The Impact of Ride-Sharing and Car-Sharing Services On Urban Transportation Systems

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Abstract- The growth of ride-sharing and car-sharing services has dramatically impacted urban transportation systems worldwide. This study reviews the effect of these services on the transportation sector, including their impact on traffic congestion, the environment, and urban mobility. The methodology includes a comprehensive literature review and examination of relevant case studies. The study provides insights into the advantages and disadvantages of ride-sharing and car-sharing services and their potential to contribute to sustainable urban mobility. The results indicate that while these services offer a convenient alternative to conventional modes of transportation, they also raise concerns about increased traffic congestion and reduced use of public transportation. Therefore, urban transportation planners and policymakers must carefully consider the impact of these services when formulating plans and policies for sustainable urban mobility.

I. INTRODUCTION

Over half of the world's population lives in cities, many of which have populations in the millions. This growing urbanization presents a challenge for designers, urban planners, logistics specialists, and government officials. According to United Nations projections, the population of cities is expected to reach 6.3 billion (72% of the Earth's population) by 2050, requiring a change in thinking about how cities function. The concept of sustainable development highlights the need to not only meet the needs of present generations but also to consider future ones (Tundys, 2013). With increasing knowledge of the aggregate impact of climate change, there is a growing urgency to take action (OECD, 2015). Policies should focus on economic sectors with a large carbon footprint and persistent decarbonization in response to technological change. The transportation sector, which generates more than a quarter of global greenhouse gas emissions, plays an important role in addressing climate change (IPCC, 2014; IEA, 2018).

Urban transportation systems are undergoing significant changes due to the development of new technologies, such as ride-sharing and car-sharing services. These services offer a convenient and flexible alternative to traditional modes of transportation and have become increasingly popular in recent years. As a result, the impact of ride-sharing and car-sharing on urban transportation systems has become a topic of significant interest among researchers and policymakers.

Ride-sharing trips are typically arranged through matching applications that allow drivers and passengers to find potential rides. They often include community-based trust mechanisms, such as user ratings, and links to social networks to allow prospective sharers to verify each other. Despite its potential, ride-sharing has seen limited uptake so far due to business, economic, and technological barriers (Ferguson, 1995; Furuhata et al., 2013; Hartwig & Buchmann, 2007; Hwang &Guiliano, 1990).

II. HISTORICAL BACKGROUND

The origin of ridesharing can be traced back to World War II, when the U.S. government mandated workplace ridesharing arrangements as a result of a shortage of transportation options, to conserve rubber during the war (Chan and Shaheen, 2012). Additionally, the oil crisis of the 1970s, which saw an increase in gasoline prices, also led to a rise in ridesharing. However, the current ridesharing revolution was made possible through advancements in GPS, smartphone technology, and electronic payments (Kowshik et al., 1993).

Ridesharing platforms such as Uber and Lyft bring together drivers and customers in need of a ride for a pre-agreed price (Luca, 2016). Typically, the process begins with the customer using a smartphone app to request a ride at a specific time and location. The app then guides the customer through a series of steps, including the estimated cost of the ride, the driver's location, and the expected wait time. It also allows the customer and driver to communicate with each other while maintaining their anonymity (Luca, 2016). GPS is utilized to arrange the ride and determine the most optimal route for the driver. The platforms also employ measures of rider and driver quality to build trust (Luca, 2016), as well as an efficient payment system through a credit card stored in the platform's database. Ridesharing companies can adjust prices in real-time, in response to changes in demand or driver availability (Wood, 1989).

The ridesharing platforms earn their revenue by taking a portion of the fare for each ride, which can range from 0% to 30%, with an average of around 20% to 25% (Huet, 2015).

III. FEATURES OF RIDE-SHARING AND CAR-SHARING SERVICES

Real-time tracking: Users can track the progress of their ride or the location of their reserved car in real time, providing greater peace of mind and transparency.

Cashless transactions: Ride-sharing and car-sharing services typically use electronic payment systems, making the process of paying for rides or car rentals seamless and cashless.

Accessibility: These services aim to provide a more accessible mode of transportation, especially for people with disabilities or those who cannot drive.

Network of vehicles: Ride-sharing and car-sharing services have a large network of vehicles, which helps to ensure that there is always a car available when needed.

Dynamic pricing: Ride-sharing and car-sharing services use dynamic pricing models that adjust the cost of rides and car rentals in real time based on demand and supply.

In summary, the key characteristics of ride-sharing and car-sharing services include convenience, flexibility, cost-effectiveness, environmental sustainability, driver verification, user feedback, customization, real-time tracking, cashless transactions, accessibility, and a large network of vehicles. These features have made ride-sharing and car-sharing services increasingly popular among consumers, and have had a significant impact on urban transportation systems.

IV. ADVANTAGES OF RIDE-SHARING AND CAR-SHARING SERVICES

Ride-sharing and car-sharing services offer several benefits, including:

1. Convenience: With just a few taps on your smartphone, you can easily request a ride or a car rental. This saves time and makes transportation more accessible, especially for those without their vehicle.
2. Cost-effectiveness: Compared to traditional taxi services or car rentals, ride-sharing and car-sharing services can be more affordable and cost-effective, especially for short trips.
3. Environmentally friendly: By reducing the number of cars on the road, ride-sharing and car-sharing services can help reduce carbon emissions and improve air quality.
4. Increased accessibility: These services make it easier for people without access to personal vehicles to get around, particularly in areas where public transportation may not be available.
5. Flexibility: With ride-sharing, you can choose from various ride options, such as shared rides, private rides, and luxury rides, based on your needs and budget. With car-sharing, you can rent a car for a few hours or days and choose the make and model of the car you prefer.
6. Improved safety: Ride-sharing and car-sharing services often have safety features, such as GPS tracking and in-app emergency assistance, to ensure the safety of passengers and drivers.
7. Socialization: You have the opportunity to meet new people while sharing a ride, which can lead to building new relationships.

8. Reduced traffic: By having fewer cars on the road, ride-sharing can help reduce traffic congestion and the associated costs, such as fuel and time spent stuck in traffic.

V. DISADVANTAGES OF RIDE-SHARING AND CAR-SHARING SERVICES

While ride-sharing and car-sharing services offer many conveniences, they also have several drawbacks, including:

1. Safety concerns: The use of a stranger's vehicle comes with inherent safety risks, as there is no comprehensive screening process for drivers or their vehicles.
2. Privacy concerns: Sharing personal information with a third-party provider, such as home addresses and credit card details, raises legitimate privacy concerns.
3. Reliability issues: Despite efforts to monitor and regulate these services, the reliability of ride-sharing and car-sharing can be impacted by factors like traffic, driver availability, and technical difficulties with the app.
4. Inequality in driver pay: Due to the commissions and fees charged by ride-sharing companies, some drivers may earn less than the minimum wage.
5. Environmental impact: The rise in popularity of ride-sharing and car-sharing services can lead to increased traffic congestion and air pollution, negatively affecting the environment.
6. Competition with traditional taxis: The widespread use of ride-sharing and car-sharing services can impact traditional taxi services, resulting in job losses and economic disruption.
7. Cost: Although these services offer convenience, they can be more expensive than traditional public transportation or taxi services, especially for longer trips or during peak hours.
8. Insurance coverage: There are questions surrounding insurance coverage in the event of an accident while using a ride-sharing or car-sharing service and determining who is responsible for damages.

VI. IMPACT OF RIDE-SHARING AND CAR-SHARING SERVICES ON URBAN TRANSPORTATION

Ride-sharing and car-sharing services have greatly impacted urban transportation systems. The following are some of the effects these services have had on urban transportation:

1. Reduced Personal Car Ownership: The availability of ride-sharing and car-sharing services have made it possible for individuals to have access to transportation without the need to own a car, leading to a decrease in the number of personal vehicles on the road.
2. Increased Convenience: These services have made it more convenient for people to travel in cities, particularly in areas where public transportation options are limited.
3. Improved Accessibility: Ride-sharing and car-sharing services have improved accessibility for people with disabilities and those who are unable to drive.
4. Decreased Traffic Congestion: By decreasing the number of personal cars on the road and offering alternative transportation options, ride-sharing and car-sharing services have helped to alleviate traffic congestion in cities.
5. Increased Air Pollution: However, the rise in the number of ride-sharing and car-sharing vehicles on the roads has also contributed to increased air pollution in cities.
6. Job Losses for Traditional Taxi Drivers: The growth of ride-sharing services has resulted in job losses for traditional taxi drivers, who are facing heightened competition from these new services.

CONCLUSION

In conclusion, the impact of ride-sharing and car-sharing services on urban transportation is complex and far-reaching. While these services bring many benefits, they also raise new challenges and trade-offs that must be carefully evaluated. The rise of ride-sharing and car-sharing services has had a mixed impact on urban transportation systems. While these services have provided greater access to transportation and reduced traffic congestion, they have also led to a decrease in public transportation usage and a decline in funding for public

transportation systems. Given these effects, cities must evaluate their urban transportation strategies and implement measures to minimize the negative impacts of ride-sharing and car-sharing services.

As these services continue to grow and evolve, the impact they have on urban transportation systems will also change. It's essential to be aware of both the positive and negative consequences of these services and to work towards creating a sustainable and equitable urban transportation system.

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