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Impact Assessment of Taxi Services in Nagpur City: A Review

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Abstract: ***Meru cab service was introduced in Indian market in 2004. Taxi systems are now being regarded as promising means of improving travel flexibility, customer satisfaction with pick up/ drop off points. Market of taxi services in Nagpur is becoming more competitive and consumers also become more demanding in metropolitan cities as a result competitive companies implements various strategies to attract Core percentage of consumers while retaining old consumers also. The various components of sustainable transportation systems gets affected due to many developed projects such as App based taxi service in Nagpur city. Our focus is to address urban transport problems and promote better use of existing infrastructure. Therefore, it is necessary to assess the impact of taxi services with respect to environment, public safety, service quality, mobility pattern, productivity, and pollution levels in Nagpur city. This study is focused to identify the significant parameters of taxi service system, and its beneficial and adverse impact on the existing transportation system in Nagpur city. Result of this study will help in developing urban transportation planning system in Nagpur city to develop public transport solutions, traffic solutions, public safety, Mobility of passengers & pedestrian patterns and solutions that are financially and economically viable.***
Keywords: Demographic Impacts, Mobility Impacts, Socio-Economic Impact, Taxi Services

I. INTRODUCTION

Nagpur is third largest city of Maharashtra State and is the 13th largest city in terms of population. In Nagpur the urban development is heading under two departments, Nagpur Municipal Corporation and Nagpur Metropolitan Region. The wards under N.M.C. is essential for considering intensity of mobility. Mostly Transport master plans basically focus on vehicle movements, but mobility of people and goods should also be considered as important part of transport studies. Nagpur city is facing increased congestion and vehicular emissions due to higher dependency on private vehicles. Hire Passenger transport services are extensive component of well-operating metropolitan areas. But the Taxi market, and other for Hire vehicles subject to imperfections which regulators made a try to correct or at least debilitate therefore they are now facing cogent disruption due to the arrival of new mobility services known as Ride sourcing app based platforms. For passengers there are huge difference in transport services being provided by private traditional taxis and App Based taxi services as long as the travel trip is carried out fairly satisfactorily and also in a timely manner. This study will focus on the mobility services of the passengers of Nagpur city to address problem relating to existing public and private transport facilities which will lead to alliance of land use and transport, imperative for building smart cities.
Taxis are semi private character which provides origin to destination service to the public. Consumers are dependent on taxis to provide full area coverage where fixed service systems does not support all travel demand. Taxis provide transport in accordance to public demand. There are some areas in some regions where taxi services is the only public transport available. Taxis also aggregate the accessibility component as it provides travel options for persons who for disability reasons and geographical reasons cannot adapt public transportation systems. Nagpur city has five Taxi market segments;

Five market segments

- Hailing segment
- Rank segment
- PRE book segment
- Contract segment
- App Based Taxi market

Hailing means addressing taxi on a street when taxi with unoccupied seats drive around the city with purpose of new trips. It is basically adopted in large cities where higher population density needs the taxi densities. **A Stand or Rank Segment** includes A taxi stand is a place where taxi are available for passengers. Locality of these stands are outside transport hubs such as airports, railway stations, hotels, government buildings etc. In a taxi stand either taxi waits for passenger or passenger waits for taxi based on

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first in first out basis usually preferred in many cities. In some cases passengers only chooses the first parked vehicle. The service does not offer high densities of taxi to work because taxi are placed around the hubs in spite of spread over large urban streets and areas. Traffic congestion is the prominent problem in many Indian cities. **Contract Market Segment** - In this market segment private and public authorities needs taxi service on monthly, quarterly, yearly basis. Public authorities includes Government organisations, transportation of school children and private organisations and industries on regular or semi-regular basis. This market functions very well and buying a taxi is a good alternative in this market segment. **Shared Taxi** - Shared taxis are prominently adopted in developing and developed smart cities. Shared taxis work in the pattern of public transport. These form public transport between mass rapid transit systems and ordinary taxis. Sometimes these taxis operate on predefined lines where public transport is totally exhausted. The dispatching company or agency collects fares and trips from identical origin and destination. These service provides low fares on predefined lines and trips as compared to conventional and metred taxis. The vehicles used are mostly 8-15 sitter which is larger than 5 seats private vehicles. Shared taxis have larger market segment in terms of fares with scheduled trips and time.

Need to regulate taxis should be well constituted which seems to be motivating consumer interest, references to congestion, references to public safety, market failures related to street market segments and sometimes city image is also taken as argument and in developed and developing countries it is also legal requirement[Jorgen Aarhaug; Kare skollerud 2013]. The recent advances in technology have given significant opportunities in vehicular controlling areas, with the extension in entire controlling areas of vehicle operation. The continuous Monitoring of locations is today made possible with the help of NAVSTAR Satellite receivers being installed in several railroads. Route finding with the help of computer based platforms are used as a part of A.H.S(AUTOMATED HIGHWAY SYSTEMS)[ELLOIT 1982].

The main goal of automated highway system is to escalate lane capacity and to advance travel time performance. App based Taxi Services were introduced in 2010 in Mumbai by ANI Technologies, because of it's choice of door to door services for consumers, booking cabs at one click using smart phones, customer's expectations and service quality, cabs offering from economy to ultimate luxury, these apps based aggregators gained popularity offering convenient mode of travel options with increased employability by providing jobs to drivers. [Dr.rupali rajesh; Snehal Chincholkar]. The urban growth speed is astounding therefore concerns embossed regard to quality of public services and facilities in these fast changing urban areas. Public transit services in major areas urban brinks usually indicate low density and unsteady, analogous and land development notably in the primeval development period. With such spatial separations, the commuting distance and time in peak hours is increased in newly developed areas. The fixed route transit services with established path and programs, hefty load carrying capacity of vehicles desires more concentrated demand to federate flows in cost effective manner, and thus deteriorate to hay the travel needs of passengers in off peak hours period[JIE YU; XIAOLIN LU 2018].

Thus, the people living and traveling in outskirts lead to have higher dependency on automobiles where public transit services fizzle to provide superior quality services. Flexible transit services is perceived as one of the potential explication under low, medium demand conditions in recently developed urban or sub urban areas (Alshalafa 2009; Quadrifoglio 2005). For safety enhancements the transportation agencies increasingly pursue to impulse reactive approaches to incorporate safety in their transportation planning processes. Taking into the bias of decreased car ownership especially in urban areas Taxi travel should be at least safe and admirably be safer than using one's vehicle. In order to expand the safety of drivers and passengers, the taxi industry should accomplish for improving the quality and attractiveness of the services as well as safety by developing the professionalism of drivers and managers [LAUNA BIDASA; ELLEN TOWNSEND, MAY 2016]. Along with the economic development in Nagpur city, urbanization process states increased tendency and Traffic flow in urban cities exaggerates obviously. In the late years, with the active growth of private cars urban road way transportation capacity enlarges abruptly and many road sections access to soggy limits in peak time interval. Better understanding and restrictions of roadways may prohibit the familiar backwards bending congestion phenomenon regnant on roadways. (kumares c.sinha - 2012).

II. LITERATURE REVIEW

Transportation Engineering is the major element of civil Engineering. Transportation Engineering comprises planning, designing, construction, maintenance and operation of Transportation system and facilities. Advanced Technologies in the arena of information system, telecommunications, Automation have future of accomplishing cost savings, and productivity advancement as well as enabling permissive new developments in the transportation system. Advanced Technologies for taxi systems such as Vehicle navigation, vehicle control and vehicle location, Automated Highway system, Computer Based Route Findings, Automatic Vehicle

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Monitoring (AVM) are developed for a better future transportation designing of smart cities (Kumares Sinha, Chris et al.ASCE-1988). JIE Yu et al. (ASCE-2016) examined traveler willingness to use flexible Transit services prior to their formation in Chinese cities. The survey included questions based on urban public transit customer satisfaction, and flexible transit service related information. Their research demonstrated that respondent explicit higher preference for those services which provide fixed route attribute with an easy approach locations for pick up and drop off points. A study by JIE YU et al. (ASCE-2016 suggested that, to accommodate specific spatial and temporal travel behaviour of, Passengers, different types of flexible transit services are needed in the smart cities. Dr. Rupali et al.(2017) focused on classifying the difference between Ola and UBER customers in Mumbai. They collected data over structured questionnaire. The data were composed of Mumbai from working professionals. Statistical Analysis performed and showed consumers safer with Ola than UBER service, female consumers mostly prefer UBER service. RAHMAN (2014) The rise of BPO industry with odd working hours, visiting shopping mall, going out on exclusive occasions, ministering late night parties is considered as one of the reason for the growth of Taxi industry. This growth is seen in metropolitan cities in India. A study by PARONDA, REGIDOR (2016) analysed key performance of indicators of conventional taxis which constitutes passengers expenses, reliability, quality of service, comfort, Travel speed. Surveys based studies concluded that Ola and UBER services offers better quality ride and services than conventional taxis. KANJER HANIF AND NAGDA SAGAR (2016) proposed that these taxi services have high conceivable growth in Mumbai and other Metropolitan cities addressing rich and middle class both. KAVITA AND RAJESWARI (2017) mobile wallets companies like Paytm, Free charge, Mobi-kiwiki offers huge discounts and free rides to customers by cashless transactions options. RUCHIKA MALIK (2017) Employing drivers reward system triggers the driver to build loyalty terms to customers service. This reward system helps drivers and owners for vehicle maintenance. App based service providers also initiate automobile insurances, health and wellness packages to their families. Jorgen Aarhaug et al. (ETC 2013**)** conducted empirical studies on NORWEGIAN REGIONS. They defined the understanding of TAXI MARKET where taxis operates and prevails in different market segments with different properties. They provided vision into some reasons why there are differences in different market segments, and typology model is prepared describing the impacts of these differences in different market segments. The typology model further discusses how the regulation regimes will be economically favourable and optimal in different market segments. Abbey D et al. (ASCE-2018) suggested that adaptive Traffic control system rigorously alter to changing Traffic so as to improve Traffic performance at un-signalised and signalised intersection. Fully Estimating the Feasibility of ATCS implementation, however needs evaluating changes in Lasting ATCS performance with changing Traffic Demands. The Empirical investigation aims using theory of Venkatesh et al.(2003) Determining the dominant factors for alteration of Taxi Hailing Mobile apps along the Malaysian taxi users with consumers acceptance theory, and technology use theory (UTAUT) . Their investigation includes dependent and independent variables. The independent variables are performance and effort expectancy, facilitating conditions and social influence. Dependent variables includes consumer behaviour, consumer behaviour intensions. For research questions structural equation modelling and confirmatory factors analysis are used where effort expectancy and consumer behavioural intensions have no influence on consumer behaviour and social influence and performance expectancy bear decisive influence. Nagpur city like all other cities in India evidencing increased dependency on private Motor vehicles for personal travel trips, dominating to vehicular congestion and pollution emissions. Impact Assessment of all modes of transport should be adopted on regular and yearly basis so as to plan, design better transportation infrastructure before leading to traffic and congestion problems and also to assure that Nagpur city will have systematically planned urban Transport system which should be efficient, economical, safe and sustainable.

III. SCOPE OF WORK

A. Demographic profile impact
B. Socio-economic impact
C. Mobility impact

The Impact Assessment consists of following vital parameters

1) *Demographic Profile Impact:* This impact shares the Nagpur City's consumer perception of overall facilities towards Traditional and App Based taxi Service. This impact encompasses passengers Gender, Age, Income, Passengers perception towards Safety and most essential requirement is consumer's comfort ability, and satisfaction level over private market segments and app based taxi service.
2) *Socio Economic Impact:* This Impact will implement urban transport stake holders Employment opportunities, flexibility working conditions, safety of manufacturers/producers, money transactions with effect of the upsurge taxi services demand in the Nagpur City which haphazardly leading to increase in Urbanization.

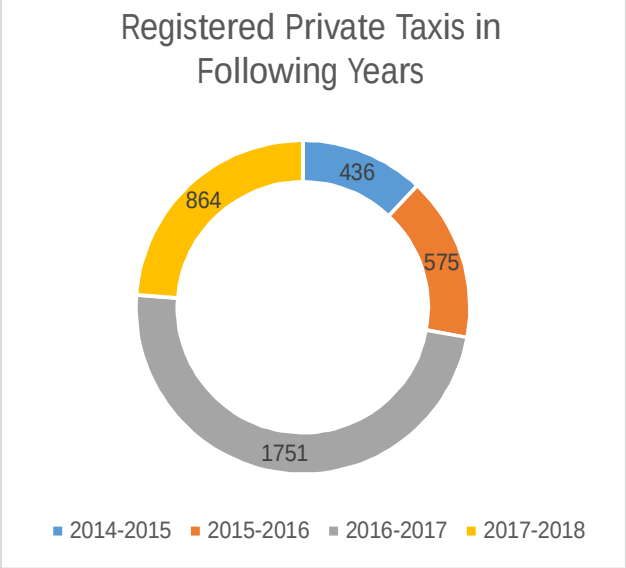
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3) *Mobility Impact:* Most cities anticipate urban Transport masters plans by Regulating, transport and traffic studies. Traffic congestion and increase in traffic accidents in cities and towns are severe transport problems which results due to rapid urban development in India. The increase in need for active transfer of people and goods is due to increasing level of urbanization and economic growth with account in increased interaction between various land uses. This firmly results in increased travel times, travel congestion an also increased traffic accidents. Planning for accessibility and mobility in urban economics and improved transport solutions will encounter these urban city issues. The problem of nimbly increasing the private vehicle population has been provoked to larger extent, although state government and local bodies are working to improve transport problems in Nagpur city.

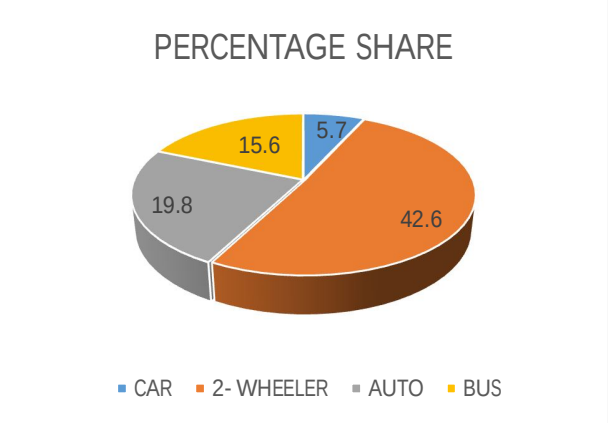
Primary data to be collected from state and local authorities

a) Total Population Growth in Nagpur city
b) Taxi Growth In The Following Years
c) Taxi Growth Rate from 1971 to present Year
d) Registered Taxis In These Following Years
e) Mode Share Classification of Nagpur City
f) Employment Data of Nagpur city
g) Employment Increased By Taxi Services

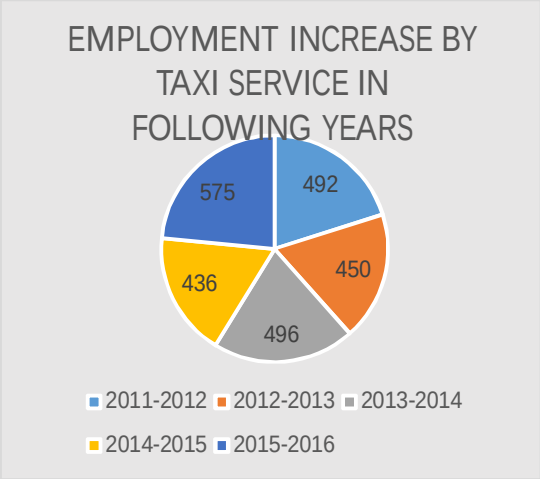
Taxi Registration In Nagpur City In Following Years



Mode Share In Nagpur City



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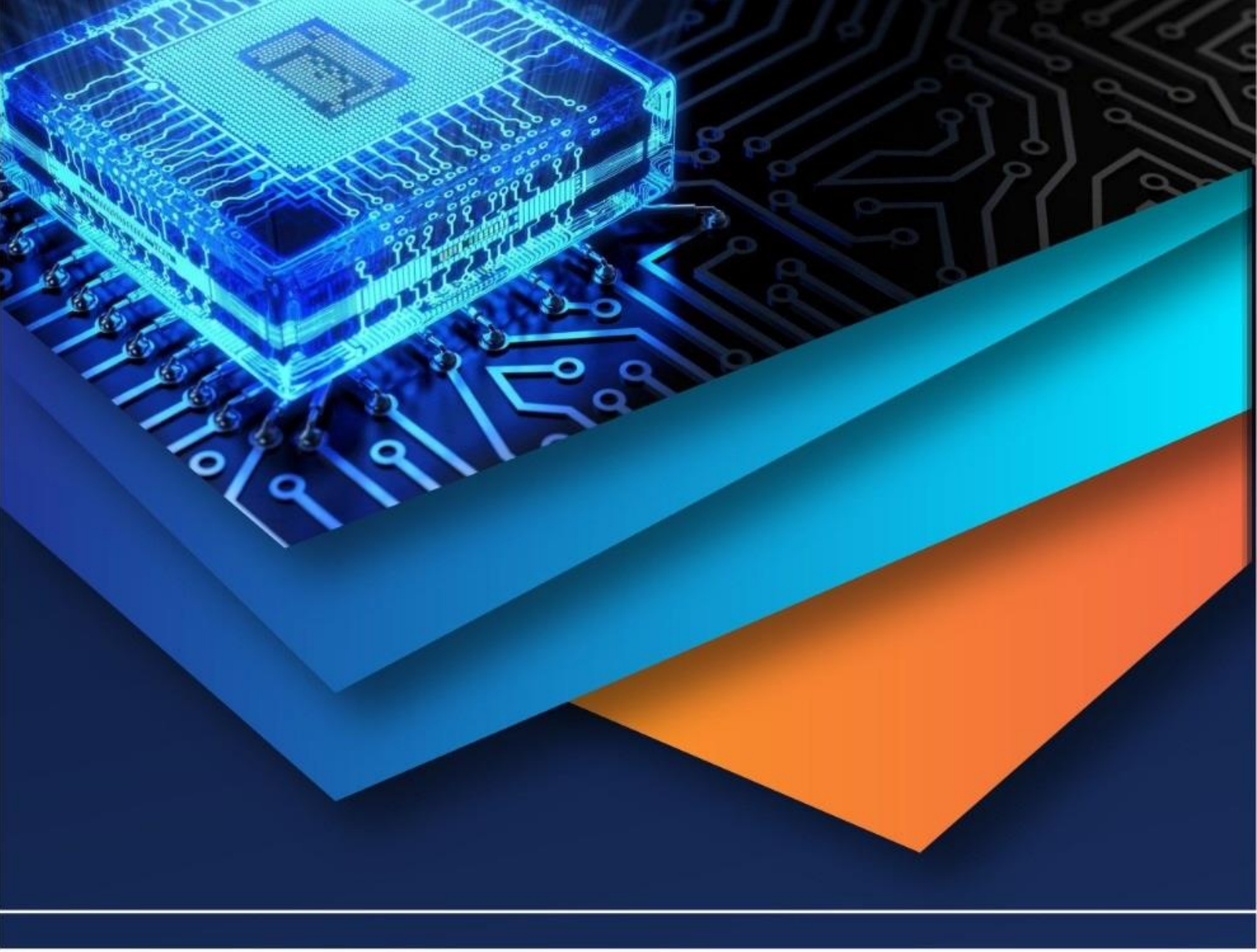
IV. CONCLUSION

The paper has represented a detailed Impact of Taxi market segments prevailing in Nagpur city, intend to give a brief idea of all parameters pertaining to environment, public safety, service quality, Mobility patterns, productivity, congestion and pollution levels in the city. This study tries to identify the differences between Traditional Taxi Market segment and App based taxi market segment so as to aid the Taxi service Industry to design their strategy and customer relationship plans This study signifies that driver behaviour have adverse co-relation on customer satisfaction although comfort, reliability and affordability also have impact on customers satisfaction in taxi market. This study defines travel speed, passenger expenses and quality of service as the most important and key performance indicator. Therefore it is not easy for traditional taxis to operate in an environment which is extra customer centric, target oriented, extra innovative and have unyielding resistant to pressure from regulatory authorities and keep gratifying their customers. With the increasing number of cab users in the city this study is designed to understand the customers perception towards Taxi market Segments.

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