

IMPACT STUDY OF PRIVATE CABS ON THE USAGE OF PUBLIC TRANSPORT: STUDY OF DELHI

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Abstract: On-demand cabs or rental taxi were introduced in 2004 in India and soon became popular among consumers in urban cities, especially in the capital city Delhi with over 158,000 registered taxis (**Ratna Suran, 2018**). Taxi market in India is growing rapidly affecting the other public taxi market and public modes of transportation. The major players in the Taxi market are OLA and UBER with a lot of new cab service providers. The public transports are old with next to no comfort and security, while then again the cabs in the private taxi market are modern alongside with features like GPS, more comfort and safety. Thus, this study is focused to study the effect of emerging private taxi companies on public transportation market in India. A few explicit factors have been taken into account considering the standard factors that a customer may consider while booking or taking a cab for research to explain the impact of the private taxi market on the public transport market such as ease of availability, comfort, safety, technology patterns, fare charges, payment methods (**Geetha Iyer, 2017**).

I. INTRODUCTION

The Indian taxi market has been dominated by unorganized transport sector for decades but the organized private on-demand cab service market has been growing over the past several years with metro cities witnessing exponential growth with the penetration of organized sector. However, since the Radio cabs have entered the market, the use of technology like mobile apps has totally changed in India (Kumar, Singh, Akshita T. Ghate, & Wilson, 2016).

On-demand rental cab services were introduced in 2004 but the actual revolution came in 2010 with OLA and in 2013, where the competition became dense after the launch of Uber (Rajesh & Chincholkar). As the taxi market became more competitive, consumers became more demanding forcing different rental cab companies to use different strategies to bring more customers as well as to retain old ones and to meet customer's expectations. There are various factors that play an important role in customer satisfaction such as price and quality service followed by other factors, for example, safety and payment options. As per financial express report, introduction of app-based cab services has grabbed customer's attention as well as increased employment opportunities in the taxi market for drivers (Chen, 2014). Most taxi apps in the taxi services market have similar services to offer such as concept of taxi aggregators, air conditioned taxi

services, reasonable fares luring passengers of the metropolitan cities.

Safety is mandatory but ease of availability and convenience while travelling also effect the customer's choice between the public and private transport. On-demand cab services are operated through mobile applications which makes it easier for customers to book a cab at their door or at any desired location. There is no inconvenience of changing transport for longer distances as well. Also there are vast number of options to choose from such a cab or pool or auto or bikes. As per (Utsav Pandya, 2017), mobile cab services also proved rental cabs for inter-city travelling at no time. Every UBER or OLA account have an option to opt for online methods of payment such as PAYTM wallet, PHONEPAY, GOOGLEPAY, UPI, etc. and also to pay through debit or credit cards.

This paper tries to study the current scenario of taxi market in India to understand the effect of various factors like technology trends, safety, price, comfort, ease of availability, tariff and payment methods affecting the current taxi market. The research mainly focuses on to study the impact of these variables on radio cabs and public transport and how it is affecting the public transportation market.

II. LITERATURE REVIEW

The articles and research paper reviewed below talks about the revolutionary changes, patterns and trends

that emerged after the introduction of private on-demand taxi companies and how they affected the traditional transportation sector and India's economy.

The paper emphasis on the sudden increase in the utilization of personal transport in Sana's, Yemen. To increase road safety and enhance road environment, the report highlights the efforts taken as well as suggests factors that encourage users to shift towards public transport in order. Models like SPSS and LOGIT are applied for a description of the survey data and the two basic approaches are used in this study for data collection, Revealed Preference (RP) to focus on personal information and Stated Preference (SP) methods to focus on trip characteristics. The report established through research that the travel time and travel cost have significant influence on model shift from car to public transport. (AOWS N. ALTEF, 2013)

The research paper aims to review how Taxi Aggregators through offering discounts or coupons and other various methods like quality service, mobile applications, educated and skilled drivers, payment options, user support, electronic fare meters, GPS enabled vehicles, etc. has influenced the society. The current study is based on primary data collected from the different parts of Coimbatore from 200 respondents through a questionnaire to study perception of user and satisfaction towards online cab services. The study concludes an unorganized Indian taxi market but the emerging private sector over the years that has identified opportunity in this sector which has given rise to the organized taxi market in India. According to review on Taxi industry, incomes are step by step declining in Indian Society. Taxi Service client's frame of mind are changing reliably and anticipating a lot more extra advantages in future. (DR. S. M. YAMUNA, 2019)

III. INDIAN TAXI MARKET

Overview of the current taxi market of India

In context of transportation and conveyance, India has been one of the most revolutionized country which has experienced major shifts over the several decades from the traditional bullock carts, horse carriages to hand pulled rickshaws to autos and to nowadays, on-demand taxis. These shifts and innovation has resulted to greater comfort level in many factors ranging from

cheaper to convenience and comfortable modes of transport. It has also made people to have second thoughts about buying their own personal cars because they can book taxis anytime and anywhere they want just in minutes. (Jain, 2015)

Due so such factors, there has been a huge rise in demand of taxi cabs and therefore, to meet the demands of riders, several business operation models are introduced in the Indian Context such as:

1. Marketplace business model
2. Cab sharing business model
3. Self-drive business model

The Indian taxi industry has been witnessing revolutionary regulatory changes, soon after the introduction of Marketplace Model, Cab-sharing model was introduced and after its popularity, the aggregators of Indian taxi markets like Uber and Ola expanded their range of vehicles from 4 seaters to Majority of the population are not aware about the new systems and schemes being introduced or do not have enough knowledge about the same. (Rungta, 2017)

Organized and unorganized Indian taxi market

The organized taxi market of India which includes Radio Cabs i.e. the companies registered under the Radio Cab Services, affiliate's and the companies which are aggregating taxis under single brand constitutes to only 12-8% of the India's Taxi Market. Whereas, 88-92% of the market is still unorganized which includes individual operators or cabs running in different part of country. (Utkarsh, 2014)

Growth of private taxi industry on the Indian Economy

The impact of introduction of Private taxis on the Indian economy can be studied through several factors affecting the Indian economy. Some of these factors are:

1. **Road accidents:** The year 2010 is taken into consideration as Ola was firstly introduced in Dec 2010. So the road accident data of 2010 will help us to see the situation of India before introduction of one of the major player of privately owned modes of transport, Ola Cabs. The year 2014's data on road accident is used as the greatest international private on-demand cabs company, the recent year's data i.e. of 2018 has also been studied in order to compare the percentage increase or decrease in the road accidents of

different types of vehicles such as cars and taxis, buses, auto-rickshaws and two-wheelers.

2. **Increase in employment rates:** As per EPFO data, over one crore new accounts were added in 2017 to the 45 million members of the organization. Minister of State for Civil Aviation Jayant Sinha said that there has been a major upsurge in job creation but not in the traditional economy rather in the new economy. He also cited the example of Ola Cabs and Uber Cabs apps. He also stated that apps like uber and Ola have given employment to over 1 million.
3. **Lesser crowd in the public transportation:** Many people have shifted their preference towards the on-demand taxi cabs due to various incentives being offered which have directly or indirectly impacted the crowded public transports of the India such as crowded metros and buses. This unfortunately have not impacted much on the railways as the cabs are preferred for a shorter distances rather than for intra-city or between states.
4. **Increased mobility in the remote areas:** The much less appreciated advantage of the private cabs like Uber & Ola is that they drop the riders at their desired location that is not provided by the public transports.
5. **Rise in crimes:** When the apps for booking cabs were launched in the metropolitan or major cities of India, they promised the rides that will be hassle-free as well as safe. However, after a certain amount of time, many consequences were also seen in Indian economy, the most disturbing was increase in number of crimes, especially against women.
6. **Increased strikes:** India has witnessed several strikes by the public transport employees either for the rise of wages or due to other incentives. The participants of traditional taxi market have also been on strike opposing the on-demand cabs and several strikes have also been conducted by Private on-demand cab drivers due to drop in their revenue in the year 2016 and 2018.
7. **Increase in technology:** The major requirement for the usage of on-demand taxi cabs is smartphones and an internet connection as these cabs can only be books through their respective applications which are needed to be installed in the phones. The communication and technology advancement is what that has contributed in such greater popularity of such services.

8. **Pollution levels increased:** The popularity of private on-demand taxi cabs or radio cabs have resulted in the greater number of vehicles on road which is contributing the pollution levels of India.

IV. RESEARCH METHODOLOGY

The methodology used for the following research has been incorporated from the data used of several countries and of India related to the topic. The data available for the Indian cities in which the taxi services are available is very less in comparison to the other countries as the concept is very new and has been introduced in India only after the immense success of Radio Taxi service companies in the other developed and developing nations. (Rungta, 2017).

To study the impact of private taxis on the public transport market, specific variables have been used in order to measure their effect of private taxis on the public ones.

VARIABLES

The following study takes into consideration seven variables which will help in determining the effect of each independent variables on the dependent variables to understand the impact of radio cabs on public modes of transport. The variables are explained as under:

1. **Technology Trends:** This study the effect of technology on the Public/Private taxi market of India. Technology trends include the growth of apps and smartphones as well as internet for GPS tracking with the emergence of app based private cabs.
2. **Ease of Availability:** This variable talks about the availability of private taxi or public cabs when booked by the demanders of cabs at their place of interest to the destination point.
3. **Affordability:** Price/rate variable is the amount or value that the riders are charged after they board the demanded cabs and complete their destination to the desired destination.
4. **Payment Options:** This variable is the multiple options available to the riders such as cash, Paytm or other wallets in order to pay the drivers after completing the ride.
5. **Comfort Level:** This variable refers the amount of comfort that riders experience while boarding the ride. It includes the cab's condition as well as driver's behavior towards passengers.
6. **Safety Level:** This variable talks about the safety that riders or drivers have when taking

cabs. It includes the various safety features such as emergency numbers, sharing ride details, etc. cities especially with respected to female riders.

7. **Taxi Market:** This is the dependent variable and is of the study's primary interest as it helps to study the effect of each following independent variables. Both public and private taxi markets have been considered as the dependent variable.

V. DATA ANALYSIS

1) DATA COLLECTION

For studying the impact of private taxis on the public taxi market, an online survey has been conducted from a random number of samples from population for the purpose of data collection. The respondents are selected at random and belong to Delhi region to whom the questionnaire survey was circulated via social media in form of Google forms. The sample size on the basis of respondents is n=67.

Secondary research data has been used for further research of several countries and of India related to the topic. The data available for the Indian cities in which the taxi services are available is very less in comparison to the other countries as the concept is very new and has been introduced in India only after the immense success of Radio Taxi service companies in the other developed and developing nations. (Rungta, 2017). The data has been collected from National Research Council (U.S.), Transportation Research Board, and Committee for Review of Innovative Urban Mobility Services, Ministry of Transport and Highways, Government of India and other trustful sources, various journals, research papers, articles, etc.

2) **THEORETICAL FRAMEWORK**

Two different sets of data are studied of public taxi market

Two different sets of data are studied of Public taxi market and private taxis separately. The dependent variable is the public/private taxi market and comfort, ease of availability, technology, affordability, comfort level, safety level and paytm options are the independent variables. The study will conclude whether the independent variables effect the dependent variable directly/indirectly or not.

3) **HYPOTHESES**

- i. **Null Hypothesis:** Independent variables does not affect the Dependent variable

- ii. **Alternate Hypothesis:** Independent variables affect the dependent variables.

4) **DATA ANALYSIS METHODS**

- i. **Correlation analysis:** Correlation analysis will help to study whether any two variables are related to each other linearly or not. The null and alternate hypothesis are considered and then accepted or rejected based on the tests run in excel. In data analysis; the earlier discussed independent variable will be studies whether or not they are related with the dependent variable.
- ii. **Paired sample T-test:** paired sample T-test is used after performing Correlation analysis to further compare two population means. It is also used to compare the before and after results if there is a matching pair sample.
- iii. **Bar graphs, Pie charts and Trend lines:** Bar graphs and charts are used to study the trend of taxi market in Delhi from the data collected through secondary sources in order to analyze the growing market trends since the private taxis were introduced in India and the current scenario as well as to predict the future trends and growth.

5) **DATA ANALYSIS AND DATA INTERPRETATION**

- i. **CORRELATION ANALYSIS:** Correlation analysis has been performed in Microsoft Excel to study the interdependence of each independent variable separately with the dependent variable.

The Independent variables are: Technology, Comfort, Affordability, Payment Options, Availability, and Safety. The Dependent Variable is Private/Public Taxi Market.

Hypotheses testing for the Public/Private Taxi market

- a. **Technology trends**
- b. **Comfort Level**
- c. **Affordability**
- d. **Payment Methods**
- e. **Ease of Availability**
- f. **Safety level**

Ha: Independent variables do effect the Public/private taxi market.

H0: Independent variables does not affect the Public/private taxi market.

Correlation between technology trends and public taxi market		
	PUBLIC-TM	TT
PUB	1	
TT	0.54661	1
P- VALUE= 0.0000171; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between technology trends and private taxi market		
	PRIVATE-TM	TT
PVT	1	
TT	0.54993	1
P- VALUE:0.0001070 ACCEPT ALTERNATE HYPOTHESIS		

Correlation between payment methods and Public taxi market		
	PUBLIC-TM	PAYMENT
PUB	1	
PAY	0.1109	1
P- VALUE= 0.371625; ACCEPT NULL HYPOTHESIS		

Correlation between payment methods and Private taxi market		
	PRIVATE-TM	PAYMENT
PVT	1	
PAY	0.42917	1
P- VALUE= 0.00029024; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between comfort level and public taxi market		
	PUBLIC-TM	COMFORT
PUB	1	
COM	0.35711	1
P- VALUE= 0.00301164; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between comfort level and private taxi market		
	PRIVATE-TM	COMFORT
PVT	1	
COM	0.39641	1
P- VALUE= 0.00089737; ACCEPT ALTERNATE HYPOTHESIS		

CORRELATION BETWEEN SAFETY LEVEL AND PUBLIC TAXI MARKET		
	PUBLIC-TM	SAFETY
PUB	1	
SAFE	0.4556	1
P- VALUE= 0.00010701; ACCEPT ALTERNATE HYPOTHESIS		

CORRELATION BETWEEN SAFETY LEVEL AND PRIVATE TAXI MARKET		
	PRIVATE-TM	SAFETY
PVT	1	
SAFE	0.3209	1
P- VALUE= 0.00810490; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between affordability and Private taxi market		
	PRIVATE-TM	AFFORDABLE
PVT	1	
AFF	0.31563	1
P- VALUE= 0.00927365; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between affordability and Public taxi market		
	PUBLIC-TM	AFFORDABLE
PUB	1	
AFF	0.2990	1
P- VALUE= 0.01397623; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between availability And Private taxi market		
	PRIVATE-TM	AVAILABLE
PVT	1	
AVB	0.41917	1
P- VALUE= 0.00041466; ACCEPT ALTERNATE HYPOTHESIS		

Correlation between availability and Public taxi market		
	PUBLIC-TM	AVAILABLE
PUB	1	
AVB	0.3609	1
P- VALUE= 0.001264; ACCEPT ALTERNATE HYPOTHESIS		

ii. PAIRED T-TESTS

- The affordability is lesser among the private taxis on an average is higher by 0.5 points.
- The comfort level among the private taxis on an average is higher by 1.2 points.
- Private cabs have greater ease in availability for the riders than the public modes of transport. There are greater chances of finding private taxis in the market by an average of 0.8 points.
- The safety level among of the private taxis on an average is higher by 0.6 points.
- The results indicate that the private cabs are higher in terms of promoting technology by approximately 1.7 points.

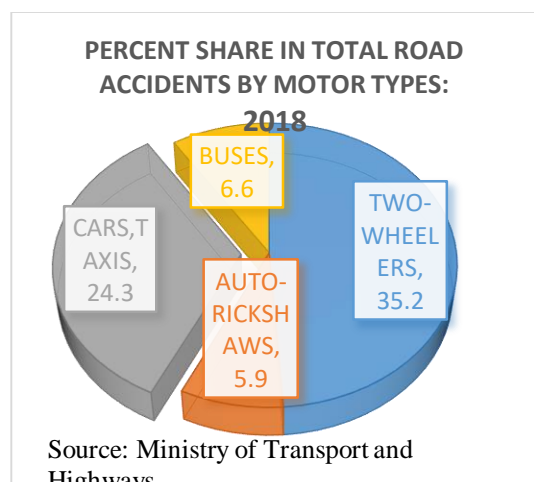
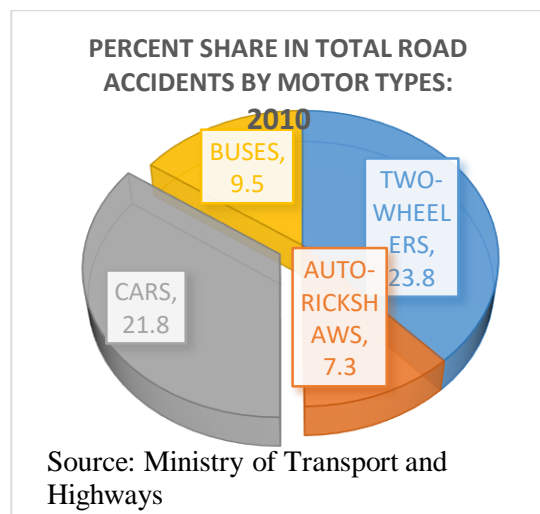
iii. GRAPHS AND CHARTS

a. ROAD ACCIDENTS

The following tables analyses the data of the road accidents data of India of three different years: 2010,

2014 and 2019. Year 2010: Ola Cabs was launched in India & year 2014: Uber Cabs was launched in India

The road accident data of year 2010 and 2014 will analyses the percentage change in the road accidents with the recent year data of year 2018.



The percentage change between 2010 and 2018 interprets that the introduction of on-demand taxis such as Uber, Ola and Jugnoo, etc. have shown a positive impact on the India's economy.

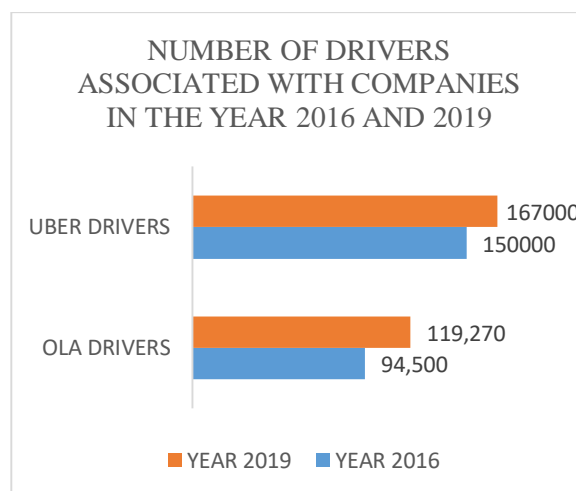
The percentage of road accidents between the year 2010 and 2018 has reduced by 6.5% although there has been a 4.2% rise in the number of car accidents.

EMPLOYEMENT

As per EPFO data, over one crore new accounts were added in 2017 to the 45 million members of the organization. Minister of State for Civil Aviation Jayant Sinha said that there has been a major upsurge

in job creation but not in the traditional economy rather in the new economy. He also cited the example of Ola Cabs and Uber Cabs apps. (STANDARD, 2018)

YEAR	2010	2014	2018	% CHANGE BETWEEN 2010-2014	% CHANGE BETWEEN 2014-2018	% CHANGE BETWEEN 2010-2018
TWO - WHEELERS	118911	133634	164313	12.38%	22.96%	38.2%
CARS	108919	111218	113490	2.11%	2.04%	4.2%
BUSES	47465	41365	30746	-12.85%	-25.67%	-35.2%
AUTOS	36473	31172	27385	-14.53%	-12.15%	-24.9%
TOTAL	499628	489400	467044	-2.05%	-4.57%	-6.5%



The above graph indicated that there is significant increase in the number of uber drivers indicating towards increase in employment in Indian transportation sector. The increase in the number of drivers in the major players of the on-demand cab services have benefited the Indian economy and may also result in increasing the per capital income of the country.

CHAPTER 5: CONCLUSION

The study based on the primary data collected through survey from the sample population of Delhi indicates that the independent variables does have an effect on both private and public taxi industry, thus concluding that private taxis have a major impact on the traditional taxi market. The levels of technology, safety, comfort,

availability, payment methods and affordability are increased and higher for the private taxis. The data interpretation done above concludes that the usage of smartphones and internet has increased the usage of on-demand radio taxis in India and several metropolitan cities such as Delhi, Bangalore, Jaipur, Mumbai and many more. As a result of such sudden popularity, the on-demand taxi cab operators have made a significant share in the taxi industry by overcoming the drawbacks of public taxi industry. The consumer's preference has also been seen to be increasing toward the radio cabs due to the various factors studied above. The innovations and technology trends are seen to be rising with the increase in demand of such cabs. The consumer's preference towards these on-demand radio cabs is due to increased ease of availability or access, cheaper price/rate, options of different payment levels and greater level of comfort. These factors and increased consumer's demand have had a several impact on the public transport. Some positive impacts being decreased road accidents, reduction in crowd for public transport, increase in competition, and increase in the employment opportunities and greater mobility in remote areas. Some negative impacts were also witnessed such as rise in crimes, rise in unhealthy competition, strikes, rise in pollution levels, etc. In conclusion, rise of privately owned on demand cab companies have impacted consumer's preference, public transportation industry and India's economy.

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