ESTIMATING THE DETERMINANTS OF DEMAND FOR UBER SERVICES IN LAGOS-STATE, NIGERIA

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Abstract

The advent of technology has reinvented the taxicab business model. Uber applications assist matching people who want a ride with car driver with people who will like to provide the service using their personal/private cars. It is against this background that this study sought to estimate the determinants of demand for Uber services in Lagos. To this effect, a sum of 600 consumers of Uber services was sampled using *purposive sampling techniques within the Lagos metropolis. This sample size was determined using an infinite population formula since a number of people commuting in Lagos-state daily is very large and follows a random distribution. Responses from the sampled customers were elicited using a structured questionnaire. The research instrument was validated through content validity while Cronbach's alpha test of reliability was conducted with a Cronbach's alpha scores 0.785 for customers' safety and trust (CST), 0.812 for customers' convenience (CCV), 0.834 for price (PRC), 0.878 for drivers' efficiency (DRF) and* 0.856 for *Uber benefits. Regression was performed on the variables with demand for Uber service with the results showing R-square value of 0.533 suggesting that 53.3% of the variation in the demand for Uber services can be explained by the included variables (CST, The parameter estimates of the model show that customer safety and trust (CST, CCV, PRC and DRF) is positive and significantly (β = 0.618, t = 1.828) related to demand for Uber services in Lagos State at 10% level of significance. Thus, customers' safety and trust, customers' convenience, price and drivers' efficiency are the main determinants of demand for Uber in Lagos metropolis. The study therefore,*

recommends that stakeholders in private transportation business such Uber should augment training of drivers towards the determinants of Uber`s service patronage as suggested by the study.
Keywords: Demand, Regression, Transportation, Uber, Nigeria.
JEL Classification: D5, C1, O3, O55, J44, L98

1. Introduction

Uber is a technology company that connects riders with drivers through a smart-phone application which has come to help create a new future of transportation, one that seeks to expand access to transportation, reduce individual car ownership and help governments plan future transportation investments. Uber relies more on partnership as it provides just the software to connect drivers with riders, and so the company may not own any vehicles. People make money on the Uber platform by driving their cars themselves and picking up Uber customers, or putting a fleet of cars on the Uber network and hiring drivers to drive them. In a way, this has created jobs for some deserving and qualified individuals who are interested in that mode of business. As ride requests arrive on the Uber platform, it allocates these requests to nearby drivers in the location of the customers who made the request, while when a trip is completed; the riders is expected to pay fare per-mile or per-minute rate based on scientific calculation on the Uber technologies (Chen, Chevalier, Rossi, & Oehlsen, 2017). Uber takes a 25% commission and credits the car owner's bank account at the beginning of each week with the earnings. Uber's gross revenue in 2016 reached $20 billion, its net revenue was estimated at $6.5 billion and its total number of rides was about 2 billion for the same year (Business Insider, 2017; Forbes, 2017). Thus, Uber is a platform on which drivers can make use of their privately owned or rented vehicles to offer rides from passenger/customer from one location to another.

Recently, Uber declared Lagos was potentially bigger than its London market; such was the unleashed increase in demand for convenient and comfortable rides among the megacity's fast-growing middle class. But afterwards, the narrative has taken a very different turn as its push to win as many customers as possible in the face of stiffer competition has led to severe clashes with its drivers. According to Bureau of Labor Statistics (2018), the top two reasons for drivers to choose Uber are work-day flexibility and higher income.

Uber was launched in Lagos in 2014 around the same time it was launched in Cairo, and within a year in Lagos, Uber received massive patronage from drivers and passengers alike. In the second half of its first year, growth multiplied by ten times. In addition to the everyday services, Uber is available on demand for personnel and gift deliveries during festive seasons. Such was the success of Uber during its first 12 months in Nigeria, and it's been ever growing. Uber literally took Lagos by

storm. Two years after it was launched in Lagos, Abuja became the 400th city Uber launched in (Venture Africa, 2017).

However, safety, trust, customers' convenience, fair transport fare and drivers' efficiency may be determinants for the demand of Uber services in Lagos State. Studies have variously inquired into the determinants of Uber services (Lam & Liu, 2017; Li, Hong & Zhang, 2016; Faghih, Safikhani, Moghimi & Kamga, 2015; Marten, 2015), however, very few studies have investigated the determinants for the demand of Uber services in Lagos State. This study therefore, seeks to ascertain the determinants of demand for Uber services in Lagos State. The specific objectives of the study are; to analyze if the relationship between price and Uber patronage is a determinant for demand of Uber services in Lagos State; and to investigate whether drivers' efficiency is a determinant for demand of Uber services in Lagos State.

2. Literature Review

Based on the fact that the introduction of Uber as convenient means of moving people from one location to another is new, empirical literature examining demand determinants for this product is very scarce. However, the few empirical efforts in this direction will be appraised.

Starting with the study by Ferrie (2015), the study examined the demand for Uber vs. the CTA among Northwestern undergraduate students. It also determined the factors that influence this demand employing Survey method. The study revealed that year in school and gender does have significant influence on demand for Uber and CTA services. However, variables such as past transportation behavior, cost of transportation, and duration of transportation have statistically significant influence on demand for Uber and CTA services. The study furthered estimated $0.15 per minute or $9.00 per hour as time used on transit for Northwestern students. Variation of value was also revealed in the course of the study between men and women. The value for men is $0.143 per minute, or $8.58 per hour; while that of women is $0.155 per minute, or $9.30 per hour. Similar variation was also observable between inexperienced and experienced riders. The price for inexperienced riders goes for $0.135 per minute or $8.10 per hour while experienced rider's chargers $0.166 per minute, or $9.96 per hour. In conclusion, it can be established that in a given six different transportation choice conditions, 39.1% of individuals would go for Uber in a given situation, and 60.9% would go for CTA. In conclusion, this finding reveals that Northwestern students are open to both methods of transportation.

In another study by Faghih, Safikhani, Moghimi and Kamga (2015), the study investigated the short-term Uber demand using spatio-temporal modeling technique and New York City as reference point for the study. The has been reported that demand for e-hailing services is moving very fast in large cities and Uber appears to be the first and e-hailing company of choice in the New York City. Similar attempt

was also made to compare the demand for yellow-cabs and Uber in NYC during the same period. The results from the study revealed that the demand for Uber has increased. However, this demand may not be distributed uniformly either spatially or temporally. The study also posits that using spatial-temporal time series models can help to better understand the demand for e-hailing services and to predict it more accurately.

Recent study conducted by Li, Hong, and Zhang (2017) on empirical analysis of on-demand ride-sharing and traffic congestion is another important study worthy of attention in this review. The study investigates the impact of Uber, an on-demand app based ride sharing service, on urban traffic congestion. The results from study underscores the welfare effect of Uber as the it shows that after Uber entry, congestion of this area has been reduced significantly. The study also established the robustness of the results with the use of instrumental variable analysis as alternative measures. Study by Lam and Liu (2017) examined the demand and consumer surplus in the on-demand economy: the case of ride sharing. The study exploit granular data on dynamic pricing and wait time on Uber and Lyft at type-route-time level, and public data on taxi and public transit in New York City. The study employed a discrete-choice demand modeling technique that allow for substitution among transportation means. Simulation performed revealed three main findings. First, those who used platform gain 72 cents per dollar spent on these platforms. Second, welfare gains are disproportionately higher in underserved community by taxi and public transit. Third, it estimates that 64% of welfare gains.

3. Research Methods

The study covers the metropolitan areas of Lagos State, Nigeria. The state remains the commercial nerve centre of Nigeria despite her change in status as the former capital of the country. To ensure ease of business administration and transport logistics in the state, three administrative zones were created; Lagos West, Lagos Central, and Lagos East, respectively. Subsequently, administrative staffs of Uber, drivers and customers in each of the specified zones are purposively sampled. Customers had experience Uber services before and those who may transit between and across each zone are randomly targeted over a period of three months- January 12th to March 15th, 2019. By considering the factors of access, time and resources, 200 respondents were sampled from each zone to obtain a total of 600 respondents. The data are obtained from primary sources through the use of structured questionnaire. Face and content validity of the instrument was done by giving the instrument to research experts, Uber customers and drivers to vet. Cronbach's alpha test of reliability which were found to be reliable with a Cronbach's alpha scores 0.785 for customers' safety and trust (CST), 0.812 for customers' convenience (CCV), 0.834 for price (PRC), 0.878 for drivers' efficiency (DRF) and 0.856 for Uber benefits. The Cronbach's alpha scores were

within the limit in assessing the internal consistency of the entire scale. Pallant (2004) established that reliability scores greater than 0.70 are acceptable. Furthermore, Nunnally and Bernstein (1994) specified that 0.7 - 0.9 to be an acceptable reliability coefficient, thus, the items enjoys internal consistency in this manner reliable.

The data covers information on the demographics of the respondents, customers' safety and trust, customers' convenience, price, drivers' efficiency and frequency of patronage. Data relating to the determinant of demand are captured in Likert scale of 1 to 5 which ranges from strongly agreed to disagree. Data collected are fitted to regression model after descriptive statistics using mean and descriptive statistics. Statistical package for social sciences (SPSS) version 20 was used as the statistical tool to process and analyse the data. The explicit regression model for the study is specified as:

The estimated regression model is given as:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_1$

Where:

Y = is demand for Uber services measured by frequency of patronage

X_{1-4} = the independent variables

X_1 = customers' safety and trust (CST)

X_2 = customers' convenience (CCV)

X_3 = price (PRC)

X_4 = Drivers' efficiency (DRF)

β_0 = intercept

β_{1-4} = parameters to be estimated

ε = error term or stochastic variable

4. Results and Discussion

4.1 Description of benefits provided by Uber in Lagos State

The respondents agreed (4.31) that one of the objectives of Uber, which is to make transportation around town cheaper and more convenient was achieved. There is an agreement (4.26) that with Uber services, customers get from point A to point B with ease. The objective of attaining good level of safety was also achieved. The respondents agreed (3.80) that partnership with safety agents to guarantee minimum safety conditions were made possible with Uber services. However, an important aspect of good transport experience is to have clear cut solutions to freight-booking challenges. Expectedly, Uber service providers are anticipated to provide such services. But, the respondents disagreed that such objective (2.79) has been achieved by Uber service providers.

Table 1: Benefit provided by Uber in Lagos State

S/N	The following Uber objectives have been achieved in Lagos State	FX	Mean	Remark
1.	To make car ownership obsolete by making it cheaper and more convenient to Uber around town than buying and driving your own car.	1725	4.31	Agreed
2.	To help customers get from point A to point B with ease.	1705	4.26	Agreed
3.	To partner with safety advocates and develop new technologies and systems to help create a world where it's safe and easy for everyone to get around.	1520	3.80	Agreed
4.	Creating new freight-booking solutions and helping companies provide a seamless employee travel experience.	1114	2.79	Disagreed

Source: Field survey. 2019.

4.2 Customers' safety and trust in Uber services in Lagos State

Data from Table 2 shows that five out of the six listed items showed a mean score of 3.0 and above. Hence the respondents agreed that Uber services are better than other transport firms in Lagos (4.09); Uber drivers are highly trained and drive with utmost caution. It is safer to ride with (4.32); Uber maintain world class safety measures to avoid road accident (3.92); my luggage is safer in Uber than other transport firms in Lagos I trust (3.67) and Uber more than other transport firms in Lagos (3.76). However, the respondent disagreed that Uber than other transport firms in Lagos (2.83).

Table 2: Description of customers' safety and trust

S/N	Items	FX	Mean (x)	Remark
1.	Uber services are better than other transport firms in Lagos	1635	4.09	Agreed
2.	Uber drivers are highly trained and drive with utmost caution	1727	4.32	Agreed
3.	It's safer to ride with Uber than other transport firms in Lagos	1133	2.83	Disagreed
4.	Uber maintain world class safety measures to avoid road accident	1568	3.92	Agreed
5.	My luggage is safer in Uber than other transport firms in Lagos	1468	3.67	Agreed
6.	I trust Uber more than other transport firms in Lagos	1503	3.76	Agreed

Source: Field Survey, 2019.

4.3 Customers' convenience with Uber services in Lagos State

Data from Table 3 shows that all of six listed items showed a mean score of 3.0 and above. This shows that the respondent agreed that; the customer relationship approach of Uber has encouraged them to patronize Uber (3.56); Uber drivers' friendly gesture have motivated me to continuously use Uber (3.61); Uber vehicles are conducive for short and long trips (3.57); getting Uber services is very quick (4.68); Uber services is very reliable (3.47) and Uber App is user friendly (3.61).

Table 3: Description of customers' convenience

S/N	Items	FX	Mean (x)	Remark
1	The customer relationship approach of Uber has encouraged me to patronize them.	1425	3.56	Agreed
2	Uber drivers' friendly gestures have motivated me to continuously use Uber.	1425	3.56	Agreed
3	Uber vehicles are conducive for short and long trips.	1443	3.61	Agreed
4	Getting Uber services is very quick	1427	3.57	Agreed
5	Uber services is very reliable	1870	4.68	Agreed
6	Uber App is user friendly	1388	3.47	Agreed

Source: Field survey. 2019.

4.4 Perception of service price of Uber patronage in Lagos State

Data from Table 4 shows that five out of the six listed items showed a mean score of 3.0 and above. Hence the respondents agreed that Uber services are affordable (3.86); making short trips with Uber cost much (3.49); making long trips with Uber doesn't cost much (3.28); Uber charges are low (4.03) and Uber has fixed prices (3.87). However, the respondent disagreed that Uber fares are considerate (2.67).

Table 4: Perception of service price of Uber patronage in Lagos State

S/N	Items	FX	Mean (x)	Remark
1	Uber services are affordable	1544	3.86	Agreed
2	Uber fares are considerate	1065	2.67	Disagreed
3	Making short trips with Uber cost much	1397	3.49	Agreed
4	Making long trips with Uber doesn't cost much	1313	3.28	Agreed
5	I patronize Uber because of its low service charges	1611	4.03	Agreed
6	I use Uber because of fixed prices.	1546	3.87	Agreed

Source: Field survey. 2019.

4.5 Drivers' efficiency and Uber services in Lagos State

Data from Table 5 shows that all the six listed items showed a mean score of 3.0 and above. Hence the respondents agreed that Uber drivers are always available when

needed (3.80); Uber drivers are always equipped with information on road situation (3.87); Uber drivers are skilled to navigate congested route (4.32); Uber drivers have excellent customer relations (4.68); Uber drivers get to destinations on time (3.86) and Uber drivers make long and short trips worthwhile (3.28).

Table 5: Extents to which drivers' efficiency have determined the demand for Uber services in Lagos State

S/N	Item	FX	Mean (x)	Remark
1	Uber drivers are always available when needed	1520	3.80	Agreed
2	Uber drivers are always equipped with information on road situation.	1547	3.87	Agreed
3	Uber drivers are skilled to navigate congested route.	1727	4.32	Agreed
4	Uber drivers have excellent customer relations	1468	3.67	Agreed
5	Uber drivers get to destinations on time	1425	3.56	Agreed
6	Uber drivers make long and short trips worthwhile	1427	3.57	Agreed

Source: Field survey. 2019.

4.6 Determinants of demand for Uber services

The results of estimation of determinants of demand for Uber services are presented in Table 6. The diagnostics of the model such as the F-value is significant suggesting the appropriateness of the specification. The R-square value of 0.533 suggests that 53.3% of the variation in the dependent variables is explained by the included variables. The parameter estimates of the model show that customer safety and trust (CST) is positive and significantly ($\beta = 0.618$, $t = 1.828$) related to demand for Uber services in Lagos State at 10% level of significance. The result suggests that a unit increase in the level of safety and trust of the customers, demand for Uber services is expected to increase by 0.618. Parameter of customers' convenience is also positive and significant ($P < 0.05$), indicating direct relationship between customers' convenience and demand for Uber service. The more the level of convenience experienced by the consumers, the more the expected level of demand for the service. Similarly, price perception of customers and driver's efficiency also exerts positive and significant effect ($P < 0.05$) on demand for Uber services.

Table 6: Determinants of demand for Uber services

	Coefficient	Std. Error.	t-value	Remark
CST	0.618	0.174	1.828	Significant
CCV	0.711	0.204	3.485	Significant
PRC	0.522	0.145	3.601	Significant
DRF	0.826	0.294	2.809	Significant
Constant	0.518	0.123	4.211	Significant
R-square = 0.533				
Adjusted R-square = 0.507				
F value = 11.04				
P value = 0.00				

4.7 Discussion of Result

The result of the analysis indicates that the four variables (customers' safety and trust, customers' convenience, price and drivers' efficiency) are determinants for demand of Uber services in Lagos State. Findings show that customers' safety and trust is a determinant for demand of Uber services in Lagos State. This impact is in the area of safety measures and luggage management. The findings also show that customers' convenience is a determinant for demand of Uber services in Lagos State. This impact is in the area of customer relationship approach, service delivery and Uber App which is user friendly. Furthermore, findings show that there is a relationship between price and Uber patronage in Lagos State. Uber customers patronize Uber since they believe that Uber services are affordable and considerate. This finding aligns with Lam and Liu (2017) that 64% of welfare gains come from dynamic pricing used by Uber platforms. In addition, findings show that drivers' efficiency is a determinant for demand of Uber services in Lagos State. The efficiency is in the area of drivers' availability, excellent customer relations, and making trips a worthwhile experience. This finding aligns with Marten (2015) that past transportation behaviour, cost of transportation, and duration of transportation are influential in determining Uber services demand.

5. Conclusion and Policy Implications

The conclusion from this study is that drivers' efficiency, customers' convenience, customers' safety and trust and price are the revealed determinants of Uber patronage in Lagos metropolis. Contrary to the expectation, price is not the most influential factors of Uber patronage but the efficiency of the drivers followed by the customers' convenience, customers' safety and trust. This suggests that Uber customers give more preference to ability of the driver to take them to their destination within the shortest possible time. The policy implication is that government should provide a more efficient means of public transportation to residents of Lagos as this will go a long way

to increasing the productivities of working population in the city. The study also recommends that stakeholders in private transportation business such Uber should augment training of drivers towards the determinants of Uber`s service patronage as suggested by the study, in order to enhance the sustainability of their businesses through increase customer patronage.

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