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Urbanisation: A Growing Story in Context of Efficient Urban Mobility and Urban Transport

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ABSTRACT

Urbanisation in the Indian landscape has primarily been a post-independence development and has been gaining momentum steadily over the decades.According to the Census of India 2011, around 31% of Indian population lives in urban areas and this number is estimated to reach 40% by 2031. However, with the sheer scale of urbanisation comes the spiralling pressure of swelling urban population on services which causes some externalities, the most burgeoning being the 'transport externality'.Through its 'Smart Cities Mission', India aims to alleviatethese negative externality imposed by growing urban population in the form of traffic congestion and environmental pollution.The present study aims to assess residents' satisfaction across multiple components of the transportation system in Chandigarh.The analysis delves into the problem of traffic congestion and demand for urban mobility vis-à-vis the affordability and accessibility to urban public transport. The results show that various measures must be adopted to moderate the damaging outcomes of the incessant and indiscriminate escalation of the menace of the crowding traffic. A lot still needs to be done in the area of urban mobility to make Chandigarh smart and sustainable.

1. Introduction

Urbanisation in the Indian landscape has primarily been a post-independence development and has been gaining momentum steadily over the decades. According to the Census of India 2011, around 31% of Indian population lives in urban areas and this number is estimated to reach 40% by 2031. This clearly demonstrates that India will be at the epicentre of urbanisation in the coming decades (Ahluwalia, Kanbur, Mohanty).However, with the sheer scale of urbanisation comes the spiralling pressure of swelling urban population on services which causes some externalities, the most burgeoning being the 'transport externality'. The challenge that glares India in the face today is the negative externality imposed by growing urban population in the form of traffic congestion and environmental pollution. Through its 'Smart Cities Mission', India aims to alleviate these and one of the key factors in determining the success of this project will be good mobility and transportation system. It has stated that the building blocks of smart cities in India should include efficient urban mobility and public transport. In particular, the Smart Cities Mission has identified three key points for efficient urban mobility: Smart Parking, Intelligent Traffic Management and Integrated Multi Modal Transport (UNECE,2015).

2. Research Methodology

The present primary data based survey study aims to investigate the level of satisfaction of different socio-economic backgrounds about the availability and quality of transport infrastructure and services in Chandigarh. The source of primary data that has been used in this study are the individual respondents per each household. The source of secondary data that has been used in this study is the Official Website of the Chandigarh Administration and the Census of India 2011. To gauge their opinion, the respondents have beenadministered a questionnaire orally and his/her response noted down. Keeping in time the restraints of time and resources the sample size has been limited to 100 respondents. A total of 100 respondents were interviewed on a structured questionnaire, out of which 68 were males and 32 were females. The survey was largely conducted in some of the northern and southern sectors of Chandigarh, rehabilitated colonies of Sector 25 and village Dhanas. Efforts were made to make the data collection representative of the population so that various categories of respondents were adequately represented. Constraints of time and resources as well as practical considerations prevented from making the data collection strictly random. The analysis further delves into the problem of traffic congestion and demand for urban mobility vis-à-vis the affordability and accessibility to urban public transport.

3. Analysis of the demographic background of the respondents

The analysis is based on the field survey carried out in the Union Territory of Chandigarh from January-April 2018.As per Census 2011, compared to an all India figure of 940, Chandigarh has recorded a sex ratio of 818. Maximum number of respondents (26 percent) were in the age group of 50-59 years followed by 21 percent each between the age groups of 30-39 and 40-49 years. The sample for the study consists of the following categories of individuals: business, service, professionals, informal sector, retired servicemen, unemployed people, housewives and students. Majority of respondents (58 percent) are educated with a graduation and above degree. Only 8 percent of the respondents were illiterate.

The level of education of the respondent greatly influences an individual's perception about the development of the city. Chandigarh has always recorded a high literacy rate since inception due to the high quality of educational infrastructure available in the city. According to Census 2011, the literacy rate of Chandigarh was 86.43 percent. 58 percent respondents dwell in urban areas, followed by 22 percent in the rural areas and 20 percent in the rehabilitated colonies of Chandigarh.

4. Efficient urban mobility and urban transport: results of the analysis

"One day, people will come to Chandigarh to see the park wherein one does not see the automobile, where one sees the nature." This is what Le Corbusier, the creator of Chandigarh, envisioned when he planned the City Beautiful. However, today, his vision is blurred in the choking volume of traffic. There has been a manifold increase in the number of vehicles clogging Chandigarh and the joint capital of Punjab and Haryana boasts of the highest per capita ownership of motorised vehicles in the country. Extensive urbanisation and massive increase in traffic have overrun the original plan which sought to abate these very problems. All this chaos has underscored the need to highlight the issues and recommend solutions which can alleviate the problem.

Preferred Modes of Vehicle

Table 1: Distribution of Sample Respondents on the Basis of Area of Residence and Preference of Mode of Vehicle

Area of Residence	Preference of Mode of Vehicle			Total
	Private	Public	Both	
Urban	53 91.4%	01 1.7%	04 6.9%	58 100.0%
Rural	05 22.7%	06 27.3%	11 50.0%	22 100.0%
Rehabilitated Colonies	05 25.0%	08 40.0%	07 35.0%	20 100.0%
Total	63 63.0%	15 15.0%	22 22.0%	100 100.0%

Table 1 shows that only a meagre percentage of respondents from the urban areas (1.7 percent) travel solely by public mode of transport and a slightly higher percentageprefer both public and private transport. The stark opposite is the case of preference for private vehicles (91.4%). The reasons for this preference are revealed in the subsequent tables.

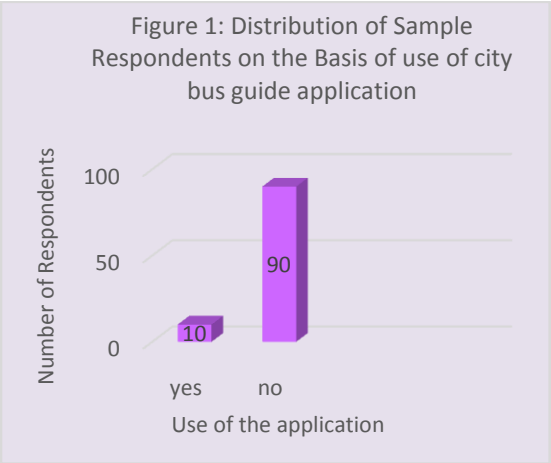
Satisfaction with the City's provision of public transport

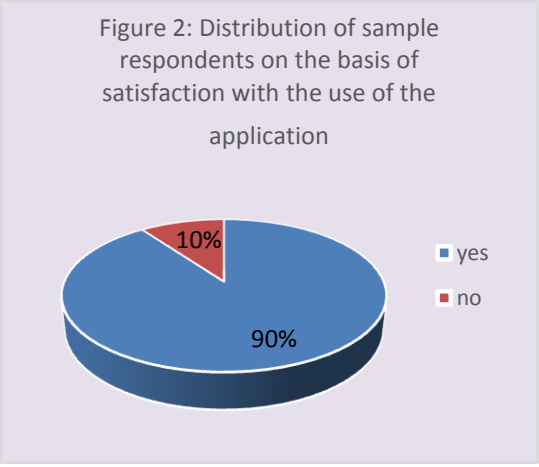
Table 2: Distribution of Sample Respondents on the Basis of Area of Residence and Satisfaction with the City's provision of public transport

Area of Residence	Satisfaction with the City's provision of public transport		Total
	Yes	No	
Urban	24 41.4%	24 58.6%	58 100.0%
Rural	12 54.5%	10 45.5%	22 100.0%
Rehabilitated Colonies	4 20.0%	16 80.0%	20 100.0%
Total	40 40.0%	60 60.0%	100 100.0%

Table 2 shows that the maximum percentage of respondents who use the public transport ie. The respondents from the rehabilitated colonies, also form part of the major percentage of respondents who are not satisfied with the provision of the City's public transport system. The reasons they cite are overloaded buses, considerable time gap between two subsequent buses, less number of buses plying in those areas, polluting autos etc.The reasons the respondents from the urban areas give for their dissatisfaction with the provision of public transport majorly include the lack of adequate infrastructure to cater to the needs of urban mobility of the masses and also the unawareness about the existingfacilities which can be used to save time. On some of the roads, the share of two wheelers and cars in total traffic is more than 80% indicating inadequacy of the public transport system.

Use of City Bus Guide Application





The graph in Figure 1 shows that there is a lack of awareness among the city residents about the introduction and use of online applications to make travelling by public transport easier and convenient. A user-friendly bus route system eludes the city. Buses

have to be changed many times to reach the destination and there are no route plans to guide the commuters. Mobile-based application 'Chandigarh bus guide' informs about the bus routes and shelters but not about the running schedule of buses. The pie chart reveals that almost all the respondents (90 percent) who have used the application are satisfied with its provisions.

Non-motorised modes of transport: preference for walking/cycling short distances

Table 3: Distribution of Sample Respondents on the Basis of Area of Residence and their response on whether they find the City considerably walkable/cyclable

Area of Residence	Is the City considerably walkable/cyclable		Total
	Yes	No	
Urban	24 41.37%	34 58.63%	58 100.0%
Rural	10 45.45%	12 54.54%	22 100.0%
Rehabilitated Colonies	09 45%	11 55%	20 100.0%
Total	43 43.0%	57 57.0%	100 100.0%

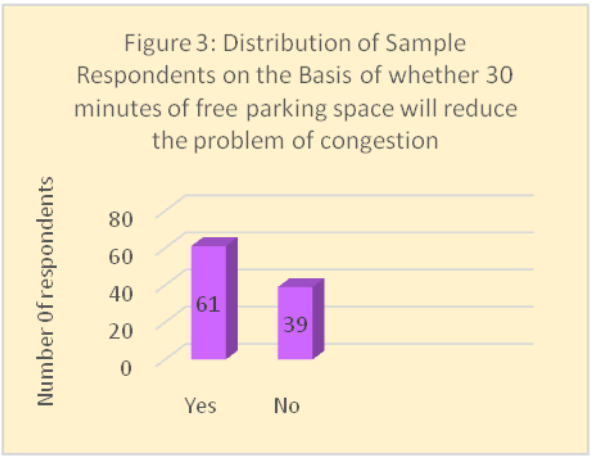
Table3shows that more than half the respondents (57 percent), irrespective of their area of residence, feel that there is not considerable emphasis on the needs of pedestrians and there is not enough infrastructure to promote cycling. This percentage is not completely in tune with the broad perspectives of an ideal smart city. With road widening beginning to eat into and encroach upon pedestrian pathways and many open spaces getting converted slots for parking cars, legging a distance has become risky. The pedestrian pathways for linking different sectors through open green spaces from north to south have largely remained on paper. Some cycle tracks have been laid along the V3s dividing sectors but even these are poorly planned or incomplete, and in any case, do not provide safe continuity across the fast traffic roads.

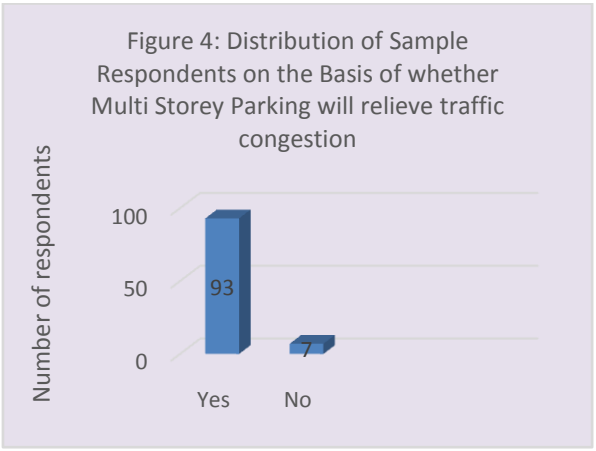
Problem of parking space in the City

Table 4: Distribution of Sample Respondents on the Basis of Area of Residence and their response on Problem of parking space in the City

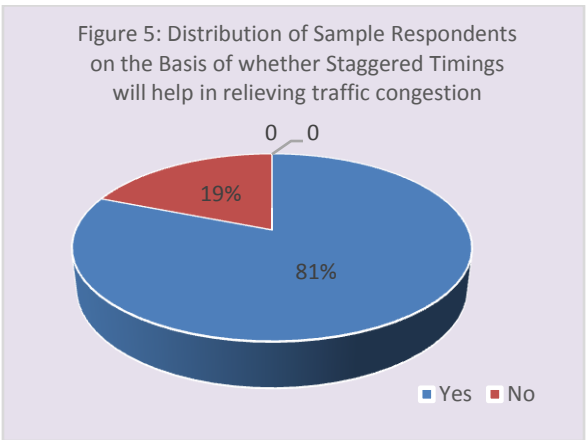
Area of Residence	Is there a problem of parking space in the city		Total
	Yes	No	
Urban	58 100.0%	0 0.0%	58 100.0%
Rural	21 95.5%	01 4.5%	22 100.0%
Rehabilitated Colonies	20 100.0%	0 0.0%	20 100.0%
Total	99 99.0%	01 1.0%	100 100.0%

Table 4puts across a worrisome picture of the existing problem of parking space in Chandigarh, be it near homes, near the work place or in market places. Mostpeople have suggested that the number of cars per family should be rationed and common parking lots should be constructed near residential area. Since there is a Government school in almost every sector of the city, there parking lots can be utilised by the near-by residents in the evening. The respondents from rehabilitated colonies claimed that the places allotted for making parks are being used for parking vehicles and setting up jhuggis, leading to everyday quarrels and disrupting the peace of the locality.





In Figure 3 a considerable percentage of respondents (61 percent) say that the provision of 30 minutes of free parking at selected areas like busy market places would help relieve the congestion problem as people availing the provision of free parking would make it a point to be back in time. Almost all respondents feel that multi storey parking would help greatly in combating the congestion problem.



The pie chart in Figure 5 shows that the majority of the respondents (81 percent), irrespective of their area of residence, think that imposing staggered school and office timings would effectively help in relieving traffic congestion problem during peak hours in the morning and evening. However the feasibility of rational different timings need to be studied.

TABLE 5: Distribution of Sample Respondents on the Basis of Area of Residence and whether parking charges should be hiked

Area of Residence	Should parking charges be hiked		Total
	Yes	No	
Urban	18 31.0%	40 69.0%	58 100.0%
Rural	11 50.0%	11 50.0%	22 100.0%
Rehabilitated Colonies	05 25.0%	15 75%	20 100.0%
Total	34 34.0%	66 66.0%	100 100.0%

Table 5 shows that majority percentage of respondents (66 percent) from all the areas responded that hiking parking charges would not help much in relieving congestion in most market places.

TABLE 6: Distribution of Sample Respondents on the Basis of Area of Residence and whether Metro Project will help in relieving congestion

Area of Residence	Will Metro Project will help in relieving congestion?		Total
	Yes	No	
Urban	47 81.0%	11 19.0%	58 100.0%
Rural	22 100.0%	0 0.0%	22 100.0%
Rehabilitated Colonies	20 100.0%	0 0.0%	20 100.0%
Total	89 89.0%	11 11.0%	100 100.0%

Table 6 shows a large majority of respondents of all the areas feel that the Metro Project will hugely alleviate the escalating traffic problem, not only in the city but also in its neighbouring cities and areas.

TABLE 7: Distribution of Sample Respondents on the Basis of Area of Residence and whether car free day once a month will help to reduce congestion

Area of Residence	Car free day once a month to reduce congestion		Total
	Yes	No	
Urban	30 51.7%	28 48.3%	58 100.0%
Rural	21 95.5%	01 4.5%	22 100.0%
Rehabilitated Colonies	10 50%	10 50%	20 100.0%
Total	61 61.0%	39 39.0%	100 100.0%

Table 7 shows that despite the Chandigarh Administration having dropped the idea of the car free month, a considerable percentage of respondents (61 percent) responded that its imposition would help in relieving the crowding traffic in Chandigarh.

TABLE 8: Distribution of Sample Respondents on the Basis of Area of Residence and whether the transport system in Chandigarh is 'disabled-friendly'

Area of Residence	Is the transport system in Chandigarh is 'disabled-friendly'?		Total
	Yes	No	
Urban	11 19.0%	47 81.0%	58 100.0%
Rural	01 4.5%	21 95.5%	22 100.0%
Rehabilitated Colonies	01 5.0%	19 95.0%	20 100.0%
Total	13 13.0%	87 87.0%	100 100.0%

Table 8 shows that the general view of majority of the respondents is that the transport system in Chandigarh is not friendly for disabled people.

TABLE 9: Distribution of Sample Respondents on the Basis of Area of Residence and whether increasing the number of traffic lights will help to combat traffic congestion

Area of Residence	Will increasing the number of traffic lights will help to combat traffic congestion		Total
	Yes	No	
Urban	18 31.0%	40 69.0%	58 100.0%
Rural	05 22.7%	17 77.3%	22 100.0%
Rehabilitated Colonies	03 15.0%	17 85.0%	20 100.0%
Total	26 26.0%	74 74.0%	100 100.0%

Table 9 shows that majority view point of all the respondents is that the increasing number of traffic lights will not combat the problem, in fact it might become a hindrance in the mitigation efforts to reduce the problem of growing traffic. In fact the total replacement of roundabouts with ATC lights in a few cases such as the Press Chowk and the Transport Chowk along Madhya Marg has not been appreciated by the city residents who have a strong affinity with the cities beautifully landscaped roundabouts.

5. Conclusion & Recommendations

Chandigarh, being a naturally endowed city, is far better than its urban contemporaries in a lot of areas, yet there are certain regions which need to be focussed on for a better and faster up gradation of the City and its residents. The problems that Chandigarh faces today are primarily due to the ever growing influx of people from the neighbouring states in search of a better life. The present study was conducted to analyse the pre-existing transport infrastructure of the City in comparison to the prerequisites of a city on the lines of the Smart Cities Mission. The results show that the manifold increase in the number of vehicles clogging Chandigarh, though not anticipated, has thrown up acute problems.

Various measures can be adopted to moderate the damaging outcomes of the incessant and indiscriminate escalation of the menace of the crowding traffic. All modes of public transport should be well interconnected and adequately accessible.Modes of public transport should be safe and comfortable for commuters and technology should be embraced to ensure quick accessibility to emergency helplines. Introducing congestion fees on the high traffic corridors and an entry tax on outstation four wheelers can help to generate revenue which can be utilised for the infrastructure required for efficient urban public mobility.The facility of park-and-ride infrastructure should be made available to allow for easy intermodal connection.In city centres, road capacity should be decreased for motorised transport to make it easily accessible by public transport and to make it available to bicycles and widened pedestrian zones.This would discourage the pressure of private cars on roads. As Gustavo Petro, Mayor of Columbia said, *"A developed country is not a place where the poor have cars. It's where the rich use public transportation".* Lessons can be learnt from the success of urban models of Beijing, Singapore, New York etc where use of public transport has been promoted and that of private vehicles has been disincentivised. The Ultra-modern public transport should be arranged to avoid harassment to the commuters and senior citizens and disabled persons. It can be concluded that a lot still needs to be done in the area of urban mobility to make Chandigarh smart and sustainable.

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