Weights |
|-----------------------|-------|------------|------|------------|-------|------------|------|------------|---------|
| Passenger Ratings | 3 | 7 | 6 | 1 | 8 | 4 | 5 | 2 | 4 |
| Free tickets to Women | 4 | 1 | 5 | 7 | 3 | 2 | 8 | 6 | 6 |

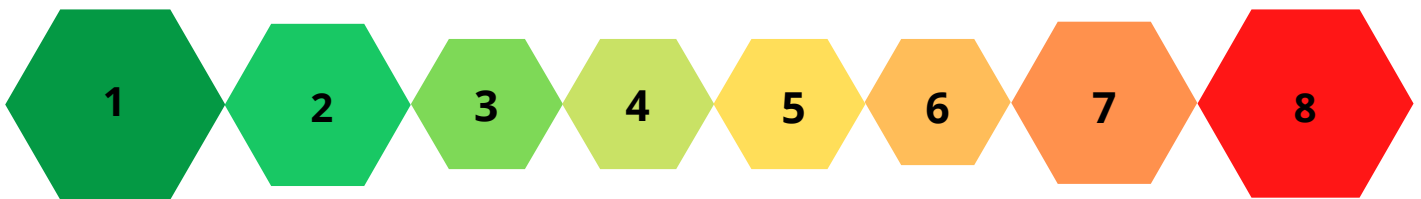
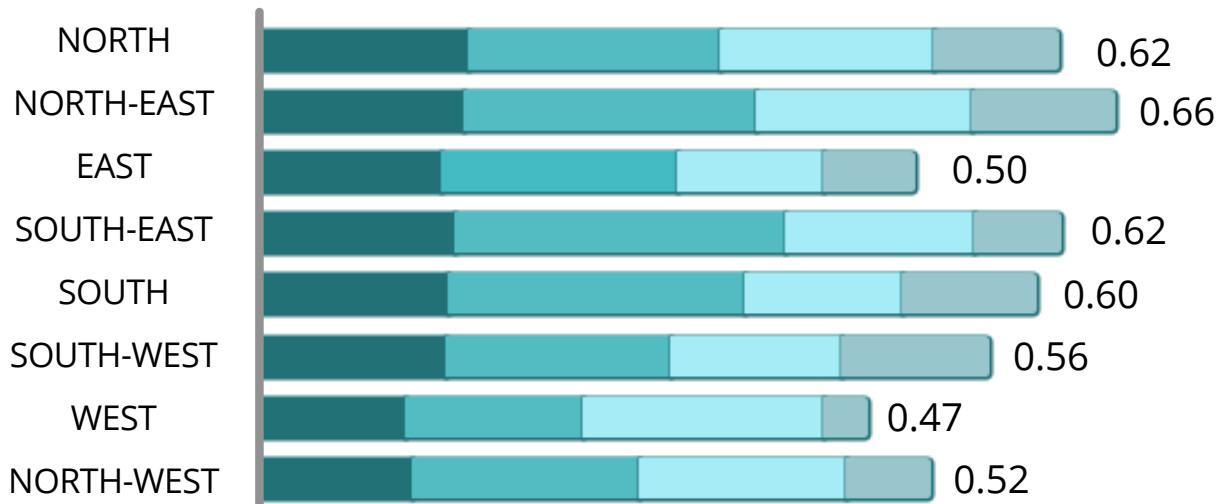
The fourth basis of comparison for the eight zones includes the miscellaneous factors. This was judged in two regards viz. passenger ratings and free tickets as reported by the female commuters. This head takes into account the general and overall ratings with respect to the experience of traveling in the buses and the provision of free tickets to the female commuters as reported by the interviewees. The two said measures were given their respective weights and the zones were ranked thereafter. The findings from the survey suggest that most women were able to avail the scheme and hence, were satisfied. The South-West Zone ranks first here with the West Zone ranking last.

RANKINGS ON THE BASIS OF 'MISCELLANEOUS FACTORS'



OVERALL RANKING

● Availability & Convenience
 ● Safety
 ● Cleanliness
 ● Miscellaneous



1 North-East 2 South-East 3 North 4 South 5 South-West 6 North-West 7 East 8 West

The graph provided above and the overall rankings based on the four broad indicators show that the North-East Zone is ranking first overall and the West Zone is ranking eighth. The four broad heads were given the weights 0.35, 0.3, 0.2 and 0.15 respectively and the zones were accordingly ranked thereafter. The same can be divulged from the stacked bar graph presented above that clearly indicates the respective score of each Zone in the four categories. The Zonal Analysis has been helpful in evaluating which zone performs better than others in different regards and the respective areas of improvement elsewhere.

COMPARATIVE ANALYSIS

In order to further understand the degree of effectiveness and efficiency of the DTC buses, we studied their performance, taking into consideration the quintessential policy as prescribed by the Government of Delhi. We studied their working under 9 main indicators, weighted as per their importance in making DTC a good alternative mode of transportation in the city. These 9 indicators were further categorized under the following 4 heads :

1. Availability and Convenience

- a) Proximity to Bus Stop
- b) Waiting Time
- c) Crowd at Bus Stops
- d) Occupancy of Buses

3. Cleanliness

- a) Cleanliness in Buses and at Bus Stops

2. Safety

- a) Drivers obeying Traffic Rules
- b) Safety of Passengers

4. Bus Services

- a) Free tickets for Women
- b) Allied Facilities in Buses

The following spider chart illustrates the weighted score (out of 50) of 9 performance metrics highlighting the metric-wise performance of DTC buses, as per data provided by respondents:





RECOMMENDATIONS

- | | | | |
|----|--------------------------------------|----|--|
| 33 | APP RECOMMENDATION | 46 | LOST & FOUND - RETRIEVAL |
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APP RECOMMENDATION



PROBLEM

- Almost half of the commuters interviewed had to wait for over twenty minutes at the bus stop to board a bus. This implies that the buses are not arriving at bus stops as per their schedule due to traffic and other reasons. Hence, the regular commuters end up spending a lot of their time at the bus stops.
- Commuters shift to lower capacity vehicles if they have to wait for long periods of time for the buses. This leads to them paying an amount higher than the bus fare and losing out on time.
- Out of the people interviewed, very few commuters were aware of the Open Transit Data Portal.
- The Open Transit Data Portal provides data of only 1,700 buses that are under the control of the Delhi Integrated Multi-Modal System (DIMTS) while information regarding the larger fleet of buses operated by the DTC is not provided on the portal.
- The GTFS (General Transit Feed Specification) feed available on the Open Transit Data Portal is seen to be incomprehensible for the larger public who are now accustomed to the tracking systems offered by private cab companies, such as Uber and Ola, which have facilities including map representations for their vehicles.

Open Transit Data
DELHI

[Home](#) [Static Data](#) [Real Time Data](#) [Documentation](#) [Contact](#) [About](#)



STOPS

Count: 3464

List of all the active stops and terminals.

ROUTES

Count: 543

Information about all the routes plying in Delhi

STOP TIMES

Count: 378324

Approximate arrival and departure times of buses on the stops

TRIPS

Count: 16562

Frequency and schedule of routes



SOLUTION

- The Delhi Government can, as an improvement to the Open Transit Data Portal, develop a mobile application of their own that shows the real-time location of all the buses along with their estimated time of arrival to the bus stops in the route.
- The Open Transit Data Portal is not user friendly and a common man planning his journey does not prefer to go through the GTFS feed. A representation of the buses on a map in real-time is a desirable option. And this can be solved through the application proposed.
- The real-time tracking will apprise people of the arrival of the buses in the estimated time, thereby saving their waiting time.
- The application can have the following features to significantly improve the DTC experience and encourage public transportation -
 - A map displaying the routes of all the buses along with their real-time location.
 - The estimated time of arrival for a bus at the bus stops.
 - Secure login and registration for each user for e-booking of tickets.
 - Provision to get a bus pass issued via the app.
 - The app would also consist of the e-pass of the commuters.
- While e-ticketing for DTC buses is already being done through the Chatr app, the app does not provide users with the desired experience and efficiency on map tracking of buses. A private app named the Chalo app on the other hand has been operating in over 25 cities, providing users with a better experience and features such as live tracking of buses updated every 5 to 10 seconds, journey planners, digital tickets that can be bought through the app directly, which then can be verified via a visual or sound QR, or a Chalo Card- a pre-paid smart card to buy bus tickets on the go, and even an SOS system. Amid COVID-19 restrictions, a live passenger indicator feature was also incorporated into the app for the commuters to know if the buses have space for them.



FEASIBILITY

- Unlike private cab companies that use smartphones to track the location of their fleet of cars, the DTC buses would have to be equipped with GPS trackers. Presently only the buses under the DIMTS have GPS trackers installed in them via which the GTFS feed is updated on the Open Transit Data Portal.
- Developing a public transportation tracking application is very expensive and its maintenance requires a lot of additional funds, which given the accumulated losses of the DTC is not a viable option.
- A more prudent option for the Delhi Government would be to partner with a private-public transportation tracking company. For example, the transport corporations of Bengaluru, Kolkata, Kerala, Tamil Nadu and several other cities have partnered with the private bus tracking app 'Chalo'.
- The private management would ensure a better quality of services to the commuters, allowing all the features from tracking to e-ticketing to cashless payments.
- Given that most of the DTC buses do not have functional GPS trackers, a collaboration with the Chalo App would be beneficial and cost-effective for the government as the trackers are provided and installed by the company itself.
- While the average internet penetration rate in India is only 40%, Delhi's internet penetration rate is the highest among the states and stood at 68% by the end of 2019. Therefore, an app for DTC buses, if marketed well, can garner many users.



TICKETING SYSTEM



PROBLEM

- Around 69% of the passengers surveyed still use One-Time Ticket bought after boarding a bus for their commute, despite the introduction of the e-ticketing mechanism.
- This type of ticketing increases human contact through the transfer of money and thus increases the scope of transmission of viruses and other diseases (given the pandemic situation).
- One major factor for one-time tickets being the most common form of ticketing is that electronic ticketing machines in DTC buses malfunction multiple times in a week as reported by 50% of the conductors.
- As the fear of infection via public transport increased, bus systems across cities like Delhi, Mumbai, Bengaluru, Ahmedabad, Pune, Chennai and Hyderabad have witnessed a decline in ridership.
- One time physical ticketing system also increases the chances of revenue leakage as the passengers may take the advantage of crowded buses and try to not pay the charge for their travel.



SOLUTION

- The current online e-ticketing mechanism on the DTC website is too cumbersome and not user friendly. The website can be re-designed and new features of real-time bus tracking, as mentioned earlier, should be added. Such a one-stop user-friendly website can help popularising paperless and digital transactions in leaps and bounds.
- With the increasing number of citizens now using smartphones, the system of QR code ticketing, which has been used on a pilot basis in a limited number of buses, should be expanded to all the buses. Such a mechanism is already in use in many foreign cities such as the M-Ticket System of Edinburgh.
- DTC should either continue its partnership with the Chartr App or look at other options like the 'Chalo' app for a platform where passengers can not only see real-time data about buses but can also book their tickets on the same platform.

- Such partnerships can be extended to allow passengers to book tickets through third-party apps like Paytm and BHIM UPI. Such modes of ticket purchase can incentivize people to travel in buses safely.
- With 48% of the people surveyed also using Metro as an alternative to DTC buses, the Delhi Government should continue with its pilot project of One Delhi Card which can be used for both DTC buses and Delhi Metro.

FEASIBILITY

- The government can outsource the task of redesigning the website to research and educational institutions. Thus, students will also gain real-time exposure to working on actual projects.
- QR codes should be placed in different corners of the buses so that people can pay for their tickets without forming huge crowds. Once paid, the app would show the purchased ticket in the 'Purchases Tab'. Such a ticket can be shown to the conductors, thus preventing huge crowds for ticket purchases and revenue leakage.
- The Chalo App is already partnering with other government entities such as BMTC-Bengaluru, WBTC-Kolkata, KSRTC-Kerala, TNSTC-Tamil Nadu etc. Thus, such a partnership will not be very difficult to undertake. Even in the worst-case scenario wherein this isn't achieved, the government can outsource or give tenders to students to create such apps that will serve the required purpose.



IMPROVING EFFICIENCY OF BUS SERVICES



PROBLEM

According to our analysis, almost 50% of the commuters had to wait for more than 20 minutes for the bus to arrive and many passengers find it difficult to get a seat, especially during morning and evening.

Around 18% of the respondents face difficulty finding buses in their desired location. With regards to the quality of the buses, 25% of the respondents find it to be unclean and 23% reported that the ACs don't work. Many non-commuters also reported that better quality of buses would incentivise them to travel in DTC buses. Some people also complained that many times the buses don't stop at the designated bus stops.



SOLUTION

The efficiency of buses should be optimized by increasing frequency, improving quality and cutting down delays. Regular maintenance and cleaning of buses would incentivise more people to travel via buses.

- **Availability and Accessibility:** Since a large number of the commuters travel for educational and employment purposes, long waiting time and delay in bus arrival poses a huge problem. Hence, the buses should be available at a reasonable frequency and on all routes.

- **Quality of buses:** Since a fourth of the commuters find the buses to be unhygienic, thorough cleaning of buses is very important. The buses should be cleaned and sanitized regularly. Sanitiser dispensers should be installed in the buses. Proper and timely maintenance of buses is necessary to minimize breakdowns and hence, delays.
- **Facilities in buses:** It was found that the e-ticketing machines malfunction sometimes. To make contactless ticketing more efficient, the e-ticketing machines should be maintained properly and all problems should be fixed on time. ACs in buses should be maintained and serviced regularly to ensure proper functioning. To expand the coverage of public transport, the number of high service level buses and AC buses should be increased.



FEASIBILITY

- Currently, DTC has 3760 buses under its fleet and more than 25 lakh people utilise the bus services in Delhi every day. To make sure that the buses are available at reasonable frequencies on all routes, the number of buses operating needs to be increased to at least two times the current fleet. This can be done by hiring buses from private entities or co-owning them.
- To avoid the problem of overcrowding in buses, DTC should reduce the number of bus stops per route and re-route buses to increase frequencies at crowded bus stops. This can be achieved by conduction of a study regarding commuter needs in their designated zones by zonal authorities.
- The routes should be designed in a scientific way to avoid the problem of omission of certain areas, keeping in mind the short-term as well as long-term forecasts, current ridership statistics and route performance.
- There should be sufficient incentives for bus maintenance and fines for non-compliance. Proper employee training sessions must be given to DTC employees by the bus manufacturers to ensure maintenance. The head of depots should ensure the enforcement of maintenance rules and proper functioning of facilities inside the buses.



COST

According to the 2019 budget, the fleet utilisation of DTC buses stood at 84.63% against 98.6% of cluster buses. The operating cost of DTC buses was Rs. 47.12 per km more than cluster buses. Therefore, DTC should opt for more such corporatisation measures. This way, the government can do away with the acquiring cost of buses.

Considering that DTC buses that ran for 22.72 crore kilometres in 2019-20, the total cost of doubling the fleet under such schemes would be around 1130 crores.

The buses can be introduced in phases so as to not put a financial strain on the government. DTC can introduce 2000 buses each year, which would be 4-5% of the budgetary allocation for the transport sector. DTC should introduce 2000 buses each in 2022 and 2023, and the number of buses to be acquired in 2024 can be altered according to change in ridership patterns.

The increase in costs can be met by an increase in revenue. Considering that the revenue earned by a cluster bus per day in 2019, was Rs. 6400, the total revenue from the new buses each year (considering 2000 buses are introduced each year) would be around Rs. 467 crore. This would be enough to cover the staffing and operating costs. Any additional costs can be met by revising bus fares, and from other public revenue streams.



BUS MARSHAL SCHEME

PROBLEM

- There is still scope for improvement in the way the Bus Marshal scheme operates presently, evidenced by the fact that 13.36% of passengers who knew about the scheme still believe that the introduction of bus marshals has not made buses safer for women.
- There is a lack of proper hierarchies for reporting and accountability which makes the implementation of the scheme less effective. The lack of support from higher authorities and a quick response team also adds to the problem. It is also difficult to hold a perpetrator for as long as it takes for the police to arrive at the scene and take further charge.
- There exists an awareness gap amongst one in five passengers regarding the existence of this scheme and the associated duties that it bestows upon marshals. Only if it was well-known, incidents of offences being committed would reduce due to the knowledge regarding presence of authority to prevent such occurrences.





SOLUTION

- Restructuring the organizational setup, eliminating the difference between Home Guards and Civil Defence Volunteers whilst working as bus marshals is important. This would entail them reporting to the Delhi Transport Corporation and their jurisdiction shifting from their respective directorates entirely or marginally to DTC when working as bus marshals.
- Addressing the lack of training and inadequate eligibility criterion for the marshals is necessary to counter the problem of gender sensitization. If the organizational structure is tweaked, rigorous training can be provided to all as opposed to only providing it to Home Guards.
- Reserved seats should be clearly colour coded to ensure that such seats are only occupied by those who are eligible. When the department considers the purchase of new buses, it should be ensured that a certain fraction of seats is reserved for women, and is colour coded.
- In addition to PCRs, a Quick Response Team (QRT) can be instituted for each depot in the case of theft, criminal act or if a woman wishes to file a complaint.



FEASIBILITY

- The current procedure creates arbitrary divisions between Home Guards and Civil Defence Volunteers. This distinction sets separate training requirements, daily allowances and human resource policies for the same role, i.e. bus marshal. Transferring their accountability under DTC will simplify matters and help streamline training and employee benefits system.
- There is a requirement of regular workshops and training sessions/boot camps that create value without getting burdensome. The training should include the know-how of coordinating with the Police and the Quick Response Team, identifying and addressing gender-based violence, assisting younger women, and dealing with pick-pockets.

REVAMPING BUS STOPS

PROBLEM

Our analysis shows that about a fourth of the respondents find the bus stops to be unhygienic. As mentioned before, 61% of commuters report that they walk 5 to 15 minutes to reach the nearest bus stops from their homes.

Many passengers also complained that obtaining information about buses is very difficult, indicating the inadequacy of available information for passengers at bus stops. These observations prove that the 3,700+ bus stops, which are crucial components of the bus transit system, do not get required attention. There is a need to provide required utilities and information for the benefit of passengers at bus stops.

SOLUTION

An efficient method with regards to revamping the bus stops will initially require analysing the existing condition of the same. Then, further steps can be taken to ensure uniformity in the status of all the bus stops in Delhi.

- **Passenger information:** The most basic requirement at each bus stop must be sign boards with the details regarding bus number, route number, bus timings and important contact details. Though bus stops are provided with these boards, they are either dilapidated or the information provided is inadequate. LED displays to intimate details of the approaching bus can also be included. To ensure wider utility, the boards can be displayed in both English and Hindi. The boards should also contain details of the facilities under DTC such as live-tracking, bus seat reservation and bus passes, so that passengers can utilise them effectively. The boards should also be provided with QR codes that can be scanned to download the DTC App for access to live tracking of buses and booking of tickets.

- **Passenger Amenities:** Since passengers have been noted to spend a considerable time waiting for buses, the provision of basic necessities at the shelters is indispensable. Comfortable seating, with corrosion-resistant and durable materials, must be provided for waiting. The bus stops should also be well illuminated, to ensure the safety of passengers, especially women passengers, utilising night services. Even floor lights can be installed to wade off reptiles and rodents from the bus shelters. It shall be ensured that each bus stop, irrespective of its location or condition, will have a uniform design and structure.
- **Bus stop in-charge:** It will also be prudent from DTC's side to assign employees that ensure proper functioning of the bus stops. The 'Bus Stop in-charge' will be entrusted with the responsibility of managing the bus stop facilities, their availability, condition and requirements. Their role will be similar to a Railway Gangman, that is, examining the status of all facilities at the bus stop under them, regularly.



FEASIBILITY

- As all bus stops already have hoardings and boards displaying advertisements, they can be additionally utilized to display passenger information. Therefore, there is no requirement for any significant change in the nature of each bus stop.
- Additionally, all required information to be displayed is already available with the corporation. It only needs to be compiled and presented.
- All the bus stops already have passenger amenities such as seating and lighting at a limited level. Their distribution, however, is highly non-uniform with some shelters having good seating, while others having none. They must be reorganised to include facilities that are usable and well functioning.
- Only a dedicated in-charge for bus stops can ensure the efficiency of the other facilities proposed. One in-charge can take responsibility for about 20 - 25 adjacent bus stops.



COST

Much of the space in bus shelters is used for advertisement purposes. And it constitutes a major share in DTC Revenues. Therefore, additional signboards, will be placed in a manner such that they don't hamper their visibility. The boards can be hung from the roof of each shelter, ensuring visibility, as represented in the image to the right. This will not prove to be a large financial burden and won't incur opportunity costs.

The cost of providing bus stop facilities is contingent on the existing condition of the shelter. If we assume that 20% of the bus stops have very poor facilities with inoperative seating and lightings, they can be revamped for an estimated cost of Rs. 75,000. The other bus stops will only require minor work, which would incur cost lower than Rs. 25,000.

Employing the in-charges will require a larger financial outlay. To manage all the bus stops, 150 to 200 personnel will be required. If each person is paid Rs. 10,000 a month, DTC will have an additional expenditure of about Rs. 2 crores p.a.



Representative Image



LOST & FOUND - RETRIEVAL



PROBLEM

- The primary reason for why passengers are unable to retrieve their items is that the effort and time required to do so is not commensurate with the value of the lost item. Nearly 34% of respondents who have lost some item believed that it was not worth the effort to try and retrieve it.
- Even when people undertook the efforts to find it, nearly 36% of them were not able to retrieve their lost goods. This figure is statistically significant as it further discourages people from making the effort to retrieve their property.
- To further ensure that drivers and conductors submit all lost items that are found to the bus depots, there has to be some involvement and introduction of incentives that motivate them to involve themselves in the procedure.



SOLUTION

- A running form can be created, and made available on the DTC Website in order to facilitate an improved mechanism for passengers or commuters to file an enquiry with the authorities about their lost property. The form shall include questions that will be descriptive of the lost article, the day/date of misplacement, the Bus Number/Route of the bus in which the article was lost/misplaced etc. The same can then be matched by maintaining an inventory database of the corporation that assigns certain attributes to each item. This whole system is structured in such a manner that would improve the ease with which lost property can be identified and retrieved from the depot by the concerned person.

- Credit/Incentivizing mechanism : In order to introduce incentives and promote responsible behaviour on the part of the bus drivers and conductors, a virtuous system can be implemented under which the employee would receive benefits for submitting lost items, in the following ways:
 - Edibles/Ration coupons: Provision of food and beverage coupons to the employees subject to the value of the items submitted with the corporation, that can be availed at government ration shops/ DTC cafeterias.
 - Monthly Bonuses: Another method that can be put in place to incentivize the drivers/conductors can be by providing them with monthly bonuses for their diligent efforts into submitting/returning the lost items to the respective depots. The bonuses can be direct additions to their paychecks and will be decided based on the monetary value of the items and/or the number of items deposited.



FEASIBILITY

- If certain lost items are not retrieved within a timeframe of 2 months, then these can be donated to charitable organisations or sold for scrap value, if not usable.
- Even if an additional section is introduced within the website for submitting lost and found requests, the traffic that it would receive would be less than desirable. As shown by our survey results, very few passengers are aware/use the website, despite its utility. People prefer to resolve these issues directly, in person. In order to improve awareness, more economically viable campaigns need to be run by the state government to highlight the various facilities available to the public, not only restricted to the lost and found facility but other initiatives as well.
- There needs to be an expiration date for the coupons provided and the same can be printed by the Printing Press department of DTC providing the name of the Depot/Terminus and other specific details.
- Edibles/Ration coupons to be issued directly by the officials working in the Public Distribution System of the government. This will ensure that the coupons are accepted and the employees can access and avail them without hassle.

IMPROVING THE WORK ENVIRONMENT



PROBLEM

- When asked about the work environment, only 12.5% of all drivers and conductors were fully satisfied with it. They have to face harassment from passengers and suffer delays in salary payments. They are paid way below the international standards and lack ample social security benefits as well.
- On average, the starting salary in DTC ranges from Rs. 25,000 to Rs. 29,000 - comprising 5% DA, 24% HRA, a mere monthly medical allowance of Rs. 100, and uniform washing allowance of Rs. 75 - with an average annual increment of just 3%.
- On the social security front, the government offers only pension plans after retirement. Such low and lacklustre compensation packages disincentivise the staff to do their work with utmost sincerity.
- In addition to the above-mentioned points, some of the DTC employees also lack proper training in giving proper first aid (31%) and operating hydraulic lift systems (54%).



SOLUTION

- Around 20% of the respondents said that they have faced salary delays of more than 20 days. In order to eliminate this problem and to ensure that they receive their salaries within the first five days of the month, it is imperative that all the drivers and conductors be encouraged to open bank accounts so that the credit of salary can take place smoothly and swiftly without any hassle of middlemen.
- Considering the already strained budget of DTC, an increase in the basic pay may not be the most viable option. However, other social security schemes can be offered like PPF and increased medical/accident insurance to make these jobs more financially attractive.

- The need for first aid and hydraulic lifts is very rare but these services cannot be neglected at any cost. Therefore, drivers and conductors should undergo yearly assessment tests and drills to ensure that they do not forget the set procedure to be followed and to acquaint themselves with new developments in technology.



FEASIBILITY

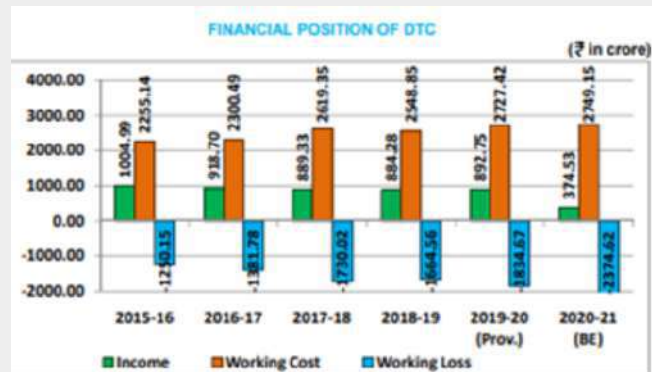
- The Delhi government can partner with some major public sector banks to ensure that all the employees have their salary accounts within the same bank. This will help in eliminating any delays that may take place in the salary transfer of the employees who might be account holders in different banks. This will eliminate any possible case of red-tapism between two banks, and will ultimately benefit the employees
- The current medical allowance is just Rs. 100 per month per employee. Considering the costs of doctors' consultation and medicines, the allowance limit should be increased to at least Rs. 500 per month per employee. Such an increase for 12,521 conductors and 11,389 drivers will cost DTC around Rs. 11.47 crores.



FINANCIAL HEALTH AND BUDGETARY ALLOCATIONS



PROBLEM



Source-Economic Survey of Delhi 2020-21

Despite increasing budget allocations for DTC buses and expansion plans with respect to increasing the number of buses and adding e-buses to the mix, the financial health of DTC buses has provided cause for concern. The working losses incurred by DTC for the year 2020-21 are north of Rs. 2,300 crore, even after ignoring interest payment obligations.

The current dependence on government funding leads to major impediments in the way of growth. Additionally, the distribution of the budget among the different zones in which the DTC buses operate is skewed and uneven. Zones boasting bus stops in a spick and span condition coexist with zones bereft of bus stops altogether.





SOLUTION

Increasing revenue from alternate streams :

- Nearly 85% of the revenue comes from fare charges, which are capped at an extremely subsidised rate of Rs 2.5 per km. The revenue streams need to be diversified and optimally utilised in order to reduce dependency on grants and increase autonomy.
- DTC can look into better and more effective utilisation of its land, capital and advertising space in order to increase its non-passenger revenue by exploring innovative monetization plans, long term contracts and commercialisation projects to achieve such diversification.
- While it is not possible to raise bus fare to the actual cost incurred, there is surely immense scope to improve the ticketing methods to ensure better recovery. The process of ticketing needs to be automated in order to reduce the scope for human error and ease the burden on the conductor.
- The prevalent organisational hierarchy must be decentralised and authorities need to be established at a zonal level. More funds need to be allocated for the development of zones that are generally labelled unsafe and currently lack amenities to increase the overall accessibility and functioning of the DTC bus system. The presence of such zonal authorities will help pin down accountability for variations in zonal performance and will also provide the incentive to undertake commercial developments in their own jurisdictions.
- Employee productivity is a major contributor to organisational growth. Thus a meticulously-designed performance-based incentive policy needs to be implemented that rewards the workers for their behaviour, punctuality, and adherence to rules.
- A gradual reduction in staff and outsourcing can act as potential cost-cutting measures for DTC. It is seen that outsourcing certain jobs like maintenance can actually yield better results, at a substantially lower cost.



FEASIBILITY

- As of now, advertisements are mostly restricted to bus shelters, with buses rarely sporting advertisements for private companies. As shown by the financial success of BMTC, effective utilisation of buses for advertisement can go a long way in ensuring financial stability.
- In other parts of the world, the practice of bus stop naming, in which people pay to get bus stops named according to their preference, is also prevalent. This can also be explored as a possible source of revenue. An auction system can be created to grant such privilege for selected bus stops. Prospective participants may include- resident associations, corporate entities, and even individuals.
- Commercial developments at bus depots and terminals, such as construction of guest houses, parking spaces and subletting available space to private players to set up facilities like eateries and shops can help fulfill the dual objective of expanding revenue and developing infrastructure. The multilevel parking system currently under construction can be shared with private entities to increase revenue
- DTC currently employs about 12,521 conductors, 11,389 drivers and 518 sweepers for managing a fleet of 3762 buses, an average of about 6 employees per bus, which is well above the established standards. Hence, rationalising the employment structure can surely help DTC cut down on a major component of their cost.
- Considering that the performance linked remuneration scheme rewards the top 10% employees by a 20% bonus on their base salary, there will be an increase of only 0.6% of the total expenditure incurred by DTC, but will create value far above the cost incurred.
- Since DTC was established in 1970, and is one of the oldest public transport authorities of India, it has been saddled with inflexible legacy costs that are a constant burden for the organisation but do not generate any revenue. Outsourcing jobs to specialised agencies will not only help bring down such costs in the future but also improve service level.

GRIEVANCE REDRESSAL



PROBLEM

In the status quo, DTC buses lack a redressal mechanism. Additionally, redressal mechanisms, where they do exist, are inaccessible and unwieldy. The problem of grievance redressal is two pronged: it affects both the commuters and the bus drivers. Most commuters are unaware of the current system in place or follow an archaic practice of writing in complaint books, which are handled by the very people these complaints are filed against. For the slightly more aware, the existence of helpline numbers provide a ray of hope, till one call leads to another without any resolution. For instance, as mentioned earlier, only 6 out of 12 complaints are addressed by DTC within a few days. The major issue, from the point of view of drivers, stems from the lack of employment security. Often employed on an ad hoc basis with the possibility of termination always looming over their heads, the drivers are stressed and lack social security.



SOLUTION

For the commuters:

- **Setting up a centralised audio-based redressal system:** The presence of a centralised helpline number across all the zones and for all purposes will help avoid confusions and discrepancies that arise regarding registering a complaint. For instance, a toll free number with language options that routes people to different servers according to the nature of the grievance could help greatly in this regard.
- **Spreading awareness:** Posters containing helpline numbers need to be tacked on the walls at all the bus depots and be made clearly visible in the buses too. The marketing efforts need to be concentrated and well planned to ensure that all people know about the procedure to follow when registering a complaint.

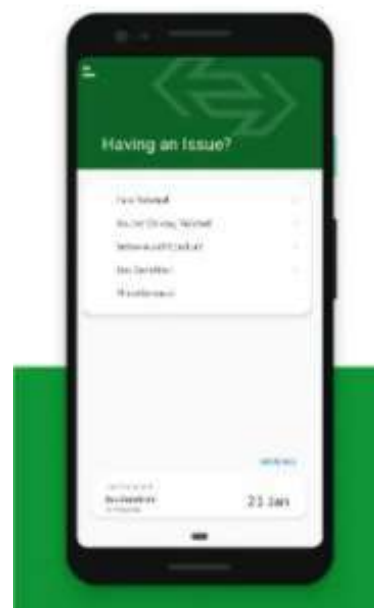
For the drivers:

- Instating better laws governing the well-being of drivers and taking conscious measures to cover the drivers under various social security schemes is the first step towards addressing the grievances of the drivers. As drivers and conductors feel greater accountability and ownership towards the DTC buses, there will be a positive feedback loop and problems associated with uncouth behaviour and negligence of buses will be solved.



FEASIBILITY

- Taking into consideration the guidelines provided for setting government helplines, we can estimate the total expenditure to be 98 lakhs annually, and since DTC already has a redressal mechanism in place, the cost incurred for centralisation will be a fraction of this cost.
- Considering the budgetary outlay, it will not put any pressure on the finances, instead, it will improve the level of customer satisfaction and ultimately lead to increased revenue.
- For complaint tracking, there is a need for a ticket generation mechanism, which the affected passengers can use to track the resolution system of their complaints.



| S.No. | Item | Per Unit Price (Rs.) | Units | Estimated Cost (Rs.) |
|----------------------------------|--|----------------------|-------|----------------------|
| A | | | | |
| Recurring | | | | |
| 1 | Helpline Centre Management | 6,00,000 p.m. | 12 | 72,00,000 |
| 2 | Rent | 30,000 p.m. | 12 | 3,60,000 |
| 3 | Administrative cost including hiring vehicle | 65,000 p.m. | 12 | 7,80,000 |
| 4 | Telephone Bills for the Call Centre | 50,000 p.m. | 12 | 6,00,000 |
| Sub-Total (Recurring) | | | | 89,40,000 |
| B | | | | |
| Non-Recurring | | | | |
| 1 | EPABX cum Call Centre Solution | 6,00,000 | - | 6,00,000 |
| 2 | PRI Lines/Extensions/Intercom Instrument | 1,30,000 | - | 1,30,000 |
| 3 | Additional Laptops, Computers, Printers and Scanners | 33,333 | 3 | 1,00,000 |
| 4 | UPS/Generator of 5 KVA for Power Backup | 70,000 | 1 | 70,000 |
| Sub-Total (Non-Recurring) | | | | 9,00,000 |

(The table has been formed by taking cues from 'Implementation Guidelines for the Universalisation of Women Helpline.' Considering the similarities between the two endeavours, DTC helpline figures were arrived at)

CONCLUSION

This research project has been an attempt to use methods of primary data-based evidence to understand and appraise the performance of bus service provided by the Delhi Transport Corporation, the public sector transport operator under the Government of the National Capital Territory of Delhi. The mechanism followed to arrive at inferences was in-person surveying of various locations in the National Capital Territory covered by DTC services and involved interviews of both drivers/conductors as well as commuters/ non-commuters.

The analysis of the data began with the quantification of responses. The variables under study were then compared and contrasted through single-variable, multivariate and inter-head analyses. The zonal disparity in bus services was observed through Zonal Analysis while the performance of the corporation in various fields was analysed through Comparative Analysis. The recommendations have been given from what was understood to be missing and lacking from the existing system of bus services. The results and inferences from the survey have led us to offer a few, but relevant recommendations.

The first broad dimension of recommendations consist of additional plans that can be implemented to revamp the Corporation's functioning. In the status quo, the DTC is known to offer bus transport services in an outmoded and inefficient manner. To address this issue, the government can adopt methods to increase the overall efficiency of services, with necessary actions to provide passengers with real-time information on bus availability and operations.

About half of the people surveyed responded that they wait for more than 20 minutes for a bus and many passengers responded that finding buses in their desired location was difficult. Though the corporation has been developing various schemes to facilitate passengers, like the "Chartr" app and Open Transit Data Portal, their popularity and usability are very low. DTC will succeed only when more people utilise the service. And to increase footfall, the services need to become more passenger-friendly.

To cover almost all the problems identified, the launch of a comprehensive mobile app is recommended. The app will be an efficient and comprehensive means for the passengers to gain necessary information regarding buses and facilitate ticketing, amongst many other uses.

The system of ticketing should also be digitalised to avoid any manual error. There exist various systems of ticketing, and they need to be systematised so that ticketing is not cumbersome.

The second broad domain of recommendations includes means to bolster and revamp the existing system of functioning of the corporation. The corporation should boost the frequency of buses and redraft routes by factoring in crowd and passenger movement. The bus shelters also should be revamped to provide basic facilities, real-time information and safety for passengers.

The Bus Marshal scheme, initiated to improve the safety of passengers, is understood to be ineffective by a sizable section of respondents. Hence, the problems we have identified in training, operation and working of the Bus Marshals should be solved promptly.

The corporation is already a loss-making entity of the Government of Delhi. Additional strategies to increase the revenue of the corporation are needed so that an equitable balance is achieved between public welfare and DTC's financial objectives. Other plans for systemic restructuring of work environment of drivers, grievance redressal and lost-item retrieval have also been identified and recommended.

All in all, this primary data inference based project fulfilled its aim of analysing the role played by the Delhi Transport Corporation in Delhi's public transportation sector. While the overall opinion exhibited is in favour of the corporation, there exists scope for improvement in a plenty of domains. The DTC is already a frontrunner in its environmental commitment and has the potential to be the largest and best public utility provider in the world!

TIMELINE



QUESTIONNAIRE

The questionnaire was divided into two main parts:

Drivers/Conductors:

The questions asked to the drivers and conductors comprised the following heads:

1. Working Conditions
2. Bus Servicing
3. Duties and Training

Commuters:

The questions asked to the commuters comprised the following heads:

1. Basic Details
2. Network
3. Facilities
4. Policies

Questionnaire Link:

<https://docs.google.com/forms/d/e/1FAIpQLSfOmzQ8iBSdFaKxSsyaj7Syswq-qRIhHIQtPkDA7PkRMJLcG1g/viewform>



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