

The Ride-Hailing Mobile Application for Personalized Travelling

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Abstract

The advancement of smartphones, global positioning system, and information technologies have a great influence on our travelling preferences and behaviour, dynamically shaping the transportation industry. In addition to providing convenience to the riders, it also has created some debate among the stakeholders, including the policy makers. This paper presents a quantitative study of Taxi service experience in Jordan. The aim of the study is to evaluate Jordanians' experiences with yellow taxi services, assess their opinion toward advantages and disadvantages of Uber taxi services in Jordan and obtain opinions on the expected future of Uber taxi services.

Keywords: ride sharing, ride-sourcing, ride-splitting, smartphone-enabled applications, third-party taxi services, transportation, quantitative study, GPS, GIS, Information System

1. Introduction

Taxis can play an important role to provide a personalised point- to-point transportation service, especially in the urban areas. Effective taxi services can significantly reduce the number of private cars on the road (Jha et al., 2018). The technological advancements in the industry of transportation and mobile devices have paved the way for smartphone enabled ride-hailing services (Maqableh & Karajeh, 2014). Initially such services used to be referred as ride-sharing or peer-to-peer mobility services. California Public Utilities Commission (2013) stated such services to be referred as transportation network companies. However, they are still colloquially known as ride sharing, ridesourcing, ride-splitting or ride-haling services. In 2009, Uber emerged as of the first service to provide such facilities ("Uber," 2018).

1.1 Uber as a Ride-Hailing Application

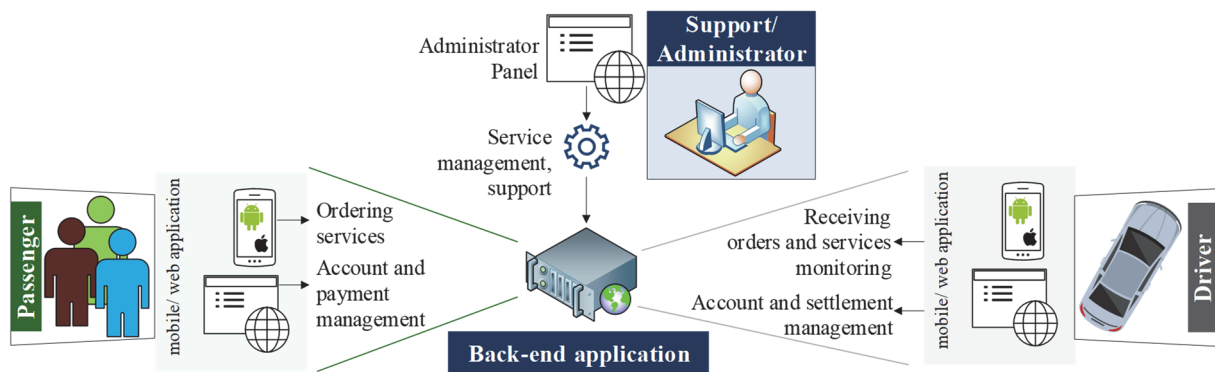


Figure 1. Uber mechanism

The Uber technology platform aids the driver-partners and the riders to be connected through a smartphone application. The mechanism is illustrated in Figure 1 (Wegner, 2017). The rider can use the application using passenger's account to request a ride in the Uber-cities. In response, when a neighboring driver-partner accepts the

request, the application lets the rider know a projection of arrival time to the passenger's location. The application also updates the rider when the driver-partner is almost near to the location. Unlike the traditional taxi, as the Uber cars do not possess any distinctive visual appearance, the application also provides few valuable information to the rider such as the type of the vehicle, license plate number, approved information regarding driver's identity to facilitate the rider to identify the driver-partner at pickup location.

The rider has the freedom to express the preference about route course to the destination. The destination can be specified through the application prior or during the journey. The journey is terminated at the destination point, followed by automatic calculation of the fare. The cost is payable in the rider-defined method, which varies in different Uber-cities. However, the payment method needs to be specified before sending a ride-request. The Uber-technology initiated a bidirectional user evaluation system. Therefore, the rider as well as the driver-partner can appraise the experience at the termination of the journey inspiring a social movement.

Globally, there are 75 million people who uses the Uber ride-hailing mobile application (Bhuiyan, 2018). There are 3 million Uber drivers. Uber is being used in 65 countries, over 600 cities. Uber reported to provide 10 million rides per day ("Uber," 2018). In 2016, Uber's share of the ride-hailing market in US was near 85% (Hartmans, 2016).

In spite of being a promising start-up, Uber is facing many challenges. The foremost challenge facing Uber is common to all forms of mechanisation since the 19th century Luddites: the (justified) fear that technological improvements take away people's livelihoods. Taxi drivers are the recognisable victims in the case of Uber. Traditional or yellow taxi drivers generally undergo additional training in driving and are subject to regulations and criminal background checks etc.; conversely, Uber has traditionally had an open-door policy in terms of who it allows to drive its passengers. This is inherently disadvantageous to traditional taxi drivers and firms, and indeed detrimental to passenger safety, regardless of employment issues (Zhao, Dimovitz, Staveland, & Medsker, 2016). However, the most vocal opposition to Uber has been on the grounds of employment (i.e. taxi drivers losing their jobs), which was the main rationale for some countries and municipalities banning the service (Gerdes & Thornton, 2015). The global taxi business developed over centuries (e.g. from horse-drawn hackney cabs in Victorian London) and is a major economic sector in its own right, generating employment for millions of people worldwide and producing large revenues, all of which is threatened by Uber.

Furthermore, Uber drivers are also increasingly concerned about their employment rights, as they do not in fact have the protections enjoyed by conventional employees; as a result of legal agitation, Uber was forced to pay substantial sums to about 400,000 cab drivers worldwide (Gerdes & Thornton, 2015). Uber seeks to view Uber drivers and subcontracting parties in a transaction between itself and passengers, but regulatory bodies and drivers themselves are increasingly wary of allowing Uber to escape the conventional expectations of taxi companies toward their employees by exploiting its aberrant technological advantage in following what is otherwise a traditional taxi business model.

Indeed, Uber's aggressive and predatory policies, such as its callous disregard for the livelihoods of yellow cab and Uber taxi drivers, indicate an ethical void at the heart of globalised business culture stemming from an outdated utilitarian vision of capitalist exploitation for short-term economic gain that is increasingly unfit for the purposes of the 21st century globalised world (Valladão, 2016).

1.2 Jordan as a Case Study

The Hashemite Kingdom of Jordan, located in southwest Asia, is bounded on the north by Syria, the east by Iraq, the southeast by Saudi Arabia and from the west by Palestine (Ministry of Tourism and Antiquities, 2017). The population in Jordan in 2016 was estimated at 9.7 million, having increased exponentially from under 600,000 in 1952. Jordan's unemployment rate for 2016 rose by 1.6% to reach 15.3% (GOS, 2017). The results of the Employment and Unemployment Survey for 2016 showed that illiterate young people constituted a small percentage of 0.8%; the results also indicate that 96% of young people are enrolled in study. The average wage in 2014 for both males and females was approximately \$8,000 p.a., about 14 percent of which is spent on transportation (Iman, 2014).

Jordan has a wide network of roads linking the northern, southern, eastern and western sides. Amman, the capital city of Jordan, is one of the fastest-growing and most densely populated cities in the Middle East, containing over a third of the Jordanian population. There are few buses operating in Amman, but they cover the main routes and fares are cheap. Buses are the most prevalent form of transport between cities, but taxis are the most common within cities. The normal taxi is yellow or grey, called a momayaz, which is considered a "special taxi" with additional services that the passenger can order, which is very popular in the streets of Amman (Ministry of Tourism and Antiquities, 2017). However, in recent years the quality of taxi services and customer satisfaction has

steadily declined (Iman, 2014).

This has made Amman ripe for penetration by Uber and similar services seeking to meet public demand for efficient taxi services, and the population rapidly embraced Uber, invoking the anger and consternation of the yellow cab drivers disenfranchised from their traditional monopoly. However, the lack of existing research about this subject inspired the undertaking of this study to fill the gap in the literature and provide useful recommendations for main stakeholders.

2. Literature Review

There are number of patents for the ride hailing mechanism (US9157748B2, 2013, US9488494B2, 2015, US9934691B2, 2016). In the recent literature, considerable amount of focus has been provided to the economic perspective of the ride-hailing applications (Chen & Sheldon, 2016; Kim, Baek, & Lee, 2018; Lee, Park, & Lee, 2018; Zha, Yin, & Du, 2017; Zha, Yin, & Yang, 2016). Few studies have been also conducted on the social aspects of this shared economy (Peticca-Harris, Degama, & Ravishankar, 2018; Smith & McCormick, 2019).

Having a great influence on the personalised travel mode in US market, studies have been conducted on cities such as New York (Salnikov, Lambiotte, Noulas, & Mascolo, 2015), Washington DC, (Yang et al., 2018), Atlanta (Wang & Mu, 2018) and San Francisco (Glöss, McGregor, & Brown, 2016).

In literature, the implications of Uber in the urban transportation system has been studied for metropolitan cities e.g. London (Glöss et al., 2016), Toronto (Haider, Donaldson, & Nourinejad, 2015), Delhi (Kashyap, 2018). Studies have been also heightened DiDi- another strong company in the ride-hailing industry (Jacquet, 2018; Jiang, Chen, Mislove, & Wilson, 2018; Zhang, Guo, Li, & Liu, 2016).

To the best of authors' knowledge, there is no existing study that can illustrate how these ride-hailing applications are affecting the personalised travelling experience in Jordan. Imam (2014) studied the methodological issues pertaining to the investigation of satisfaction with public transportation in Amman. The key finding from the study revealed that, in general, passengers are not satisfied from public transportation in Amman, and the author recommended that extensive work is needed to overhaul and improve the system to solve endemic and serious problems like congestion, accidents, noise, air pollution and fuel consumption. Therefore, there is a need of elaborate study on travel experience and behaviour which can help the policy makers to create a harmony in the disrupted traditional transportation industry while providing a better service to its citizens.

3. Research Design and Methodology

Based on the preliminary finding from our qualitative study using focus group, we designed the questionnaire using a five-point Likert scale to efficiently quantify the opinions of passengers about using taxis in Jordan. The simplicity and low cost of this method are additional advantages to its ability to quickly glean quality data from large groups of people, and the data can be easily analysed used statistical packages such as SPSS. A pilot study was conducted to test that participants could understand all items and to invite any feedback prior to actually conducting the study fieldwork (Landau & Everitt, 2004).

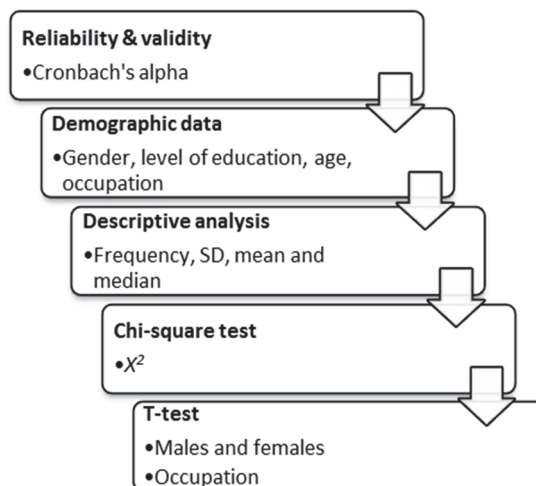


Figure 2. Questionnaire data analysis process

The use of a five-point Likert scale for the questionnaire meant that the data was easy to process digitally using

advanced analysis options in SPSS or standard spreadsheets in MS Excel. The collected data reliability can be tested, and descriptive statistic data can be presented according to each question in the questionnaire; graphs can be generated and advanced statistical test can be performed to compare between deferent group and questions (Creswell, 2003). Figure 1 shows the process of analysing data from the questionnaire.

3.1 Reliability and Validity Testing

The reliability was calculated using Cronbach's alpha equation:

$$\text{Reliability coefficient} = \frac{n}{N-1} * \frac{1 - \text{Totalvariationsquestions}}{\text{variationcollegegrades}} \quad (1)$$

3.2 Demographic Data

Analysis of gender, level of education, age group and occupation was important to present general information related to participants as well as to provide good grounds to make categories to conduct comparison and test any differences between different groups (e.g. male and female, level of education, age group and occupation).

3.3 Descriptive Analysis

This part of test was conducted to obtain a general view on the collected votes on each item within each list and translate that into strongly agree, agree, neutral, disagree and strongly disagree.

3.4 Chi-Square Test

Chi-square Test is useful to test whether the distribution of data between the voters is significantly different.

3.5 T-Test

T-test was conducted twice in order to see if the responses between different groups were of statistical significance. It was performed between males and females, T-test between usage categorisation (frequent or occasional) and ANOVA test between four groups of users (1 to 10, 11 to 20, 21 to 30 and >30, known as sections 1-4 respectively).

3.6 ANOVA Test

One-way analysis of variance (ANOVA) was conducted to see if there were significant differences between four groups of users (sections 1-4).

4. Results and Discussion

4.1 Data Collection and Pilot Study

Before the formal data collection, the survey was filled by five volunteers in order to gather feedback on structure, clarity of statements, grammatical mistakes or any deficiencies that might have negatively effects on data analysis or findings. Moreover, the pilot study yielded an indication of how the results might be presented.

The general information about participants including gender, age group, occupation and frequency of taxi use were collected. The questionnaire was electronically distributed to nearly 400 people and 148 completed responses were received, representing a response rate of 37%. The key objective of this study was to gather sufficient responses regarding the identified factors.

4.2 Data Analysis

4.2.1 Cronbach's Alpha

Cronbach's alpha was used in order to make sure the collected data is reliable and can be depended upon in subsequent analysis to provide suitable grounds for making conclusions. A Cronbach's alpha coefficient from Eq. 1 of (0.90) indicates high reliability and the stability of the scale and the validity of the study. The validity coefficient (the square of the islands) is (0.95), which shows that the scale is authentic and beneficial in relation to the studied phenomena.

4.2.2 Demographic Data

The demographic information can be visualised from Figure 2. The gender distribution is not heavily imbalanced. Figure 2 illustrates the view of the distribution of the sample by male (58.1%) and female (41.9%).

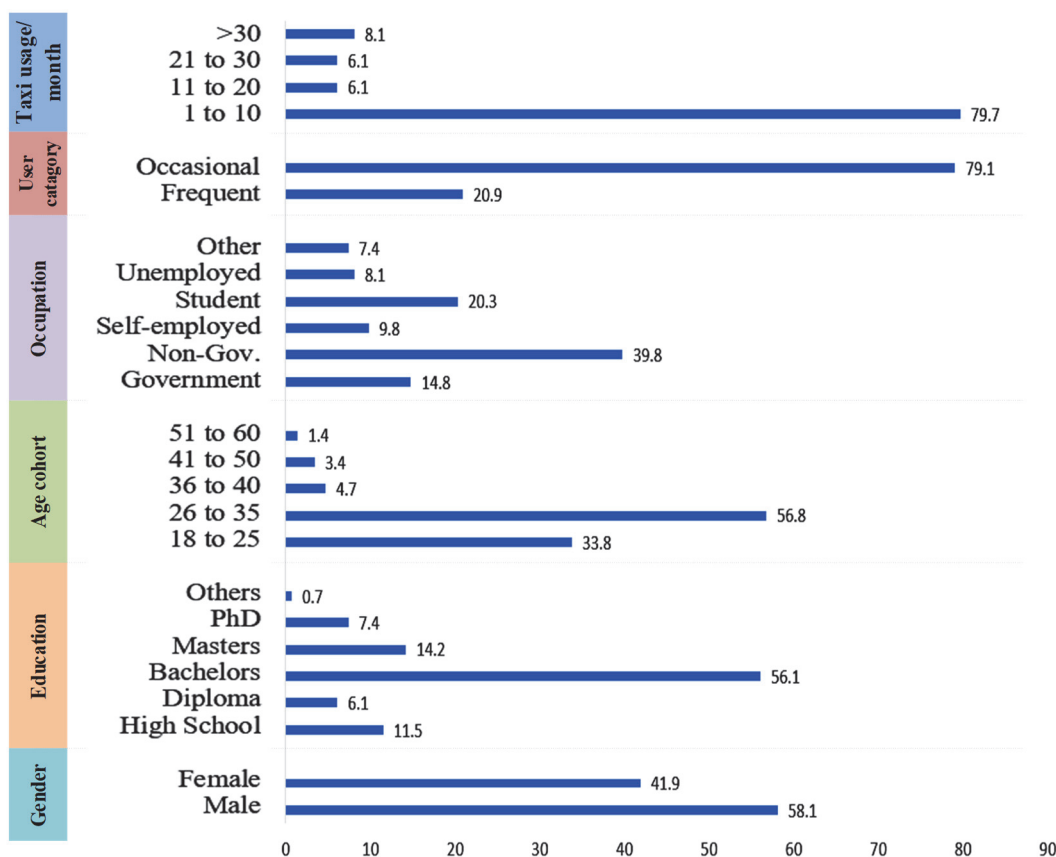


Figure 3. Demographic information

The distribution of the sample by education according was High School (11.5%), Diploma (6.1%), BSc (56.1%), MSc (14.2%), PhD (7.4%) and other (0.7%). Most of our samples represents younger demographic. The distribution of the sample by age cohort: 18 to 25 (33.8%), 26 to 35 (56.8%), 36 to 40 (4.7%) and 41 to 50 (3.4%) and 51 to 60 (1.4%). The occupation of the participants can be categorised as: government (14.8%), non-government (39.8%), self-employed (9.8%), student (20.3%), unemployed (8.1%) and other (7.4%).

Most of our participants were occasional taxi users (79.1%). Only 20.9% of the sample are frequent taxi users. The distribution of monthly usage of taxi services of the sample can be viewed from Figure 2 as 1 to 10 (79.7%), 11 to 20 (6.1%), 21 to 30 (6.1%), student (20.3%) and >30 (8.1%).

4.3 Experience with Yellow Taxis

Table 1 illustrates the frequencies for respondents' answers concerning their experience with yellow taxis before Uber. Table 2 illustrates Chi-square test results for respondents' answers about their experiences with yellow taxis before Uber.

Table 1. Experiences with taxis before Uber

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I have to walk some distance to catch a yellow taxi	56 37.8	21 14.2	37 25.0	24 16.2	10 6.8
2. Yellow taxi drivers are sometimes picky; I prefer young drivers or individuals without family luggage	70 47.3	30 20.3	24 16.2	14 9.5	10 6.8

3. Yellow taxi drivers sometimes refuse to go to some destinations or routes	92	27	12	10	7
	62.2	18.2	8.1	6.8	4.7
4. Some yellow taxi drivers are rude	57	39	34	11	7
	38.5	26.4	23.0	7.4	4.7
5. Some yellow taxi drivers ask for higher fare/payment or do not use the meter	52	38	33	18	7
	35.1	25.7	22.3	12.2	4.7
6. Some yellow taxi drivers get other passengers to share with you to maximise their income	40	28	38	30	12
	27.0	18.9	25.7	20.3	8.1
7. Some yellow taxi drivers drive carelessly	39	42	40	21	6
	26.4	28.4	27.0	14.2	4.1
8. Some yellow taxis are dirty or poorly maintained	48	42	36	14	8
	32.4	28.4	24.3	9.5	5.4
9. It is difficult to find yellow taxis at night	59	42	27	15	5
	39.9	28.4	18.2	10.1	3.4
10. Some yellow taxi drivers obstruct or do not display their information card	48	46	29	15	10

Table 2. Chi-square testing for experiences with yellow taxis before Uber

Statement	Chi-square	Df	Sig.	Median	Scale
1. I have to walk some distance to catch a yellow taxi	33.597	4	0.000	4.00	Agree
2. Yellow taxi drivers are sometimes picky; I prefer young drivers or individuals without family luggage	59.178	4	0.000	4.00	Agree
3. Yellow taxi drivers sometimes refuse to go to some destinations or routes	132.667	4	0.000	5.00	Strongly agree
4. Some yellow taxi drivers are rude	47.085	4	0.000	4.00	Agree
5. Some yellow taxi drivers ask for higher fare/payment or do not use the meter	33.442	4	0.000	4.00	Agree
6. Some yellow taxi drivers get other passengers to share with you to maximise their income	14.062	4	0.000	3.00	Neutral
7. Some yellow taxi drivers drive carelessly	25.147	4	0.000	4.00	Agree
8. Some yellow taxis are dirty or poorly maintained	35.147	4	0.000	4.00	Agree
9. It is difficult to find yellow taxis at night	52.822	4	0.000	4.00	Agree
10. Some yellow taxi drivers obstruct or do not display their information card	36.620	4	0.000	4.00	Agree

The key findings from Table 2 can be interpreted as follows:

1. The Chi-square value for the statement I have to walk some distance to catch a yellow taxi was (33.597) with P-value (0.000), which is lower than the level of significance (5%).
2. The Chi-square value for the statement yellow taxi drivers are sometimes picky; I prefer young drivers or individuals without family luggage was (59.178) with P-value (0.000), which is lower than the level of significance (5%).
3. The Chi-square value for the statement yellow taxi drivers sometimes refuse to go to some destinations or routes was (132.667) with P-value (0.000), which is lower than the level of significance (5%).

4. The Chi-square value for the statement some yellow taxi drivers are rude was (47.085) with P-value (0.000), which is lower than the level of significance (5%).
5. The Chi-square value for the statement some yellow taxi drivers ask for higher fare/payment or do not use the meter was (33.442) with P-value (0.000), which is lower than the level of significance (5%).
6. The Chi-square value for the statement some yellow taxi drivers get other passengers to share with you to maximise their income was (14.062) with P-value (0.000), which is lower than the level of significance (5%).
7. The Chi-square value for the statement some yellow taxi drivers drive carelessly was (25.147) with P-value (0.000), which is lower than the level of significance (5%).
8. The Chi-square value for the statement some yellow taxis are dirty or poorly maintained was (35.147) with P-value (0.000), which is lower than the level of significance (5%).
9. The Chi-square value for the statement it is difficult to find yellow taxis at night was (52.822) with P-value (0.000), which is lower than the level of significance (5%).
10. The Chi-square value for the statement some yellow taxi drivers obstruct or do not display their information card was (36.620) with P-value (0.000), which is lower than the level of significance (5%).

There is consensus on the main issues regarding yellow taxis in Jordan. Nine out of ten of the listed points were agreed upon; there was a neutral response to some yellow taxi drivers gets other passengers to share with you to maximize their income. Hence, it can be concluded that participants reported a high level of dissatisfaction with the yellow taxi services in Amman, corroborating findings our earlier study as well. Therefore, that might be seen as one of the driving factors for the quick deployment of Uber taxi services in Jordan as a good option for Jordanians to have quality taxi services.

4.4 Disadvantages of Uber Taxi Services

Table 3 displays respondents’ answers about the disadvantages of Uber taxi services. Table 4 shows the Chi-square test results for respondents’ answers about the disadvantages of Uber taxi services.

Table 3. Disadvantages of Uber taxi services

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. Subject to satellite navigation/GPS error, mainly in urban environments	10 6.8	19 12.8	50 33.8	45 30.4	24 16.2
2. Relatively more expensive than yellow taxis	41 27.7	32 21.6	40 27.0	24 16.2	11 7.4
3. Being unregulated is an issue	30 20.3	29 19.6	40 27.0	25 16.9	24 16.2
4. Cultural or social norms makes it a challenge for both drivers and passengers	19 12.8	25 16.9	43 29.1	22 14.9	39 26.4
5. Card payment option can be seen as a challenge	16 10.8	24 16.2	39 26.4	24 16.2	45 30.4
6. Drivers may lack experience	22 14.9	16 10.8	48 32.4	28 18.9	34 23.0
7. Sharing information might be seen as an issue by some people	21 14.2	29 19.6	49 33.1	23 15.5	26 17.6
8. Car and passenger insurance might concern some passengers	23 15.5	25 16.9	53 35.8	19 12.8	28 18.9
9. Parking or waiting areas in public places might be an issue	25 16.9	25 16.9	50 33.8	25 16.9	23 15.5
10. Uber taxi drivers might be challenged by or clash with yellow taxi drivers/owners	39 26.4	32 21.6	46 31.1	17 11.5	14 9.5

Table 4. Chi-square testing for disadvantages of Uber taxi services

Statement	Chi-square	Df	Sig.	Median	Scale
1. Subject to satellite navigation/GPS error, mainly in urban environments	38.171	4	0.000	3.00	Neutral
2. Relatively more expensive than yellow taxis	15.147	4	0.000	3.00	Neutral
3. Being unregulated is an issue	3.984	4	0.000	3.00	Neutral
4. Cultural or social norms makes it a challenge for both drivers and passengers	16.233	4	0.000	3.00	Neutral
5. Card payment option can be seen as a challenge	22.202	4	0.000	2.00	Neutral
6. Drivers may lack experience	23.209	4	0.000	3.00	Neutral
7. Sharing information might be seen as an issue by some people	12.589	4	0.000	3.00	Neutral
8. Car and passenger insurance might concern some passengers	21.349	4	0.000	3.00	Neutral
9. Parking or waiting areas in public places might be an issue	12.977	4	0.000	3.00	Neutral
10. Uber taxi drivers might be challenged by or clash with yellow taxi drivers/owners	22.124	4	0.000	3.00	Neutral

The results of Table 4 can be interpreted as follows:

1. The Chi-square value for the statement subject to satellite navigation/GPS error, mainly in urban environments was (38.171) with P-value (0.000), which is lower than the level of significance (5%).
2. The Chi-square value for the statement relatively more expensive than yellow taxis was (15.147) with P-value (0.000), which is lower than the level of significance (5%).
3. The Chi-square value for the statement being unregulated is an issue was (3.984) with P-value (0.000), which is lower than the level of significance (5%).
4. The Chi-square value for the statement cultural or social norms makes it a challenge for both drivers and passengers was (16.233) with P-value (0.000), which is lower than the level of significance (5%).
5. The Chi-square value for the statement card payment option can be seen as a challenge was (22.202) with P-value (0.000), which is lower than the level of significance (5%).
6. The Chi-square value for the statement drivers may lack experience was (23.209) with P-value (0.000), which is lower than the level of significance (5%).
7. The Chi-square value for the statement sharing information might be seen as an issue by some people was (12.589) with P-value (0.000), which is lower than the level of significance (5%).
8. The Chi-square value for the statement car and passenger insurance might concern some passengers was (21.349) with P-value (0.000), which is lower than the level of significance (5%).
9. The Chi-square value for the statement parking or waiting areas in public places might be an issue was (12.977) with P-value (0.000), which is lower than the level of significance (5%).
10. The Chi-square value for the statement Uber taxi drivers might be challenged by or clash with yellow taxi drivers/owners was (22.124) with P-value (0.000), which is lower than the level of significance (5%).

The participants reflected neutral opinions on the ten listed disadvantages of Uber taxi services, in contrast to previous literature, specifically being unregulated is an issue, more expensive than yellow taxi and insurance might be a concern for some passengers). The only possible justification for this is that the high level of dissatisfaction with yellow taxi services and the low level of competition cause Jordanians to see the disadvantages of Uber as irrelevant. Furthermore, Jordanian might accept the expense of Uber taxi services, as some yellow taxi drivers might overcharge. In addition, Jordanians might use unregulated Uber taxi services as it is often difficult to find a yellow taxi. Finally, Jordanians might see modern Uber vehicles as a safer option than yellow taxis.

4.5 Advantages of Uber Taxi Services

Table 5 displays respondents' answers about the advantages of Uber taxi services.

Table 5. Advantages of Uber taxi services

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. It offers a good way to plan my journey	68	32	29	9	10
	45.9	21.6	19.6	6.1	6.8
2. It provides anytime, anywhere services	81	29	21	14	3
	54.7	19.6	14.2	9.5	2.0
3. New and well-maintained cars	76	36	23	10	3
	51.4	24.3	15.5	6.8	2.0
4. Likely to have kind and polite driver	53	44	34	12	5
	35.8	29.7	23.0	8.1	3.4
5. Options to choose from available listed drivers and cars	45	35	43	19	6
	30.4	23.6	29.1	12.8	4.1
6. Follows global standards	50	32	44	19	3
	33.8	21.6	29.7	12.8	2.0
7. It enables ranking for both passengers and drivers	59	39	33	14	3
	39.9	26.4	22.3	9.5	2.0
8. It helps people to have the option not to use private cars all the time and travel with taxis	56	36	34	16	6
	37.8	24.3	23.0	10.8	4.1
9. It offers people another transport option when they are unable to drive (e.g. for medical reasons)	62	39	28	14	5
	41.9	26.4	18.9	9.5	3.4
10. It helps in solving unemployment issues and helps offer supplementary income to some	76	33	23	12	4
	51.4	22.3	15.5	8.1	2.7

Table 6 shows the Chi-square test results for respondents' answers about the advantages of Uber taxi services.

Table 6. Chi-square testing for advantages of Uber taxi services

Statement	Chi-square	Df	Sig.	Median	Scale
1. It offers a good way to plan my journey	58.403	4	0.000	4.00	Agree
2. It provides anytime, anywhere services	113.674	4	0.000	5.00	Strongly agree
3. New and well-maintained cars	92.589	4	0.000	5.00	Strongly agree
4. Likely to have kind and polite driver	44.062	4	0.000	4.00	Agree
5. Options to choose from available listed drivers and cars	33.054	4	0.000	4.00	Agree
6. Follows global standards	40.419	4	0.000	4.00	Agree
7. It enables ranking for both passengers and drivers	48.326	4	0.000	4.00	Agree
8. It helps people to have the option not to use private cars all the time and travel with taxis	41.116	4	0.000	4.00	Agree
9. It offers people another transport option when they are unable to drive (e.g. for medical reasons)	51.736	4	0.000	4.00	Agree
10. It helps in solving unemployment issues and helps offer supplementary income to some	83.442	4	0.000	5.00	Strongly agree

The results of Table (6) can be interpreted as follows:

1. The Chi-square value for the statement *it offers a good way to plan my journey* was (58.403) with P-value (0.000), which is lower than the level of significance (5%).
2. The Chi-square value for the statement *it provides anytime, anywhere services* was (113.674) with P-value (0.000), which is lower than the level of significance (5%).
3. The Chi-square value for the statement *new and well-maintained cars* was (92.589) with P-value (0.000), which is lower than the level of significance (5%).

4. The Chi-square value for the statement *likely to have kind and polite driver* was (44.062) with P-value (0.000), which is lower than the level of significance (5%).
5. The Chi-square value for the statement *options to choose from available listed drivers and cars* was (33.054) with P-value (0.000), which is lower than the level of significance (5%).
6. The Chi-square value for the statement *follows global standards* was (40.419) with P-value (0.000), which is lower than the level of significance (5%).
7. The Chi-square value for the statement *it enables ranking for both passengers and drivers* was (48.326) with P-value (0.000), which is lower than the level of significance (5%).
8. The Chi-square value for the statement *it helps people to have the option not to use private cars all the time and travel with taxis* was (41.116) with P-value (0.000), which is lower than the level of significance (5%).
9. The Chi-square value for the statement *it offers people another transport option when they are unable to drive (e.g. for medical reasons)* was (51.736) with P-value (0.000), which is lower than the level of significance (5%).
10. The Chi-square value for the statement *it helps in solving unemployment issues and helps offer supplementary income to some* was (83.442) with P-value (0.000), which is lower than the level of significance (5%).

As expected, participants agreed on seven of the listed advantages and strongly agreed on three of them: it provides anytime, anywhere services, new and well-maintained cars and it helps in solving unemployment issues and helps offer supplementary income to some. The first two are natural reflections of the situation presented in the preceding two sections, while the third point is linked with the economic difficulties of Jordan which compel people to seek second job opportunities to cope with the high cost of living and/or to pay their car instalments.

4.6 Future of Uber in Jordan

Table 7 displays respondents’ answers about the future of Uber taxi services.

Table 7. The future of Uber taxi services

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. It will be regulated by government in the near future	63 42.6	23 15.5	37 25.0	17 11.5	8 5.4
2. Uber will bring prices down and attract more passengers	56 37.8	35 23.6	35 23.6	16 10.8	6 4.1
3. Yellow taxi drivers/owners will start using similar applications, which will make it harder for competitors	42 28.4	31 20.9	41 27.7	24 16.2	10 6.8
4. Uber taxi services should be allowed but the number of Uber cars should be controlled	43 29.1	35 23.6	40 27.0	18 12.2	12 8.1
5. Uber or similar technologies are the future	68 45.9	35 23.6	25 16.9	14 9.5	6 4.1

Table 8 shows the Chi-square test results for respondents’ answers about the future of Uber taxi services.

Table 8. Chi-square testing for future of Uber taxi services

Statement	Chi-square	Df	Sig.	Median	Scale
1. It will be regulated by government in the near future	56.775	4	0.000	4.00	Agree
2. Uber will bring prices down and attract more passengers	46.698	4	0.000	4.00	Agree
3. Yellow taxi drivers/owners will start using similar applications, which will make it harder for competitors	16.853	4	0.000	3.00	Neutral
4. Uber taxi services should be allowed but the number of Uber cars should be controlled	21.194	4	0.000	4.00	Agree
5. Uber or similar technologies are the future	60.961	4	0.000	4.00	Agree

The results of Table 8 can be interpreted as follows:

1. The Chi-square value for the statement *it will be regulated by government in the near future* was (56.775) with P-value (0.000), which is lower than the level of significance (5%).
2. The Chi-square value for the statement *Uber will bring prices down and attract more passengers* was (46.698) with P-value (0.000), which is lower than the level of significance (5%).
3. The Chi-square value for the statement *yellow taxi drivers/owners will start using similar applications, which will make it harder for competitors* was (16.853) with P-value (0.000), which is lower than the level of significance (5%).
4. The Chi-square value for the statement *Uber taxi services should be allowed but the number of Uber cars should be controlled* was (21.194) with P-value (0.000), which is lower than the level of significance (5%).
5. The Chi-square value for the statement *Uber or similar technologies are the future* was (60.961) with P-value (0.000), which is lower than the level of significance (5%).

It seems that participants are optimistic about the future of Uber in Jordan, seeing Uber or similar technologies as the future, and they expected it to be regulated by government and to reduce prices. However, they are in the favour of controlling the number of Uber cars. On the other hand, participants seem to be cautious about the future of yellow taxi services by expressing a neutral position about yellow taxi drivers/owners starting to use similar applications.

Deeper analysis revealed that there are no substantive differences in responses between male and female participants, type and level of Uber taxi usage; consequently, there is a high level of agreement among participants.

4.7 Statistical Analysis

In order to check if results might vary according to participants, three more statistical tests were conducted: T-test between males and females, T-test between usage categorisation (frequent or occasional) and ANOVA test between four groups of users (1 to 10, 11 to 20, 21 to 30 and >30).

4.7.1 T-Test for Gender

Table 9. T-test for gender

Section	Sex	N	Mean	SD	T	Df	Sig.
1 (1-10)	Female	62	3.73	0.890	-0.920	146	0.35
	Male	86	3.86	0.870			
2 (11-20)	Female	62	2.97	0.768	-0.247	146	0.80
	Male	86	3.00	0.797			
3 (21-30)	Female	62	3.89	0.977	-0.735	146	0.46
	Male	86	4.00	0.881			
4 (>30)	Female	62	3.71	1.014	0.072	146	0.94
	Male	86	3.70	0.995			

Analysing T-test result for gender (Table 9), it can be observed that section 1 (1 to 10) was (-0.920) with a significance value of (0.35), which is more than the level of significance (5%). The section 2 (11-20) was (-0.247)

with a significance value of (0.80), which is more than the level of significance (5%). The section 3 (21-30) was (-0.735) with a significance value of (0.46), which is more than the level of significance (5%). The section 4 (>30) was (-0.072) with a significance value of (0.94), which is more than the level of significance (5%).

4.7.2 T-Test for Taxi User Category

The T-test result for taxi user category (Table 10), section 1 (1 to 10) was (0.442) with a significance value of (0.65), which is more than the level of significance (5%).

Table 10. T-test for taxi user category

Section	Service	N	Mean	SD	T	Df	Sig.
1 (1-10)	Primary	117	3.82	0.857	0.442	146	0.65
	Secondary	31	3.74	0.965			
2 (11-20)	Primary	117	3.01	0.782	0.665	146	0.50
	Secondary	31	2.90	0.790			
3 (21-30)	Primary	117	3.97	0.895	0.554	146	0.58
	Secondary	31	3.87	1.024			
4 (>30)	Primary	117	3.74	0.984	0.966	146	0.33
	Secondary	31	3.55	1.060			

The section 2 (11 to 20) was (0.665) with a significance value of (0.50), which is more than the level of significance (5%). The T-test result for taxi user category, section 3 (21 to 30) was (0.554) with a significance value of (0.58), which is more than the level of significance (5%). The section 4 (>30) was (0.966) with a significance value of (0.33), which is more than the level of significance (5%).

4.7.3 ANOVA Test between Four User Groups

ANOVA was performed for the four sections of user groups (1 to 10, 11 to 20, 21 to 30 and >30). The value of (f) test calculated to signify the differences between the numbers of individuals of the study was (0.195) with a significance value of (0.659), which is more than the level of significance (5%).

Table 11. ANOVA between four user groups

Source of Variance	Sum of Squares	Df	Mean square	F	Sig.
Between groups	0.151	1	0.151	0.195	0.659
Within groups	113.166	146	0.775		
Total	113.318	147			

Table 12. Descriptive statistics between four user groups

Valid	N	Range	Mean	SD
1 to 10	118	4	3.80	0.878
11 to 20	9	4	2.99	0.782
21 to 30	9	4	3.95	0.921
>30	12	4	3.70	1.000

5. Limitations and Scope of Future Work

Due to the lack of public research on Uber taxi services in Jordan, the literature review was limited to works available in the public domain and reviews of studies conducted in other countries which might not share the same circumstances as Jordan.

Due to the limited time frame to perform data collection, the number of questionnaire responses gathered was 148; while this is respectable, more responses would have conferred greater strength on the findings.

The study was targeted only to passengers; input from other stakeholders would help in obtaining a more comprehensive overview of Uber taxi services.

There are few future recommendations as follows:

- Findings can be enhanced with a wider sample of participants from Amman and other cities in Jordan.
- Other studies might be conducted with the inclusion of other stakeholders (e.g. taxi drivers, business owners and regulators).
- Other studies might be conducted to tackle challenges (disadvantages) related to Uber taxi services in Jordan, mainly those connected with the cultural and social norms.
- Other studies might be conducted on the role of Uber taxi services in cutting unemployment.
- Other studies can be conducted on how yellow taxi services can be improved to regain passengers' trust and enhance their quality of service.

6. Conclusion

The main aim of the research was to evaluate Jordanians' experiences with yellow taxi services and assess their opinions toward the advantages and disadvantages of Uber taxi services in Jordan. In addition, it sought to obtain opinions on the expected future of Uber taxi services. Available studies indicate that Uber is still very new and in the preliminary adoption stage in most countries in which it operates, facing general barriers to new technology such as regulation, pricing and safety. Nevertheless, Uber taxi service is becoming more appealing to passengers worldwide. Therefore, the finding from literature justified the motivation of the study to address a manifest gap in existing knowledge, and to provide a preliminary overview of Uber in Jordan that can serve as a basis for future research projects.

Jordanians have a negative experience with yellow taxi services and a high level of dissatisfaction. Uber disadvantages but it has its own particular disadvantages related to cultural, political and economic circumstances. While the main disadvantage of Uber is its expense, other disadvantages emphasised by participants were mainly related to perceived deficiencies in Jordanian readiness rather than being intrinsic to Uber per se, such as the lack of regulation, cultural barriers, the online card option (i.e. the lack of conventional cash payments), drivers may lack experience, sharing information might be seen as an issue by some people, and satellite navigation/GPS errors may be common, particularly in urban environments.

On the other hand, they identified a number of advantages: it allows them to plan their journey easily, the appearance of new cars seems more attractive, they are willing to use Uber taxi as a global standard, the ability to choose the driver they like, the friendliness of drivers, seeing Uber as contributing to reducing unemployment by providing a second job option, the possibility to rate the service and the particular utility of Uber for people who are unable to drive. Finally, compared to other studies, it seems that Uber taxi service offers extra advantages in Jordan and also faces different challenges (disadvantages) pertaining to cultural and social norms. Jordanians are in favour of Uber taxi services or similar technology and they see it as the future, and they strongly believe it will be regulated by government in the near future and fair prices will make it more affordable.

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