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Urban Mobility In The Era Of Sharing Economy: An Empirical Study Of Smartphone App Based Ridesourcing Services

Venkatesh Ganapathy[1] and George Easaw[2]

Introduction

The Ridesourcing service supply chain has come into sharp focus after this app-based service managed to challenge the dominance of the taxi industry. Riders across the globe have unanimously embraced the cab service. In India, Uber and Ola cabs continue to be the dominant players though local players are beginning to emerge.

While the reasons for the popularity of the cab services are not difficult to understand, it is important to understand the challenges faced by riders while availing these services. This will make the transportation network companies aware about the shortcomings in their services paving the path for improvement in service quality. Sharing economy is one where an asset is used multiple times by different customers either for free or for a price. The success of the taxi aggregator services has spawned many other services that are delivered through a request made through an app. In logistics, truck operators have begun using an app to better match the supply and demand. Travel portals are looking at an end-to-end approach to satisfy all of the customer's needs and demands. The growth and popularity of hotel aggregator services like Oyo rooms, AirBnb, Trivago in India has further strengthened the notion that app based services are here to stay. Food delivery is also being done through an app based request with companies like Swiggy, Food Panda and Tiny Owl coveting mind share and market share alike.

However, all these start-ups that have emerged in the entrepreneurial ecosystem have had a fair share of problems with the regulator. Transportation network companies claim that they are merely intermediaries who facilitate the user of a software app that connects the customer with the driver and that they do not fall under the purview of regulatory guidelines applicable for the traditional taxi industry. Some of the food delivery apps have had an unceremonious exit and hotel aggregators have faced the heat due to service quality and pricing issues. Actions by some of the aggregator start-ups

[1] Associate Professor, Presidency Business School, Bangalore
[2] Professor, Alliance University, Bangalore

have forced the Government to intervene. What is the sustainability quotient of these start-ups that rely on an app-based business model will continue to be a matter of debate.

This study has highlighted the regulatory challenges faced by taxi aggregators across the globe. Some of the contentious issues like surge pricing have also been highlighted. An empirical study has been conducted to understand gender-based issues and problem areas with the app-based cab services. The results of the study have been reviewed and discussed to draw meaningful conclusions. Future research directions are also proposed.

Statement of Problem

The sudden popularity of cab services in India is a grim reminder of the problems plaguing urban mobility. Transportation networks in most Indian cities are overly dependent on road travel; suburban railway travel has not been developed in most cities. The local transportation network (buses, auto rickshaws, taxis) are unable to meet the burgeoning demand for urban mobility. The quality of service in private alternatives like autos and taxis leaves much to be desired. It is important to understand the drivers of operating a successful app-based ride sourcing service in a world where sharing economy has become both a reality and a necessity.

Any new service is bound to face unexpected challenges and overcoming these is important to continue delivering uninterrupted service in the long run. Wait time is an integral component in evaluating the performance of services. This leads us to the research questions – are there gender-based differences in perception about the services? What is the unique aspect of these services that is attracting customers to avail this service? Do expected and actual wait times bear any correlation?

Research Objectives

1. To establish the correlation between gender and price sensitivity of customers.
2. To find out the association between gender and frequency of usage of the cab services.
3. To establish the correlation between frequency of usage and price sensitivity of customers.
4. To determine the correlation between gender and satisfaction of Ola cab users with current price levels.
5. To identify the one grave problem area which users of Ola cab services face.
6. To find out if alternate options for travel (if the cab service is unavailable) exercised are gender sensitive.
7. To determine if the satisfaction of males and females with the cab service is the same.
8. To find out the correlation between gender and uniqueness of the cab service.
9. To determine the differences between expected wait times and actual wait times and whether there is any correlation between the two.

Review of Literature

The emergence and subsequent popularity of Uber and alternative ridesharing services has had a profound impact on the transport industry. Legislation governing the operations of transportation network companies and their regulation has been the subject of controversy, due largely to stakeholder interests. Taxi industry, across the globe, has often alleged that the TNCs (transportation network companies) have benefited due to absence of level playing field. The taxi industry is governed by strict regulatory measures (Dosen & Rosolen, 2016).

On-demand ride sourcing services represent the quintessential example of transport services that would never have existed without mobile apps. Innovativeness of the services apart, ride sourcing services have been in the eye of storm. This was expected as these services stormed the market erstwhile dominated by the taxi industry through their disruptive ideas (Franckx, 2016).

Ridesourcing is an emerging urban mobility service through private car owners drive their own vehicles to provide for-hire rides. Without any regulatory intervention, a monopoly Ridesourcing platform will maximize the profit with drivers. The cost function of the platform is subject to economies of scale. The average waiting time of customers is proportional to the average searching time of drivers. Regulation must be restricted to the commission charged by the Ridesourcing platform (Zha, Yin & Yang, 2016).

The confluence of information, communication and vehicle technologies has led to the emergence of Ridesourcing services. Vehicle movements are connected and integrated to a unified smart mobility service (Foldes & Csiszar, 2016).

The successful spread of Uber and other TNCs into transport markets has been enabled due to low prices, efficient business models, effective market penetration and consistent feedback mechanisms. The digital platform matches supply with demand leading to better utilization of capacity of vehicles. This leads to a win-win situation for passengers (lower prices), drivers (regularity of income streams) and the TNC (commission revenues on every ride) (Dosen & Rosolen, 2016).

Ride sourcing allows riders to request a ride in real-time through a smart phone application, which communicates the rider’s location to nearby drivers. Once a driver accepts a request for a ride, the passenger can view the vehicle’s real-time location and estimated arrival time. GPS-enabled navigation helps drivers reach their destinations without taking a circuitous route. Payment options are varied – cash, debit card, credit card or through payment wallets like PayTM. The dual feedback system engenders a climate that rewards polite behavior. (Franckx, 2016).

Uber ride sourcing services (Dosen & Rosolen, 2016).

Uber was founded in San Francisco in 2009. It is the world’s largest TNC. Uber connects passengers with drivers who offer rideshare services using their own noncommercial vehicles and also allows paying passengers to order transport services through smart phones or internet and location enabled devices.

The rapid growth of the sharing economy has enabled Uber expand its presence in 77 countries and more than 503 cities worldwide. A number of ridesharing smart phone applications (apps) are now in operation throughout the world including Lyft, Gocatch and Ingogo. Like Uber, many of these apps have the operational capacity to be used to order both traditional taxis and rideshare services.

In Australia, ridesharing apps provide female drivers for female passengers. UberX connects passengers to individuals offering rides in their own private vehicles. Uberpool is a service that allows people to ride with others travelling in the same direction. Accreditation of licensing frameworks generally includes – drivers of the service, vehicles being used, owners of vehicles and operators of transportation network services.

Uber contends that rideshare services are legal under existing legal frameworks as they merely connect riders and drivers using a technology platform. Often governments have been slow to introduce legislative and regulatory measures to deal with its entry into the market. Legislation must take into account a number of stakeholder interests and is often controversial. Uber is subject to ongoing legislative & regulatory measures from governments along with litigation from driver-partners and companies around the world.

Uber Business Model (Dosen & Rosolen, 2016).

The business model operates on the premise of connecting drivers and passengers through an online market place. Uber thus provides a platform to bring together riders and drivers. Uber's popularity and penetration into the market is facilitated by favorable prices but also by its business practices.

The model includes Suppliers, Consumers, Revenue & Growth. Suppliers are drivers who have access to an appropriate vehicle with an incentive to work. These driver-suppliers are coordinated into a transport distribution platform. Consumers are those who seek transport services to request drivers through a mobile application. Uber creates a mutual review mechanism to incentivize a good service. Uber generally collects a commission of 20% for all fares. The revenue and investment capital is used to expand aggressively and increase market share at the cost of competition.

Uber builds support and popularity amongst customers and driver partners through its ability to disrupt an existing and usually heavily regulated taxi monopoly through aggressive pricing and marketing. Uber also pays regulatory infringements incurred by drivers. Incentives are offered to drivers in the form of bonuses and temporary increases in pay as well as to passengers in the form of free introductory rides, discounts and other promotions.

Surge Pricing

Surge pricing is a simple move from "rationing through queuing" to "rationing through prices" (Franckx, 2016). This has often been a bone of contention between riders and the TNCs. Taxi industry has a static pricing structure. Uber's prices change depending on rider demand and driver supply. When demand is more than supply, surge algorithm temporarily increases prices to help reach market equilibrium. An increase in demand without an increase in price would lead to an economic shortage leaving the market in disequilibrium. Essentially, the algorithm incentivizes more drivers to offer rides which push a number of potential customers out of the market place (Dosen & Rosolen, 2016).

University of Chicago has conducted research about the surge algorithm and its effects. The research showed that surge efficiency gains come from both an increase in supply of drivers on the road and from an allocation of supply to those that value rides the most.

If demand increases and the surge algorithm is not employed, the market becomes efficient. In the absence of surge pricing, drivers are less likely to drive while riders request rides in increasing numbers because of a lack of pricing mechanism encouraging them to make an economic trade-off. Employing the surge pricing algorithm leads to a consistent wait time for riders, regardless of demand conditions.

The surge pricing process

1. There is a substantial increase in demand while supply is static.
2. Market goes into disequilibrium triggering the surge algorithm.
3. Surge pricing structures are implemented meaning higher ride costs.
4. Increased prices incentivize drivers and allocate supply based on value.
5. Supply is increased to meet demand and the market reaches equilibrium.

Competitive Strategies

BMW is now experimenting with a new system of one way of car sharing called Reach Now. This would allow customers to ask for a car with driver. Thus business model of TNCs is not something that is unassailable. The matching app design can be replicated by competitors (Franckx, 2016).

Lyft, a competitor to Uber, has devised a strategy along with General Motors. This is called as Express Drive Program. Lyft drivers can rent a car from GM and if 40 rides are performed in a week, the mileage is free. If the weekly rides exceed 65, then the fixed weekly fees are also waived. Drivers can thus take part in ride sourcing services without the need to own a car. Even Volkswagen is investing in vehicles that can offer on-demand rides to the B2B market. Not to be left behind, the traditional taxi cabs market has also begun using apps. (Franckx, 2016).

Uber offers app developers to add a button to their app which would allow users to request an Uber drive to drive them to the destination that is linked to the button. In India, Ola has already been doing this by providing services for conferences, exhibitions, restaurants and movie halls. (Franckx, 2016).

Insurance For TNCS

Designing and regulating insurance for TNCs is difficult because TNC drivers also use cars for private purposes. Regulators may insist that policies include all coverage. Dallas has created an approach that proposes insurance in three phases. However, implementation of the same may not be so easy especially in India where insurance is often used as a mechanism to cover losses and seldom treated as a risk mitigation tool. (Franckx, 2016).

1. The driver is driving and the app is switched off and now he is covered by private personal insurance.
2. Driver turns on the app but has not yet accepted a ride; so the TNC has to provide contingent insurance to cover claims that are not covered by driver's personal insurance.
3. Once the driver accepts the ride primary insurance comes into play.

The Mohring Effect

Mohring effect in public transport is applicable to TNCs also. As the number of drivers hired by TNCs increases, the wait time for customer shortens. This attracts more passengers which will lead to more drivers being hired. As business grows, drivers have more uptime and so now the field is clear for TNCs to lower prices and this in turn attracts more users.

Ridesharing

Environmental concerns and traffic congestion point towards the fact that increasing the number of cabs on the road is not the right way forward. In many cities, the supply of taxis is more than the demand. Therefore, ridesharing has been touted as a most effective solution (Huang, Liu, Hu & Liu, 2016).

The competition between ride-sourcing platforms does not necessarily lower the price level nor does it improve social welfare. Regulators can think of merging the platforms and regulate them directly as a monopolist (Zha, Yin & Yang, 2016).

Ridesharing has not received sufficient attention so far. Taxi sharing matching and the route choice are complex mechanisms. Even the pricing methods have not attained a level of maturity that was expected (Huang, Liu, Hu & Liu, 2016).

Travel choices for consumers can be expanded by providing ridesharing as an option. This can improve mobility, accessibility and reduce congestion. Ridesharing takes care of the negative externalities associated with single occupancy automobile use. Benefits of ridesharing can be realized only when sufficient demand can be generated by matching drivers and passengers with similar origins and destinations. This also means that passengers must be willing to travel with potential strangers (Shay, 2016).

Use of information technology in modern life is increasing at a scorching pace. ICT based systems have ample potential providing accessibility and affordability to the urban inhabitants in developing countries. A framework for dynamic vehicle pooling system was developed. This system can be used by car, bus or even a lorry. To ensure payment security, the system is designed as a prepaid system. Rider ensures payment before getting into the ride and the driver's account is credited only when the rider reaches his/ her destination (Farin et al, 2016).

Real time ridesharing programs involving matching travelers with drivers shortly before the ride. This option offers additional flexibility and can be used when schedules keep varying. Initial perceptions were discouraging as it was felt that ridesharing would compromise on reliability and safety norms. However, as Ridesourcing services continue to penetrate the market, one can expect a marked shift in this perception (Shay, 2016).

Extending the ridesharing concept further, large employer-based ridesharing offers the possibility of bringing together a network of co-workers who travel to similar work locations and live in the close vicinity of each other. This will lead to good matches, increased familiarity with fellow travelers and social bonding. This will further engender increased participation in ridesharing pools (Shay, 2016).

Research findings have revealed that young travelers are willing to participate in ridesharing. Females are also eschewing reservations about taking part in ridesharing as passengers. Other insights that have been garnered are: those who travel in automobiles – shared or alone are more likely than those who do not travel in automobiles to participate in ridesharing. Those who walk or use transit seem to be less willing to participate in a ridesharing program than those who do not use these alternative modes. Car owners have a lesser inclination to use Ridesharing services as compared to those who own a car (Shay, 2016).

The fortunes of taxi industry have become dented due to growing popularity of ride sourcing and ridesharing services. Customers can monitor proximity and availability of Uber vehicles on their app. Uber allows cashless payments, is cheaper than taxis and allows drivers to take 85% of revenue per ride. Both the riders and drivers have access to each other's app profiles reducing the risk of anonymity that may reduce the feeling of safety in taxis. Both riders and drivers provide feedback on their experience making a system of accountability and incentivizing both parties to maintain high ratings.

The ease of use of apps is an important factor. Even a Luddite can easily use the app. Due to digital mapping of supply with demand; customers are assured of shorter wait times as compared to taxis.

Governments in some western countries are insisting that the TNCs share data with respect to accidents, driving patterns, real-time trip data and driver availability. The data can be shared with city authorities so that improvements can be made in transportation network and apps can be developed showing all available transportation options. Areas that are poorly served by transport services can also be identified (DuPuis, Martin & Rainwater, 2015).

Hypothesis Formulation

Null Hypothesis: There is no gender-based distinction for pricing charged by Ola cab services. (both males and females have equal responses to pricing by Ola cab services).

Null Hypothesis: There is no correlation between gender and uniqueness of Ola services. (I.e. all men and women have the same opinion with regards to uniqueness of Ola cab services).

Null hypothesis: There is no correlation between gender and alternate options for travel when Ola cabs services are not available.

Null Hypothesis: There is no difference between expected wait times and actual wait times when customers hail Ola ride sourcing services.

Null Hypothesis: The frequency of usage of cab services of both female and male population is the same.

Sampling

200 respondents were contacted out of which 130 responded (65% response rate). Sampling method was convenience sampling. A questionnaire-based survey method was employed as part of the empirical study.

Data Analysis & Discussion of Results

Correlation with Gender and satisfaction with pricing

From Table A, we can see that the p value is 0.045 for a 5% significance level. Therefore, the null Hypothesis can be rejected. Table B indicates the results of the Chi-square test. 75% of respondents are satisfied with the pricing charged by Ola cabs. 25% respondents have expressed dissatisfaction with the pricing charged. (Refer Table C). 80% of males and 65% of females are satisfied with the prices charged by Ola. This difference is statistically significant. The Kruskal Wallis test (Table D) further supports the results that there is gender based differences with regards to customer’s satisfaction with the prices charged by Ola cab services.

Correlation of Gender with Uniqueness of Ola services

This is represented in Tables E and F. 29.5% of respondents attribute uniqueness of Ola services to its affordability; 40.9% say that Ola is unique due to ease of booking service and 29.5% respondents feel that Ola is unique due to less waiting times. Thus, respondents have given equal weightage to pricing and waiting time and a higher weightage to the ease of booking the service through the app. As per Table F, the p-value is 0.002; this means that there is a correlation between gender and uniqueness of Ola services.

From Table G, 75% of males and 25% females feel that affordability is the USP of Ola Cabs. 72% males and 28% females attribute uniqueness of Ola cabs to ease of requesting service via the app. 42% of males and 58% females feel that less wait times represent Ola cabs' uniqueness. As mentioned previously, these differences are statistically significant.

Correlation between gender and alternate options for travel

Table H indicates the correlation between gender and alternate options. As p value is 0.01, null hypothesis is rejected. Table I indicates that when cab services are unavailable, 47% respondents prefer to drive their own vehicle, 6% ask for help, 33% travel by auto and 14% respondents prefer to travel by bus.

Table J indicates cross tabulation that indicates preferences of respondents when cab services are unavailable gender wise. Interestingly, an equal number of males and females prefer to travel by auto and bus when Ola cab services are not available. However, male respondents prefer to drive their own vehicle as compared to female passengers. These differences are statistically significant if we look at Table K. The p-value is almost equal to 0.05 indicating that the null hypothesis can be rejected.

From Table L, the measures of association express the relation between two variables. PHI is used to measure the strength of the association between two variables. As value of PHI is 0.25, the relationship between gender and alternate options for travel are moderate. The Cramer's value of 0.25 also supports this interpretation. The Cramer's V is used to measure the strength of association between one nominal variable and another nominal variable or with an ordinal variable.

Table M indicates the problem area indicated by respondents. Remarkably, 52.7% expressed their view that they did not face any problems with Ola Cab services. 10% respondents felt that driver was rude while 11% expressed their concern that car did not arrive on time. 16% respondents felt that the cab wasn't properly maintained. Figure B gives a histogram on the same.

Let us look at Table N. 18.5% respondents use the Ola cab services once a week; 29% use them once in two weeks; 23% respondents use the cab services once a month; 14% respondents use the cab once in 3 months; around 8% of respondents use the services once in 6 months and an equal number use the service more than twice a week. This data is expressed in the form of a histogram in Figure C. Figure C" expresses this data in the form of a stem and leaf plot.

From the table O, it is clear that there is a difference between the expected waiting times and actual waiting times. Interestingly, the actual wait times are lower than what the customer actually expects (Figure D) .So this is a positive attribute for the taxi aggregator services and this can be a good enough performance metric for the company to monitor on a regular basis.

A paired sample t-test was carried out in SPSS for comparing the means of expected waiting time and actual waiting time. The results are delineated in Tables P & Q.

From the results, we can say that:

- Expected wait times and actual wait times are not correlated (p-value is 0.101,). The association between the two variables is weak.
- There was a significant average difference between Expected and actual wait times. (t= 42.141, p value=0). So, the differences in the means of expected wait times and actual wait times are significant.
- On average, Expected wait times were 9.33 points higher than actual wait times (95% CI [8.889, 9.766]

From Table R, it is clear that there is no correlation between price sensitivity of customers and frequency of usage of Ola cab services. P-value is 0.708. So we may conclude that frequency of usage of Ola cab services is not correlated with prices charged.

Relation between frequency of usage of Ola cab services and gender

Table S indicates the results of the Mann-Whitney Test Statistics. As p value is 0.639, at 5% level of significance, the null hypothesis is accepted. Therefore the frequency of usage of Ola services is same among males and females.

Conclusion

A majority of respondents (75%) have expressed satisfaction with pricing levels in Ola cab services. However there is a gender-based difference in the perception about pricing. Ola cabs needs to constantly monitor price levels; some of the dissatisfaction may be attributed to surge pricing. As regards the uniqueness of Ola cab services, affordability and reduced waiting times occupy equal slots. However, most respondents have opined that the ease of booking the cab through an app is what is unique about the Ola cab services.

When the cab services are unavailable, the options exercised by riders are also gender specific. An equal number of males and females prefer to ride by auto and bus. Male riders have a greater inclination than female riders to drive their own vehicles when the cab services are unavailable.

50% respondents have expressed the view that they did not face any major problems with Ola cab services. But this is not a reason to rejoice, cheer or celebrate; 50% respondents have issues with Ola cab services that need the aggregator's immediate attention. Poor maintenance of the vehicle, cabs not arriving on time and impolite/ rude behavior of drivers are the main pain points.

The frequency of travel also varies depending on the gender. The frequency information is indicative that there is further scope for marketing these services. At present, the taxi aggregators are undertaking aggressive sales promotion strategies like payment through PayTM, attractive discounts through use of promo codes, free rides for referrals and free rides after every 5th ride if payment is made through a visa debit card. Even the first rides are laced with appealing introductory offers. But it appears that these sales promotion strategies are just not enough to increase the frequency of usage of the cab services.

There is no correlation between expected and actual wait times and expectedly so. Expected wait times are based on consumer perception; while actual wait times are technology driven. The cab services have continuously updated the software app and the changes have been concomitant with changes in mobile technology. The algorithm is now generating greater value for the customer by giving real time updates and GPS enabled view of navigation routes. The performance feedback mechanism is also easy to administer with weighted scores of customer ratings available to the customer.

Males and females have equal propensity to use the cab services; Counter-intuitively, price sensitivity and frequency of use of Ola cab services do not appear to have a correlation. This indicates that urban mobility being a necessity consumers are not too price sensitive especially when there are limited alternative options for travel.

Content analysis of subjective responses (please see the Appendix) indicates that consumers are seeking greater value from the ride sourcing cab services; to sustain the business in the long run, the taxi aggregator services must ensure regulatory compliance and maintain harmonious relations with driver-partners even as they work diligently to raise the bar when it comes to delivering superlative service quality. Consumers need to be heard and the ride sourcing service providers need to keep their ears to the ground to understand the pulse of the consumers. This will ensure a seamless transition of service providers into the demanding urban mobility space and consolidation of the market position.

Limitations of Study & Scope For Future Research

The study has been carried out primarily in Bangalore and a nationwide survey would yield rich insights and greater clarity about regional differences in ride sourcing services. A question based on surge pricing wasn't specifically mentioned in the questionnaire and so future research can explore the impact of surge pricing on customer perception about the ride sourcing cab services. The survey has been conducted mainly with those who have availed Ola cab services; a comparative study between Ola and

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Uber cabs can be conducted to understand the differences and commonalities in perceptions about these services. The sample respondents are mostly from the 21-30 age categories and in future, stratification can be done based on occupation of respondents – this will help in identifying differences in rider perceptions among those with different occupations. A 7-P analysis of ride sourcing services can also be part of research in the future. Future research can also identify dimensions of the taxi aggregator service that will substantially influence the performance of the service supply chain. A comparative study between Ridesourcing and ridesharing services and their effectiveness will also be of interest.

Table A : Correlations between Gender & Satisfaction with Pricing

		Sex	Satisfac_Pricing
Sex	Pearson Correlation	1	.176*
	Sig. (2-tailed)		.045
	N	130	130
Satisfac_Pricing	Pearson Correlation	.176*	1
	Sig. (2-tailed)	.045	
	N	130	130

*. Correlation is significant at the 0.05 level (2-tailed).

Table B : Chi square Test Statistics

	Sex	Satisfac_Pricing
Chi-Square	8.892[a]	31.508[a]
Df	1	1
Asymp. Sig.	.003	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 65.0.

Table C : Sex * Satisfac_Pricing : Cross tabulation

Count

		Satisfaction with Pricing		Total
		Yes	No	
Sex	Male	66	16	82
	Female	31	17	48
Total		97	33	130

Table D : Kruskal Wallis Test

	Satisfac_Pricing
Chi-Square	4.012
Df	1
Asymp. Sig.	.045

a. Kruskal Wallis Test

b. Grouping Variable: Sex

Table F : Correlations between Gender and Uniqueness of Ola Services

		Sex	Unique_Olaservices
Sex	Pearson Correlation	1	.266**
	Sig. (2-tailed)		.002
	N	132	132
Unique_Olaservices	Pearson Correlation	.266**	1
	Sig. (2-tailed)	.002	
	N	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

Figure A

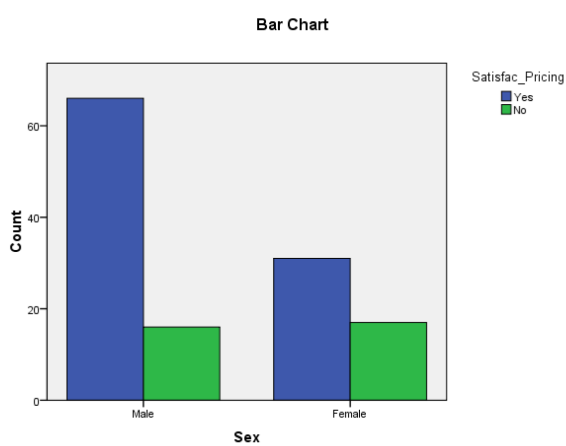

Table E : Uniqueness of Ola services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Affordability (Price)	39	29.5	29.5	29.5
	Ease of booking service (App)	54	40.9	40.9	70.5
	Less waiting time	39	29.5	29.5	100.0
	Total	132	100.0	100.0	

Table G: What is so unique about Ola cab services?

Element	Males	% males	Females	% females	Total
Affordability	29	74.36%	10	25.64%	39
Ease of requesting the service via app	39	72.2%	15	27.78%	54
Less Wait Times	16	42.11%	22	57.9%	38

Table H : Correlations

		Sex	Alt_Options
Sex	Pearson Correlation	1	.225**
	Sig. (2-tailed)		.010
	N	132	132
Alt_Options	Pearson Correlation	.225**	1
	Sig. (2-tailed)	.010	
	N	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

Table I : Alternative Options

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Drive own vehicle	62	47.0	47.0	47.0
	Ask for help	8	6.1	6.1	53.0
	Travel by auto	44	33.3	33.3	86.4
	Travel by bus	18	13.6	13.6	100.0
	Total	132	100.0	100.0	

Table J : Sex * Alt_Options Crosstabulation

Count

		Alt_Options				
		Drive own vehicle	Ask for help	Travel by auto	Travel by bus	Total
Sex	Male	47	5	22	10	84
	Female	15	3	22	8	48
Total		62	8	44	18	132

Table K : Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.016[a]	3	.046
Likelihood Ratio	8.125	3	.043
Linear-by-Linear Association	6.615	1	.010
N of Valid Cases	132		

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 2.91.

Table L : Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.246			.046
	Cramer's V	.246			.046
Interval by Interval	Pearson's R	.225	.084	2.629	.010[c]
Ordinal by Ordinal	Spearman Correlation	.225	.084	2.628	.010[c]
N of Valid Cases		132			

Table M : The one problem area in Ola Cab Services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Car arrived too early	6	4.7	4.7	4.7
	Car did not arrive on time	14	10.9	10.9	15.5

Table K : Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.016[a]	3	.046
Likelihood Ratio	8.125	3	.043
Linear-by-Linear Association	6.615	1	.010
N of Valid Cases	132		

Car not properly maintained	21	16.3	16.3	31.8
No problems	68	52.7	52.7	84.5
Unsafe driver	5	3.9	3.9	88.4
Rude Driver	13	10.1	10.1	98.4
Travel Uncomfortable	2	1.6	1.6	100.0
Total	129	100.0	100.0	

Table N : Frequency of usage of Ola Cab services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once a week	24	18.5	18.5	18.5
	Once in two weeks	38	29.2	29.2	47.7
	Once a month	30	23.1	23.1	70.8
	Once in 3 months	18	13.8	13.8	84.6
	Once in 6 months	10	7.7	7.7	92.3
	More than twice a week	10	7.7	7.7	100.0
	Total	130	100.0	100.0	

Figure B

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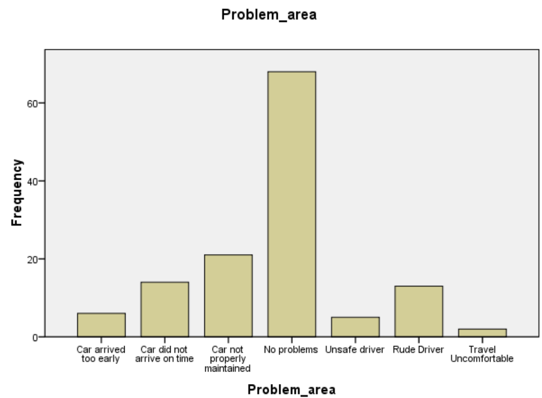

Figure C

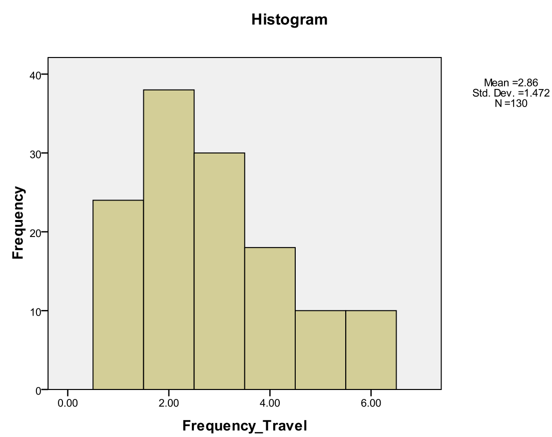

Figure C": Stem and leaf plot.

Frequency_Travel Stem-and-Leaf Plot

Frequency Stem & Leaf

24.00 1 . 000000000000000000000000
.00 1 .
38.00 2 . 00000000000000000000000000000000000000
.00 2 .
30.00 3 . 000000000000000000000000000000
.00 3 .
18.00 4 . 000000000000000000
.00 4 .
10.00 5 . 0000000000
.00 5 .
10.00 6 . 0000000000

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Stem width: 1.00
Each leaf: 1 case(s)

Table O : Expected waiting times and actual waiting times

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Expected_Wait_Times	116	5.00	10.00	15.00	11.6379	2.35685
Actual_Wait_Times	116	3.00	1.00	4.00	2.3103	.86892
Valid N (listwise)	116					

Table P : Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Expected_Wait_Times & Actual_Wait_Times	116	.153	.101

Table Q: Paired differences

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Expected_Wait_Times - Actual_Wait_Times	9.32759	2.38392	.22134	8.88915	9.76602	42.141	115	.000

Figure D

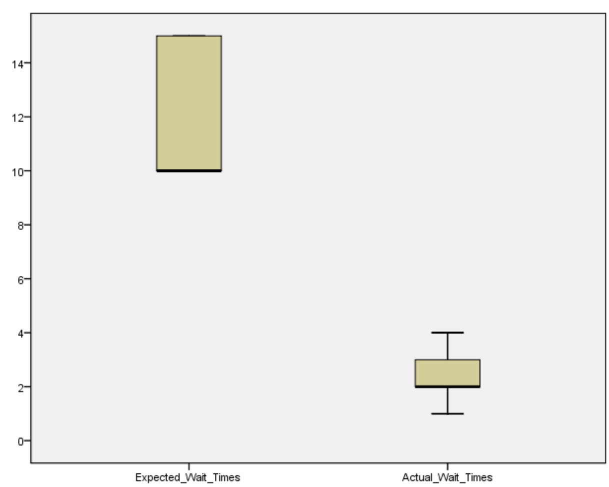

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Table R : Correlation between frequency of usage and price sensitivity

		Price Sensitivity	Usage frequency
Price Sensitivity	Pearson Correlation	1	.033
	Sig. (2-tailed)		.708
	N	132	132
Usage frequency	Pearson Correlation	.033	1
	Sig. (2-tailed)	.708	
	N	132	132

Table S : Mann-Whitney Test Statistics[a]

	Usage frequency
Mann-Whitney U	1919.000
Wilcoxon W	5489.000
Z	-.470
Asymp. Sig. (2-tailed)	.639

a. Grouping Variable: Gender

TABLE T: CONTENT ANALYSIS

Infrastructure related	Ola auto Wi-fi option in the cab For non smart phone user, a mechanism Camera in taxi & GPS systems Entertainment services on request Ola Helicopter Visual app system/ visual stores/ booth Good music system Food for early morning booking Improvement of GPS system Café services Booking without internet
Cost Related	Joining commuters as you go Avoid cheating by drivers on fares Price Reduction Round trips at affordable prices
Ease of Operations Related	More user friendly apps Better identification of passenger's pick up location Online booking

	Missed call booking for regular registered users
Payment Related	Cash payment through debit cards Cash payment through credit cards Cashless transaction
Rewards Related	Rewards after every ride Membership and Loyalty cards
Safety Related	Female Ola drivers for female passengers Technology to ensure safety for women's passengers Send photo of driver to consumers safety alarm buttons in the car

Figure E

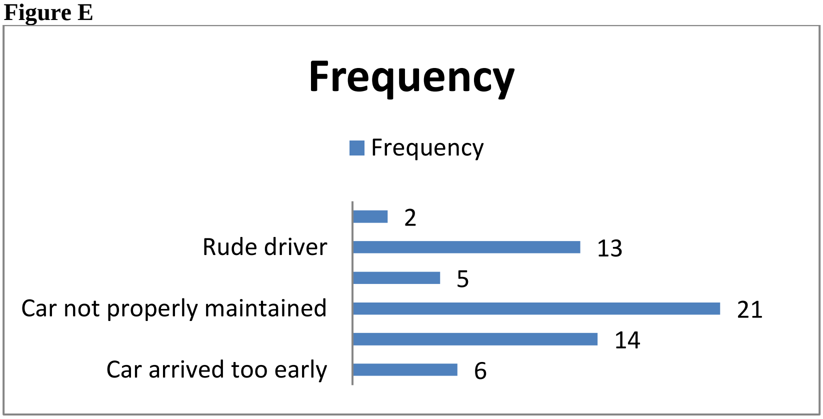

TABLE U : 80:20 PARETO ANALYSIS

Problem Area	Frequency	Cumulative Frequency	Cumulative %
Car not properly maintained	21	35	57%
Car did not arrive on time	14	49	80%
Rude driver	13	62	102%
Car arrived too early	6	68	111%
Unsafe driver	5	73	120%
Uncomfortable travel	2	75	123%

Figure F: Pareto Analysis

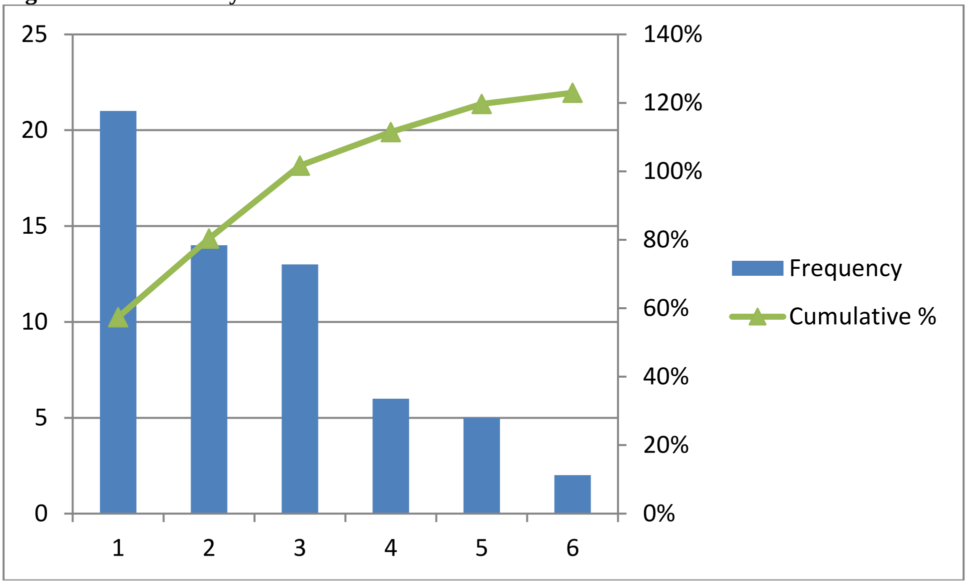

TABLE V: CATEGORIZATION OF SUBJECTIVE RESPONSES

Ease of Operations	User friendly apps, online booking, better identification of passenger's pick up location, missed call booking for regular registered users.
Cost related	Joining commuters as you go, avoid cheating by drivers on fares, reduce prices, round trips at affordable prices.
Infrastructure related	Ola auto, wi fi in cabs, booking for non smart phone user, camera in taxi, GPS systems, Entertainment services on request, Ola Helicopter, Visual app, Good music system, Food for customers doing early morning booking, improvement in GPS system, Café services, Booking without Internet.
Payment related	Cash payment through cashless options, debit, and credit cards.
Safety related	Female drivers for female passengers, safety alarm buttons in car, send photo of driver to consumers.
Rewards related	Reward after every ride; Membership & Loyalty cards.

TABLE W: ALTERNATIVE OPTIONS WHEN CAB SERVICES ARE UNAVAILABLE

Decision when cab service is unavailable	**Male %**	**Female %**
Drive own vehicle	56%	31.3%
Ask for help	6%	6.3%
Travel by auto	26.2%	45.8%
Travel by bus	11.9%	16.7%

TABLE X: DIFFERENCES BETWEEN RESPONSES OF MALE AND FEMALE RESPONDENTS

Gender	Affordability	Ease of booking through Apps	Low wait times	Total
Female	20.8%	31.3%	47.9%	100%
Male	34.5%	46.4%	19%	100%

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