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Analysis of the Operational Differences Between Traditional Taxis and Ride-Hailing Services in Metropolitan Cities

Haoshan Wang

Economics Department, Beijing Technology and Business University, Beijing, China
2208040225@st.btbu.edu.cn

Abstract: With the acceleration of urbanization and the diversification of residents' travel needs, the modes of transportation have been constantly evolving. Traditional taxis, as an important part of urban public transport, have long provided convenient travel services for citizens. However, with the rise of ride-hailing services, this emerging mode of transportation has quickly gained a foothold in the market due to its high efficiency and convenience. Therefore, this paper analyzes the operational differences between traditional taxis and ride-hailing services in big cities, focusing on aspects such as pricing mechanisms, hailing methods, service coverage, and service quality. Traditional taxis have stable prices based on the meter, with extensive service coverage suitable for remote areas and special circumstances. Ride-hailing services use dynamic pricing with significant price fluctuations, and are more convenient for hailing, with better service in urban areas and during peak hours or specific time periods. Traditional taxi drivers follow certain service standards but have varying vehicle conditions, while ride-hailing drivers have mixed quality, though some platforms have strict assessments. These differences provide passengers with diverse choices and offer references for industry development, aiming to support the traffic management authorities in formulating policies, optimizing the transportation system, and enhancing passengers' travel experiences.

Keywords: traditional taxis, ride-hailing services, operational differences, service quality

1. Introduction

With the acceleration of urbanization and the improvement of people's living standards, the demand for urban transportation is constantly increasing. Taxis, as an important part of urban public transport, meet the personalized travel needs of citizens. In many first-tier cities, the development of the taxi industry has attracted much attention. In recent years, the development of Internet technology has promoted the rapid rise of ride-hailing services, which have had a great impact on the traditional taxi industry. This has changed the travel choices of citizens, the supply and demand relationship, operation mode and service quality of the taxi market, and has affected the market pattern and citizens' travel experience.

With their convenient hailing methods, flexible pricing mechanisms, and efficient service models, ride-hailing services have gradually become one of the important travel choices for urban residents. The rapid development of ride-hailing services has also triggered competition and conflicts with traditional taxis. The traditional taxi industry, under the impact of ride-hailing services, is facing problems such as a decline in market share and a decrease in drivers' income.

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Relevant studies have deeply explored the impact of ride-hailing services on the traditional taxi industry. For example, the literature indicates that ride-hailing services have a negative impact on traditional taxis, that the emergence of ride-hailing services has led to an average reduction of 25.46% in the usage of traditional taxis [1, 2]. In addition, while ride-hailing services provide passengers with new travel choices and create more job opportunities, they have also led to a decrease in the travel volume of cruising taxis [3]. In different usage periods, the usage patterns and spatiotemporal distribution characteristics of ride-hailing services and taxis also differ. Ride-hailing services are more inclined to meet medium and long-distance travel needs, while traditional taxis mainly serve short-distance travel [4]. During the morning rush hour on weekdays, ride-hailing trips are concentrated in the city center, whereas traditional taxis are more likely to serve transportation hubs such as railway stations and bus terminals [5]. In addition, population density and land use mix are positively correlated with the share of cash payments for taxi trips, while the number of ride-hailing trips is negatively correlated with that [6]. The rapid development of ride-hailing services has had an impact on the traditional taxi industry, especially its market share. For example, the entry of Uber into the market significantly reduced the market share of traditional taxis [7]. To address this issue, studies suggest enhancing the competitiveness of traditional taxis by regulating operational management and strengthening safety supervision [8]. At the same time, under the background of "Internet+," the taxi industry needs to adapt to the trend of the sharing economy and take effective measures to respond actively [9]. These research findings further confirm the impact of ride-hailing services on the traditional taxi industry and highlight the urgency for the industry and the government to take effective measures to deal with it.

Current literature lacks a comprehensive comparison between the two and fails to systematically point out their advantages and disadvantages in terms of market positioning, entry conditions, and operation modes. Therefore, this paper qualitatively analyses the differences between traditional taxis and ride-hailing services, covering multiple aspects such as market positioning, entry conditions, operating costs, service quality and regulation, operational efficiency, and pricing mechanisms. The paper also explores deeply the impact of these differences on industry development. It provides decision-making references for policymakers, enterprises, and practitioners, offers strong support for urban traffic management departments to formulate policies, optimize the transportation system, and enhance passengers' travel experience, and also provides practical guidance for the reform and innovation of the taxi industry.

2. Comparative analysis

The differences between traditional taxis and ride-hailing services are in market positioning, operation models, service quality and regulation, operational efficiency, and pricing mechanisms, reflecting their different strategies and challenges in meeting modern urban transportation needs.

2.1. Operation model

The operation model of traditional taxis is relatively simple and straightforward. Passengers usually hail a taxi by waving on the roadside. The driver selects the driving route based on the destination provided by the passenger and charges according to the meter. Payment methods include cash or card, and an invoice is provided. This model is suitable for passengers who are not familiar with smart devices, and it offers high convenience and immediacy. However, during peak hours or in remote areas, passengers may have to wait for a long time to get a taxi, and the service quality can vary greatly.

In contrast, the operation model of ride-hailing services is based on mobile Internet technology and digital platforms, featuring higher convenience and intelligence. Passengers input the pick-up

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location and destination through the mobile application (App), select the type of vehicle and service, and the system automatically matches them with nearby drivers. The App displays the estimated arrival time, and passengers can wait at the pick-up location for the driver. Passengers can change the route through the App, and drivers are required to follow the navigation. Passengers can check the route and the estimated arrival time at any time. Upon reaching the destination, the App automatically calculates the fare, and passengers can quickly complete the payment through the linked payment method and rate the driver's service. These ratings directly affect the driver's credibility and service quality score. Using ride-hailing services, passengers can hail a car through the App, with transparent vehicle information and the ability to track the vehicle's real-time location. They can also choose different types of vehicles according to their needs, providing a better user experience.

Traditional taxi companies and ride-hailing platforms in the metropolitan area have significant operational differences. Traditional taxi companies have advantages in market coverage and service standardization, but their operation model is relatively traditional, and the service quality can vary greatly. Ride-hailing platforms excel in technological innovation, user experience, and market flexibility, but they face regulatory challenges and difficulties in balancing interests.

2.2. Profit

There are significant differences between traditional taxis and ride-hailing services in terms of operating revenue, costs, and pricing mechanisms. The operating revenue of traditional taxis mainly comes from fares paid by passengers, while operating costs include vehicle insurance, maintenance, fuel costs, parking fees, maintenance expenses, etc. They need to optimize dispatch and operation models to reduce the taxi vacant ratio. Pricing mechanism for traditional taxis is relatively stable, with fares calculated by the meter. However, during peak hours or under special circumstances, there may be a situation of insufficient supply to meet the demand. The price cannot be dynamically adjusted according to market supply and demand, making it difficult to effectively optimize resource allocation [10].

In contrast, ride-hailing services have relatively lower operating costs, but drivers' income and workload need further optimization. Platforms can attract drivers and enhance competitiveness by increasing subsidies and rewards. The operating revenue of ride-hailing services includes not only the fares paid by passengers but also service fees charged by the platform. The fee is paid proportionally to the fares paid or a flat rate, which are used to cover the platform's operating costs. Ride-hailing services adopt a dynamic pricing mechanism, adjusting prices in real time based on factors such as supply and demand, time of day, and location. During peak hours or in popular areas, the platform uses dynamic surcharges to guide drivers to high-demand areas, thereby alleviating supply and demand conflicts and optimizing resource allocation. Meanwhile, by optimizing the order dispatch algorithm and improving the level of intelligence to achieve precise dispatch, the operation efficiency can be enhanced. However, this dynamic pricing model may also lead to increased travel costs for passengers and even trigger price disputes.

2.3. Services

The service coverage and quality are key factors affecting passengers' accessibility and travel experience. Traditional taxis have a relatively extensive service coverage. Even in remote areas, off-peak hours, and under special circumstances (such as at night or in bad weather), they can provide relatively timely services to meet the basic travel needs of passengers. However, the quality of service of traditional taxis is somewhat inconsistent. Although traditional taxi drivers have undergone professional training and the service process is relatively standardized, the in-car environment varies

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greatly. Some drivers have poor service attitudes, refuse to carry passengers, or pick customers, which affects the overall experience of passengers.

In contrast, ride-hailing services are relatively well-developed in urban areas and during regular hours. They can efficiently match the supply and demand, providing passengers with a convenient and efficient travel experience. However, ride-hailing services may struggle to meet passengers' needs in remote areas or under special circumstances due to limited driver and vehicle resources. The service quality of ride-hailing drivers may also vary. Some drivers lack service awareness and experience [11]. However, some ride-hailing platforms can effectively motivate drivers to improve service quality through strict assessment systems—the passenger rating systems—and credit management mechanisms, thereby ensuring passengers' travel experience to a certain extent.

3. Case analysis — traditional taxis versus Didi in Ningbo

The traditional taxi industry and the ride-hailing industry show significant differences in operating models, profit models, and services. With the rapid rise of the ride-hailing industry, the traditional taxi industry has been hit like never before. Taking Ningbo's traditional taxis and Didi Chuxing (Didi) as examples, a detailed analysis is conducted from multiple aspects. In Ningbo, the competition between traditional taxis and ride-hailing services is particularly fierce. According to the 2024 White Paper on the Development of the Taxi Industry released by the Ningbo Road and Transport Management Center, the number of taxis and ride-hailing vehicles in Ningbo are 4,563 and 43,365, respectively. The rapid increase in the number of ride-hailing vehicles has posed direct competitive pressure on the traditional taxi industry.

3.1. Operation model

Traditional taxis mainly adopt a corporate management model, where the ownership and operating rights of the vehicles belong to the company. Drivers sign contracts with the company and are responsible for daily operations. Under this model, the company is in charge of vehicle maintenance, repair, and management, while drivers are required to pay a certain amount of "quota money" as management fees. The operation of traditional taxis primarily focuses on cruising to pick up passengers, that passengers can hail a taxi on the roadside. This mode of operation has a wide service coverage, especially showing advantages in remote areas and special scenarios.

Didi adopts a customer-to-customer (C2C) model, matching private car owners with passengers through the platform. Car owners register as platform drivers, and the platform is responsible for order matching and payment processing. This model has the characteristics of being asset-light and highly scalable, but it also faces compliance risks and management challenges. The operation of Didi mainly relies on online booking. Passengers place orders through the mobile App, and the platform matches drivers based on algorithms.

3.2. Profit and market competition

Since the operation models of ride-hailing cars and traditional hailing taxis are different, their profits are also different. Ride-hailing services, through online booking, leverage big data and algorithms to optimize order matching, significantly improving operational efficiency. For example, Didi uses dynamic pricing and intelligent dispatching systems to adjust prices and optimize vehicle allocation based on real-time traffic conditions and demand, thereby better meeting passengers' travel needs.

The profit model of traditional taxis mainly relies on the contracting fees or management fees paid by drivers, which provides relatively stable income. In contrast, ride-hailing services profit by taking a commission from each order. However, due to intensified market competition, the average revenue per order for ride-hailing services has declined. For example, in 2024, the average revenue per order

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for ride-hailing services in Ningbo was 21.9 yuan, lower than the average of 25.6 yuan of traditional taxis. Moreover, to attract users, ride-hailing services often launch low-priced products, such as fixed-price express services and special offers, which further squeeze the market share of traditional taxis.

In terms of service quality, traditional taxis show inconsistencies, with some drivers engaging in issues such as refusing to carry passengers or taking detours. In contrast, ride-hailing platforms manage drivers strictly through user ratings and complaint handling mechanisms, resulting in relatively higher service quality. For example, Didi assesses driver service quality through data-driven methods and promptly addresses passenger complaints, thereby enhancing user satisfaction.

The rise of ride-hailing services has significantly impacted the traditional taxi industry, leading to a decline in the number of passengers for traditional taxis. For example, in Hong Kong, after Uber entered the market in 2014, the number of passengers for traditional taxis plummeted, with passenger trips decreasing by 16%. A similar situation has occurred in Ningbo, where the market share of traditional taxis has been affected by ride-hailing services, resulting in a decline in overall operational indicators.

3.3. Discussion and recommendations

The rapid development of ride-hailing services has significantly squeezed the market of traditional taxis. Traditional taxis have seen their market share taken over and are facing increasing business pressures. The competition between traditional taxis and ride-hailing services is not only a battle for market share, but also a contest of operating models and service quality. The traditional taxi industry needs to enhance its competitiveness by improving service quality and optimizing operating models, for example, strengthening the service management of drivers, enhancing service quality, and reducing issues, such as poor service attitudes, refusal to carry passengers, and selective customer picking. In addition, traditional taxi companies can collaborate with ride-hailing platforms to jointly develop the market and achieve mutual benefits. By optimizing the operation mode and reducing the vacancy rate, the operational efficiency of traditional taxis can be improved.

For the ride-hailing industry, although it has advantages in technology and user experience, it also needs to further improve compliance and service quality to win the trust of more users. It is necessary to strictly enforce driver entry mechanisms, improve driver quality, and ensure service standards. Optimizing order dispatch algorithms to enhance intelligence and achieve precise dispatching will improve efficiency. Strengthening safety management and perfecting passenger rating and credit systems will enhance the platform's credibility. Companies should also encourage drivers to use new energy vehicles, increasing market share through subsidies and rewards, thereby reducing environmental impact. In the future, both taxis and ride-hailing services need to achieve complementarity and integration under the guidance of policies to meet the diverse needs of passengers.

Meanwhile, the entry requirements for ride-hailing services are relatively relaxed, mainly relying on the platforms' own review and management, which leads to certain regulatory loopholes. To ensure the healthy development of the industry and the travel safety of passengers, it is urgent to unify regulatory standards, strengthen the review of drivers' qualifications and background checks, and ensure operational safety. In addition, there should be enhanced supervision over the pricing of ride-hailing services to prevent excessive dynamic surcharges, thereby better protecting consumer rights.

The development of traditional taxis and ride-hailing services has had a profound impact on urban transportation, environment, and society. To achieve sustainable development, it is necessary to optimize the travel structure, reduce dependence on private cars, and alleviate traffic congestion. For example, this goal can be achieved by encouraging citizens to choose green travel modes such as public transportation and bicycles. At the same time, the industry itself also needs to explore sustainable development models, promote the use of new energy vehicles, and optimize operating

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models to reduce environmental impact. Traditional taxi companies can gradually phase out old vehicles and replace them with new energy vehicles; ride-hailing platforms can encourage drivers to use new energy vehicles by offering subsidies and rewards, thereby increasing the market share of new energy vehicles and promoting the sustainable development of the entire industry.

4. Conclusion

With the acceleration of urbanization and the diversification of residents' travel needs, the modes of transportation are also constantly evolving. Traditional taxis, as an important part of urban public transportation, have long provided convenient travel services for citizens. However, with the rise of ride-hailing services, this emerging mode of transportation has quickly gained a foothold in the market due to its efficiency and convenience.

Adopting qualitative analysis, the research compares the operational differences between traditional taxis and ride-hailing services, and deeply explores the impact of these differences on industry development. Traditional taxis have high level of convenience, but there are problems such as uneven service quality and untimely vehicle upgrade; ride-hailing services provide passengers with more diverse choices, but there are still concerns in terms of regulation and safety assurance. The research finds that these differences in the operation of traditional taxis and ride-hailing services provide passengers with a variety of travel choices and have also had an important impact on the development of the taxi industry.

Further, this study compares various aspects in terms of market positioning, entry conditions, operating costs, service quality and regulation, operational efficiency, pricing mechanisms, and provides policy recommendations. The traditional taxi industry needs to reform and innovate to adapt to market changes; the ride-hailing industry needs to strengthen regulation to ensure operational safety and service quality. This paper suggests that through reform and innovation, the traditional taxi industry can improve service quality and operational efficiency, and the ride-hailing industry can ensure operational safety and service quality to promote industry development. These provide decision-making references for policymakers, enterprises, and practitioners. They also offer strong support for the traffic management authorities to formulate policies, optimize the transportation system, and enhance passengers' travel experiences.

Although this paper analyzes the differences between traditional taxis and ride-hailing services from multiple dimensions, it is a qualitative paper and lacks data support. Therefore, future research can collect more comprehensive operational data and passenger satisfaction data for empirical analysis.

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