COMPARATIVE ANALYSIS OF CONVENTIONAL TAXI PERFORMANCE WITH APPLICATION-BASED TAXIS IN BATAM

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ABSTRACT

Public transportation has become an alternative for people in their daily activities. As technology develops, online public transportation or application-based online taxis emerges. The purpose of this paper is to find out the performance between conventional taxis and online taxis. The authors used the Importance Performance Analysis (IPA) method in this study. Before being able to use the IPA method, the author will first collect data by opening a questionnaire with a minimum of 100 respondents for analysis. The study's findings indicate that online taxis perform better than conventional taxis. However, in the importance perception, conventional taxis also get a lower average value than online taxis.

INTRODUCTION

In the last few centuries transportation has become one of the keys to running the economy in the world. The transportation system significantly impacts economic viability, environmental quality, and promotion of socially acceptable quality of life levels in a region (Kasyczyszyn & Sypion-Dutkowska, 2019). For example, the transportation of people and goods is overgrowing. This makes it easier for humans to carry out their daily lives by traveling from one place to another and also makes it easier for humans to work. What is transportation? Transportation is a significant component of living and life systems, government, and social systems (Aminah, 2018). Means of transportation have been created since ancient times by making means of transportation driven by humans and animals as well as by using more modern means of propulsion in the form of steam engines until, in the end, humans created means of conveyance using more sophisticated machines. The initial goal of humans creating transportation facilities was to facilitate human mobility and help move people and goods from one place to another. Mobility is the average distance that users of a transit service can travel in a given amount of time is what we refer to as mobility. Mobility and accessibility are related because increased mobility also increases accessibility (Daganzo & Ouyang, 2019). But as time goes by, people start to think about how to turn this transportation into a commercial means for profit. So he created transportation that can carry more than 1 or 2 people. The initial thought of providing public transportation, especially land transportation, began around 300 years ago when Pascal (France) began operating carriages for horse-drawn passengers in the City of Paris in 1662. At first, the provision of these trains was free, but eventually, its development began to be charged.
Public transportation in Indonesia is now in great demand, especially in big cities such as the islands of Java and Sumatra, which are very densely populated. Online public transportation in Indonesia today, starting in the last two years, has started to be widely discussed and has become a new idol of transportation, especially in big cities (Rosa & Widad, 2017). Public transportation is in great demand there because the population is too dense, with each having their vehicle so that traffic jams arise in the area, so local people prefer to use public transportation rather than private vehicles even though the community has private vehicles. People use public transportation to save time and avoid traffic jams in their cities. Public transportation (PT) offers a strategy for boosting human throughput to lessen traffic congestion's effects (Nguyen-Phuoc, Currie, De Gruyter, & Young, 2018). Thanks to technological advances, online public transportation has emerged in Indonesia. In addition, consumers are helped by the development of information technology at this time, especially for reservations. Wherever and whenever quickly and in real time, consumers can easily travel anywhere by having a current application (Nasution, Erwin, & Bartuska, 2020). This online public transportation makes ordering easier for the public via an application-based mobile phone. This online public transportation system is where consumers place orders through the application. After the order is sent, the application will immediately find the driver, and he will immediately pick up passengers at the address listed in the application. The emergence of this phenomenon makes people not need to go to bases or public transportation gathering places. Public transit can only be used after a user arrives at a bus stop or a subway station, so the users must walk to a stop or a station (Roh & Jeon, 2021). This causes people in Indonesia to be increasingly interested in using online public transportation because it is easy to access and more efficient than conventional motorcycle taxis.

The Riau Archipelago Province consists of several cities and regencies: Batam City, Tanjung Pinang City, Karimun Regency, Bintan Regency, etc. So far, cities and regencies in the Riau Islands province are still in the developing category. This is because the cities and regencies in the Riau Islands province are still in the development stage. However, in the last few decades, many people from small villages have urbanized to the city of Batam. For example, from the city of Tanjung Balai Karimun, they moved to the city of Batam due to low livelihoods in the area.

Batam is an overgrowing city in Indonesia because the government is carrying out continuous development. The city of Batam also has a very strategic location close to Singapore and Malaysia. So the city of Batam became one of the international trade routes. Batam city can also be called a city that is still new in Indonesia. This can be seen from the small population density compared to other cities in Indonesia. Turning to transportation, every household in the city of Batam has its private vehicle, both two-wheeled and four-wheeled vehicles. Therefore, vehicle prices in Batam are relatively lower compared to other cities in Indonesia. This is because vehicles sold in the city of Batam are not subject to VAT and PPnBM fees by the government.

Local people rarely use public transportation in Batam City. However, it is more often used by tourists from neighboring countries such as Singapore and Malaysia. Tourists tend to use conventional public transportation compared to online public transportation because tourists think that using conventional transportation is more accessible because listening to issues of social
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conflict between conventional public transportation and online public transportation. So tourists from neighboring countries are also worried about using online public transportation.

Meanwhile, local people in Batam City are more comfortable using private vehicles than public transportation because the traffic in Batam City is not prone to traffic jams. However, it will usually only be used by the public when there is an urgent need, such as private vehicles that are experiencing damage or UIB students during peak hours because the roads in the area are most likely to be jammed. With the integration of public transport systems sound, people are expected to switch from private vehicles and choose to use public transport as a first choice in traveling because it offers a public transport system that is connected so that the journey will be easier and smoother (Rifai & Arifin, 2020). This analysis aims to compare the efficiency of traditional public transportation to online public transportation in Batam City. They are then based on what aspects or criteria the community prioritizes in choosing which public transportation to use.

LITERATURE REVIEW

Taxi Performance

Taxis have become one of the alternative parts for humans to travel. For many years, the taxi business has served as an alternative to public transit (Mdaki, 2020). However, over time traditional taxis began to be rivaled or arguably outperformed by online taxis due to their more difficult accessibility. The taxi industry in Shenzhen has experienced a significant loss in its ridership that can be indisputably credited to ride-sourcing competition (Nie, 2017).

Compared to online taxis, which are so easy to reach. Passengers must flag down cabs at the roadside to use the conventional taxi service. As a result, finding a taxi during peak hours, bad weather, and on holidays might be challenging, and cab drivers might turn away passengers (Su & Fang, 2019). Furthermore, it was not easy to use these traditional taxis because they could only be found at specific taxi stands. To use them, a customer had to go there and choose one or call the driver directly on a personal mobile phone if they already had the number; however, this depended on whether the driver was available (Mdaki, 2020).

Traditional taxis also have higher prices because drivers tend to increase their prices. However, there are still specific issues with conventional cab services. For example, passengers temporarily have difficulty locating cabs in the region when they need the service or are being overcharged (Thilakaratne & Jayaratne, 2019). Security in traditional taxis is also not guaranteed, especially for those not under a company. Another difficulty was that security concerns, such as the possibility of hijacking, led some stakeholders to question whether it was safe to use or offer the service. Additionally, it appeared impossible to confirm the driver's and the vehicle's identity using typical taxi services in the event that any incident needed to be tracked down and recognized (Mdaki, 2020).

If not addressed wisely by the government, technological developments in transportation will trigger riots between online and conventional transportation (Bidari, 2018). Like the case in Indonesia, especially in the city of Batam. Under these conditions, drivers or traditional taxi companies must adapt to survive in this industry. Conventional transportation must be able to keep
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up with societal and technological advancements. So that traditional transportation is supported by the existence of online-based transportation, traditional transportation must be able to compete in terms of price and service (Bidari, 2018).

The Efficiency Of Online Taxi

As time goes by, technology is becoming more and more developed. Because of this, phenomena such as application-based online taxis emerged. Modern conveniences and hassle-free transportation are made possible by the current phenomena of taxi booking apps (Khan, et al., 2019). Online taxis are also handy and popular among the public. Popularity for their effectiveness in sending idle taxis to customers in need (Tong, et al., 2017).

The online taxi application is effortless to use. By pressing the booking in the application, the application will immediately find you a driver. E-hailing application is a platform that enables online booking and dispatch of available e-hailing drivers located in the proximity area of the users. This application is supported by location identification, taxi booking, payment, and a communication system between the driver and the customer (Ghani, Abidin, Abd Rahman, Wibowo, & Alwi, 2021). The online taxi system also significantly saves people without looking for a taxi. Recommender systems typically suggest the cab that is closest to the passengers (Dai, Huang, Wambura, & Sun, 2017).

Compared with traditional taxis, online taxis are relatively cheaper. With this innovation, it is easier for people to travel. With the development of mobility techniques, transportation systems have become more innovative, pursuing higher goals, such as convenience for passengers and low cost (Wang & Li, 2021). Some online taxi or E-hailing applications also accept electronic payment. Thirdly, the technology allows passengers and drivers to conduct the transaction cashless, which makes it safer and more convenient for all parties involved (Ooi & Nazar, 2021).

Online taxis are also safer because the GPS is already in the system. On the other hand, the taxis in the private taxi market are modern, with amenities like GPS, more comfort, and safety. In contrast, the public taxi market has too old taxis with minimal comfort and safety (Pandya, Rungta, & Iyer, 2017). The company that provides online transportation services, Go-Jek, prioritizes user security as its top concern. People in Bandar Lampung are delighted with online transportation services like Go-Jek since they can conveniently schedule reservations through an app on their cellphones, with affordable costs and enhanced safety (Pandjaitan, 2018).

Transportation Role

Transportation has become an unavoidable part of human life. The transport system significantly impacts regional development patterns, economic viability, environment, and promotion of socially acceptable quality of life levels (Kaszczyzyn & Sypion-Dutkowska, 2019). Transportation significantly impacts all aspects because it is related to everything in the world. Additionally, Through the creation of intra- or inter-city links throughout urbanization, the transportation network supports socioeconomic growth and improved quality of life (Wang, Xue, Zhao, & Wang, 2018).

Transportation plays a significant role in this world. We can define transport as those activities consisting of the movement of persons or goods in space using transport and by using an
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appropriate means of transport. Time has proved that transport can benefit an economy for many reasons, such as employment and the movement of goods and people. Transport has been a part of daily life since the dawn of time, and as society advanced, its significance within the intricate web of human civilization grew progressively. Transport was crucial to the growth of society and the establishment of states in antiquity (Dinu, 2018).

The global economy relies on surface transportation for its supply chain. A supply chain is “the socio-technical network that identifies, targets, and fulfills demand. It decides what, when, and how much should move to where. (Edwards, et al., 2021). As indicated in the earlier section of this paper, transportation plays a significant role in the supply chain process (Shah, 2017).

Transportation enables economic activity by connecting people, businesses, and resources. Transportation improvements are often advocated for economic development, and there is often debate over which transport policies best economic support objectives. (Litman, 2017). The growth of transportation can help the economy by allowing items to move freely between different zones, which can encourage zonal economies to grow and become more appealing (Ma, Zhu, Gu, & Chen, 2020). If transportation stops running worldwide, it will be a disaster for humans. Thus, transport contributes to the progress of society and therefore is considered one of the most important bases of the economy (Dyadchenko).

METHOD

Data is one of the main strengths in compiling research and scientific modeling. (Rifai, Hadiwardoyo, Correia, Pereira, & Cortez, 2015). The systematic scientific research process must begin with identifying the right problem. (Rifai, Hadiwardoyo, Correia, & Pereira, 2016). As time goes by, technology is developing more sophisticated and fast. Such as application-based online taxis. This makes conventional taxis practically out of date. So conventional taxis need a change or adaptation to survive in this industry. Conventional taxis need to make changes because the system is no longer effective, and the service could be better. Therefore, this research focuses on the topics mentioned above. This research will use the importance-performance analysis (IPA) method. In the Importance Performance Analysis (IPA) technique, respondents were asked to assess the level of customer satisfaction with a service by measuring the level of importance and implementation. (Hardiyanti & Rifai, 2019). Before the data is analyzed, the writer will use a questionnaire that will be made on google docs to collect valid data. The data will be collected in Batam, Indonesia.

RESULT AND DISCUSSION

The data obtained through this questionnaire uses predetermined indicators. The following indicators will be used to obtain respondent information regarding the performance of conventional and online taxis. Here are some indicators: Service to the customer (Angraini, 2018); Pricing (Karim, 2018); Distance (Arla, Efendi, & Hajia, 2022); Accessibility (Arla, Efendi, & Hajia, 2022); Comfort (Arla, Efendi, & Hajia, 2022); Security (Purbohastuti, 2018); Accuracy (Lim, 2020); Speed of obtaining mode (Tombokan & Donny, 2021); Assurance of getting mode
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(Tombokan & Donny, 2021); Safety in user mode (Alfadin & Hidayat, 2018). The data below is the result of a questionnaire filled out by the respondents.

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicators</th>
<th>Performance</th>
<th>Importance</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Service to customer</td>
<td>3.16</td>
<td>3.69</td>
<td>-0.53</td>
</tr>
<tr>
<td>A2</td>
<td>Comfortness</td>
<td>3.14</td>
<td>3.86</td>
<td>-0.72</td>
</tr>
<tr>
<td>A3</td>
<td>Security</td>
<td>3.29</td>
<td>4.04</td>
<td>-0.75</td>
</tr>
<tr>
<td>A4</td>
<td>Pricing</td>
<td>2.56</td>
<td>3.80</td>
<td>-1.24</td>
</tr>
<tr>
<td>A5</td>
<td>Accessibility</td>
<td>3.20</td>
<td>3.63</td>
<td>-0.43</td>
</tr>
<tr>
<td>A6</td>
<td>Accuracy</td>
<td>3.39</td>
<td>3.75</td>
<td>-0.36</td>
</tr>
<tr>
<td>A7</td>
<td>Speed of obtaining mode</td>
<td>3.21</td>
<td>3.83</td>
<td>-0.62</td>
</tr>
<tr>
<td>A8</td>
<td>Assurance of getting mode</td>
<td>3.22</td>
<td>3.77</td>
<td>-0.55</td>
</tr>
<tr>
<td>A9</td>
<td>Safety in using mode</td>
<td>3.33</td>
<td>4.28</td>
<td>-0.93</td>
</tr>
<tr>
<td>A10</td>
<td>Distance</td>
<td>3.41</td>
<td>3.24</td>
<td>0.17</td>
</tr>
<tr>
<td>AVG</td>
<td>Average</td>
<td>3.19</td>
<td>3.79</td>
<td>-0.60</td>
</tr>
</tbody>
</table>

The data above was obtained from 100 respondents who answered "yes" or had used conventional taxi services and online taxis in Batam. Based on the results that have been obtained, the average value of performance (X) is 3.19. Meanwhile, the average value of importance (Y) is 3.79. Therefore, from the results of the data obtained, there is an average value of the gap between performance (X) and importance (Y) which is equal to 0.60.

**Figure 1.** IPA Matrixes of Conventional Taxi
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The results of the diagram above are in quadrant a, which means concentrating on pricing performance and the comforts of conventional taxis are shallow, especially at pricing performance with a value of 2.56. On the other hand, quadrant b, which is keeping up the good work of security performance, speed of obtaining mode, and safety in using conventional taxi mode, gets a pretty good value with a performance value of 3.29 for security, 3.21 for speed of obtaining mode, and 3.33 for safety in user mode. In quadrant c, which is low priority, the performance of conventional taxis could be better because it does not pass the mean line with a value of 3.16. Whereas in quadrant d or possible overkill, four parameters enter this quadrant, namely accessibility, accuracy, assurance of getting mode, and distance. From the results obtained above, the highest gap in conventional taxis is found in the pricing parameter with a gap value of -1.24. In comparison, the lowest gap is in the distance parameter with a value of 0.17.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Service to customer</td>
<td>3.94</td>
<td>4.15</td>
<td>-0.21</td>
</tr>
<tr>
<td>A2</td>
<td>Comfortness</td>
<td>3.92</td>
<td>4.18</td>
<td>-0.26</td>
</tr>
<tr>
<td>A3</td>
<td>Security</td>
<td>3.91</td>
<td>4.49</td>
<td>-0.58</td>
</tr>
<tr>
<td>A4</td>
<td>Pricing</td>
<td>3.30</td>
<td>4.09</td>
<td>-0.79</td>
</tr>
<tr>
<td>A5</td>
<td>Accessibility</td>
<td>3.90</td>
<td>4.22</td>
<td>-0.32</td>
</tr>
<tr>
<td>A6</td>
<td>Accuracy</td>
<td>3.69</td>
<td>4.14</td>
<td>-0.45</td>
</tr>
<tr>
<td>A7</td>
<td>Speed of obtaining mode</td>
<td>3.79</td>
<td>4.01</td>
<td>-0.22</td>
</tr>
<tr>
<td>A8</td>
<td>Assurance of getting mode</td>
<td>3.84</td>
<td>4.11</td>
<td>-0.27</td>
</tr>
<tr>
<td>A9</td>
<td>Safety in using mode</td>
<td>3.94</td>
<td>4.47</td>
<td>-0.53</td>
</tr>
<tr>
<td>A10</td>
<td>Distance</td>
<td>3.64</td>
<td>3.48</td>
<td>0.16</td>
</tr>
<tr>
<td>AVG</td>
<td>Average</td>
<td>3.79</td>
<td>4.13</td>
<td>-0.35</td>
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</tbody>
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The data above was obtained from 100 respondents who answered "yes" or had used conventional taxi services and online taxis in Batam. Based on the results that have been obtained, the average value of performance (X) is 3.79. Meanwhile, the average value of importance (Y) is 4.13. Therefore, from the results of the data obtained, there is an average value of the gap between performance (X) and importance (Y) equal to 0.35.
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The results of the diagram above in quadrant a there is only accuracy with a value of x (performance) and y (importance) of (3.16, 4.14), which almost goes to quadrant c. While in quadrant b, half of the total parameters with good performance, namely service to the customer, comfort, security, accessibility, and safety in user mode. The c, or low-priority quadrant, has three parameters: pricing, speed of obtaining mode, and distance. The distance parameter is almost in the d quadrant with a performance value of 3.79. In the last quadrant, d, or called possible overkill, there is the only assurance of getting mode with x (performance) and y (importance) values of (3.84, 4.11). In the calculation results obtained in online taxis, the highest gap is in pricing, with a value of -0.79. At the same time, the lowest gap is found in the distance parameter with a value of 0.16.

CONCLUSION

This paper aims to determine the performance between conventional and online taxis in Batam. Based on the results we have obtained, the performance of online taxis gets a higher average value than conventional taxis' average value. An average value of 3.79 for online taxis and 3.19 for conventional taxis proves that customer satisfaction with online taxis is better than conventional taxis. Some of the triggering factors that cause the low performance of conventional taxis are fares, convenience, and poor service. The average value of online taxi importance also achieved a higher average value compared to conventional taxis. With an average value of 4.13 for online taxis and 3.79 for conventional taxis, conventional taxis need to improve their services and change their fares to become cheaper. Conventional taxis must also improve their comfort and create a new system to compete in the market.
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