

Chapter 4

Operation of New Energy Vehicles



As of December 31, 2020, totally 3,923,000 NEVs have been accessed to the National Monitoring and Management Platform. With the scale growth of the number of NEVs accessed to the National Monitoring and Management Platform, it is of great significance to study the operation intensity and travel characteristics of NEVs. This chapter, based on the real-time operation data of millions of NEVs on the National Monitoring and Management Platform, analyzes the operation characteristics of vehicles in the seven major segments including private cars, e-taxis, taxis, cars for sharing and rental service, buses and heavy-duty trucks, providing important research basis and references for the study and evaluation of the electrification characteristics of the automobile industry and the low-carbon trend of energy structure, and for the construction of an intelligent traffic system (ITS).

4.1 NEV Online Rate in 2020

Vehicle online rate refers to the ratio of the number of vehicles running in the current period to the cumulative vehicle access, which reflects the use of vehicles in the current period. The higher the online rate of the vehicle, the higher the demand for the use of the vehicle, and the higher the utilization rate of the vehicle. This section, through an analysis of the overall online rate of vehicles on the National Monitoring and Management Platform and the vehicle online rate in key markets in the past three years, summarizes the current utilization rate of NEVs in China's NEV market.

4.1.1 NEV Online Rate in China

The average monthly online rate of NEVs in 2020 was 81.1%, and has increased continuously for three consecutive years.

The average monthly online rate of NEVs in China is gradually stabilized. According to the data from the past three years, the average monthly online rate has increased steadily for two consecutive years: in 2020, it was 81.1%, increased by 10.9% compared with 2018 and by 1.1% compared with 2019 (Table 4.1).

At the beginning of 2020, the monthly online rate was relatively low due to the COVID-19 outbreak, but after the epidemic was stably controlled, it gradually returned to the level of the same period last year. As the distribution shows (Fig. 4.1), the online rate was lower than 80% in February and March 2020, and after March, it was recovered and grew steadily to above 80% and the operation frequency of NEVs was maintained at a high level.

Considering the driving type of vehicles, the online rate of FCEVs is higher than that of BEVs and FCEVs.

As shown in Table 4.2, the average online rate of FCEVs in 2020 was significantly higher than that of BEVs and FCEVs. Specifically, the average monthly online rate of FCEVs was 93.7%, and boasted a higher reliance from the users; BEVs followed the FCEVs in the average monthly online rate with a value of 78.9% in 2020; FCEVs had a relatively low average monthly online rate of 75.0%. According to the distribution

Table 4.1 Average monthly online rate in China

Year	2018	2019	2020
Average online rate in China (%)	70.2	80.0	81.1

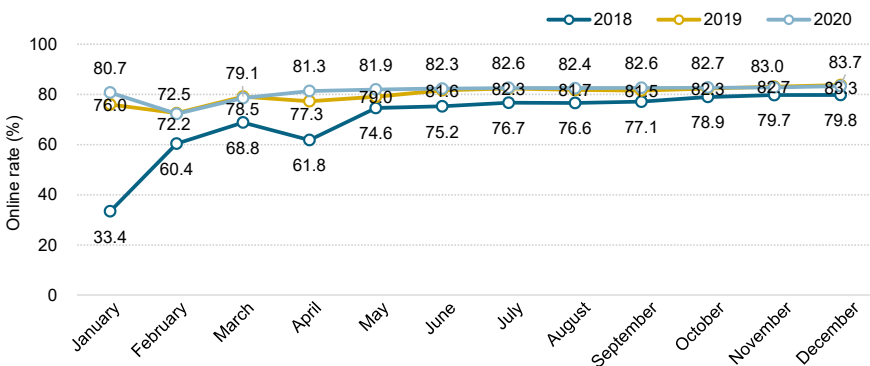


Fig. 4.1 Monthly online rate in China-by year

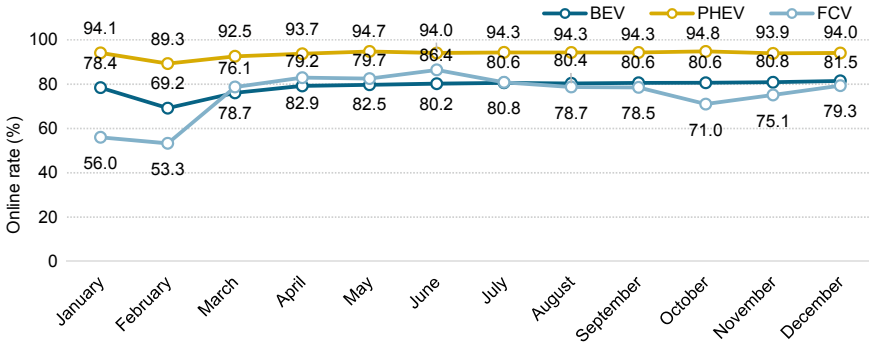


Fig. 4.2 Monthly online rate of China in 2020-by driving type

Table 4.2 Average online rate of China in 2020-by driving type

Driving type	BEV	PHEV	FCEV
Average online rate in China (%)	78.9	93.7	75.0

of monthly online rate of vehicles of different types (Fig. 4.2),the monthly online rate of PHEVs was relatively higher than BEVs and FCEVs.

4.1.2 Online Rate in Each Segment

The average monthly online rate of buses is higher than that of other segments.

According to the online rate of key segments (Fig. 4.3), the average monthly online rate of buses was the highest in 2020 with a value of 89.6%; according to the change of online rate over the years, the average monthly online rate of e-taxis, private cars, and heavy-duty trucks is increasing year by year.

4.2 Operation Characteristics of Vehicles in Key Segments

This section studies the operation characteristics of vehicles in key segments, and summarizes the travel characteristics of users, providing important basis for promoting the transition of the development mode of the NEV industry from the policy-driven mode to the market-driven mode. This section makes analysis by dividing the NEV market into seven segments including private cars, e-taxis, taxis, cars for sharing, logistics vehicles, buses and heavy-duty trucks, and summarizes the

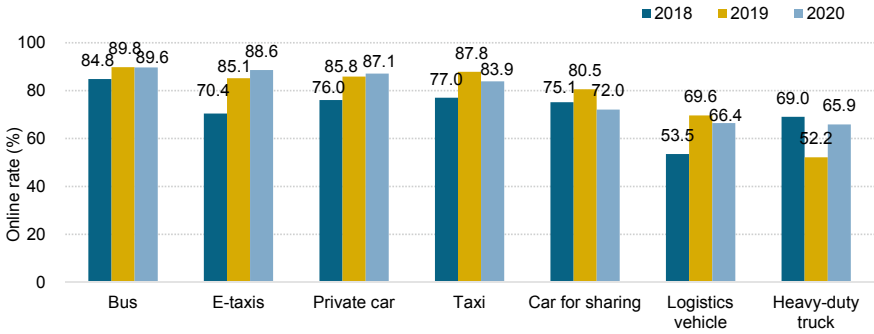


Fig. 4.3 Online rate of vehicles in key segments

travel characteristics of vehicles in those segments (Table 4.3). The specific indicators under analysis are as follows.

In this section, the average single-trip travel characteristics, the average daily travel characteristics, and the average monthly travel characteristics are analyzed for application scenarios including private cars and heavy-duty trucks; and for other application scenarios including e-taxis, taxis, cars for sharing, logistics vehicles, buses and heavy-duty trucks, the average daily travel characteristics and average monthly travel characteristics are selected as focuses for analysis.

Table 4.3 Indicators of NEV market operation characteristics

Analysis dimension	Analysis indicator	Definition
Average single-trip travel characteristics	Average single-trip travel duration	Average travel duration of a single trip
	Average single-trip mileage	Average travel mileage of a single trip
	Average single-trip speed	Average travel speed of a single trip
	Single-trip initial SOC	Average initial SOC of a single trip
Average daily travel characteristics	Average daily travel duration	Average travel duration in a single day
	Average daily mileage	Average travel mileage in a single day
	Driving time	Distribution of driving time in a single day (24 h)
Average monthly travel characteristics	Average monthly travel days	Average travel days in a single month
	Average monthly mileage	Average travel mileage in a single month

4.2.1 Operation Characteristics of Private Cars

(1) Average single-trip travel characteristics of private cars

The average single-trip travel duration of private cars in 2020 was lower than that of the same period in 2019.

According to data from the National Monitoring and Management Platform, the average single-trip travel duration of private cars in China has been declining year by year, and in 2020, it was only 0.42 h, which is lower than that in 2018 and 2019 (Table 4.4).

The average single-trip travel duration of private cars is mainly within 0.5 h. As the distribution shows (Fig. 4.4), the proportion of private cars with an average single-trip travel duration of less than 0.5 h has increased for two consecutive years: in 2020, it was 71.4%, with an increase of 9.2% and 3.9% compared with 2018 and 2019, respectively.

The average single-trip mileage of private cars is mainly within 20 km, and the average single-trip mileage in 2020 was lower than that in 2019.

According to the monthly average over the years (Table 4.5), the single-trip average monthly mileage of private cars in 2020 was lower than that in 2019 due to the COVID-19 outbreak, but by November, it was finally recovered to the level of the same period in 2019.

The average single-trip mileage of private cars is mainly within 20 km. According to the distribution of average single-trip mileage over the years (Fig. 4.5), the proportion of private cars with an average single-trip mileage of 0–10 km was nearly 50% in

Table 4.4 Average single-trip travel duration of private cars over the years

Year	2018	2019	2020
Average single-trip travel duration (h)	0.51	0.47	0.42

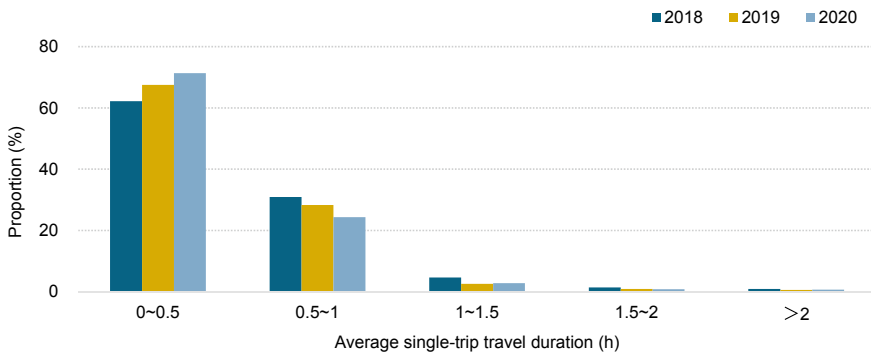


Fig. 4.4 Distribution of average single-trip travel duration of private cars-by year

Table 4.5 Average single-trip mileage of private cars over the years

Year	2018	2019	2020
Average single-trip mileage (km)	13.99	13.15	11.44

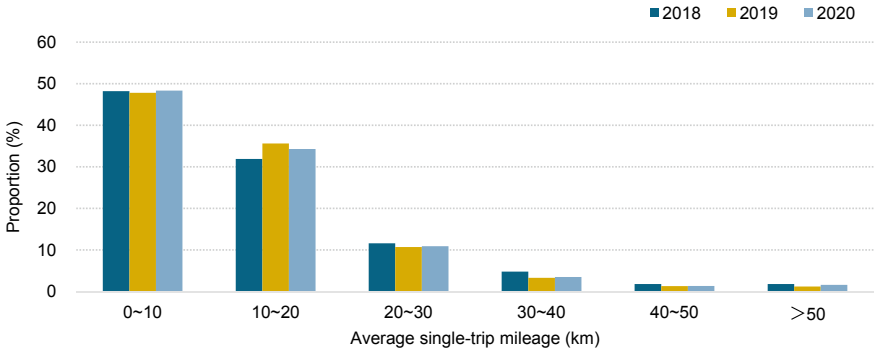


Fig. 4.5 Distribution of average single-trip mileage of private cars-by year

the past year, and in 2020, the proportion of private cars with an average single-trip mileage of 10–20 km was 34.3%.

The distribution of average single-trip mileage of private cars in first-tier and fifth-tier cities is quite different from that in other cities. First-tier cities have such a size that the average single-trip mileage of private cars is somehow affected. As shown in Fig. 4.6, in 2020, the average single-trip mileage of private cars in first-tier cities was mainly within 30 km, with a proportion up to 86.9%; also in fifth-tier cities, the proportion of private cars with an average mileage of more than 50 km was as high up to 15%, which suggests that in fifth-tier cities, the passenger cars are used not only for short-distance daily travel but also for long-distance cross-town travel.

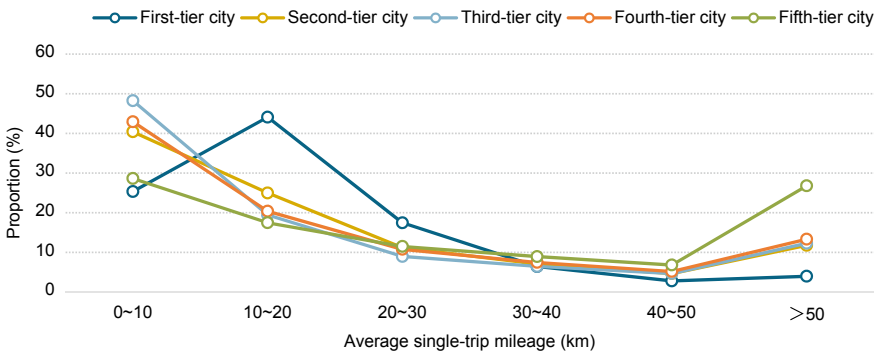


Fig. 4.6 Distribution of average single-trip mileage of private cars in 2020-by city tier

The average single-trip speed of private cars is mainly 20–40 km/h, and in 2020, it was 29.46 km/h.

The single-trip average speed of private cars is increasing year by year. In 2020, it was 29.46 km/h with a YoY increase of 11.6% (Table 4.6), contributing to a significant improvement of the traffic environment. According to the data over the years (Fig. 4.7), the average single-trip speed of private cars in the first half of 2020 was significantly higher than that of the same period in 2019 and 2018 due to the COVID-19 outbreak, and as the epidemic was quickly controlled, the monthly average of single-trip average speed of private cars, by June 2020, approximately dropped to the level of the same period in 2019, and the willingness of private car users to travel returned to normal.

The single-trip initial SOC of private cars is mainly 60–80%, and the proportion of private cars with such a single-trip initial SOC is increasing year by year

The single-trip initial SOC of private cars is increasing year by year. As shown in Table 4.7, the average single-trip initial SOC of private cars in 2020 was 63.29%, and increased by 1.36% and 0.64% compared with 2018 and 2019, respectively. The single-trip initial SOC of private cars is mainly 60–80%. As shown in Fig. 4.8, in 2020, the proportion of private cars with such a single-trip initial SOC was 66.98%,

Table 4.6 Average single-trip speed of private cars—average

Year	2018	2019	2020
Average single-trip speed (km/h)	25.76	26.39	29.46

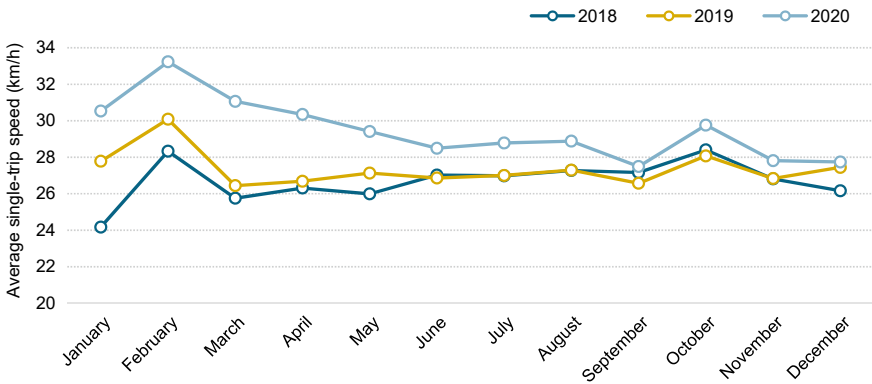


Fig. 4.7 Monthly average of average single-trip speed of private cars over the years

Table 4.7 Single-trip initial SOC of private cars—average

Year	2018	2019	2020
Single-trip initial SOC (%)	61.29	62.65	63.29

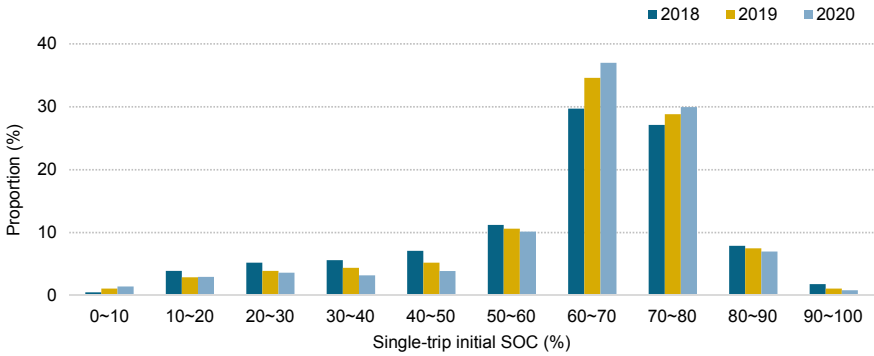


Fig. 4.8 Distribution of single-trip initial SOC of private cars-by year

which is 6.6% and 3.55% higher than that of 2018 and 2019, respectively. The increase in the single-trip initial SOC is caused not only by the increase in anxiety, but also by the wide deployment of private charging piles and the resulting improved convenience of charging.

The single-trip initial SOC characteristics of BEV and FCEV private cars are quite different (Fig. 4.9). The distribution of single-trip initial SOC of BEV private cars is basically the same as that of new energy private cars, i.e., relatively concentrated, but the single-trip initial SOC of BEV private cars is mainly 60–80%. In 2020, the proportion of BEV private cars with a single-trip initial SOC of more than 60% was 89%, but the distribution of the single-trip initial SOC of FCEV private cars is relatively discrete, for example, in 2020, the proportion of FCEV private cars with a single-trip initial SOC of more than 60% was only 26.6%.

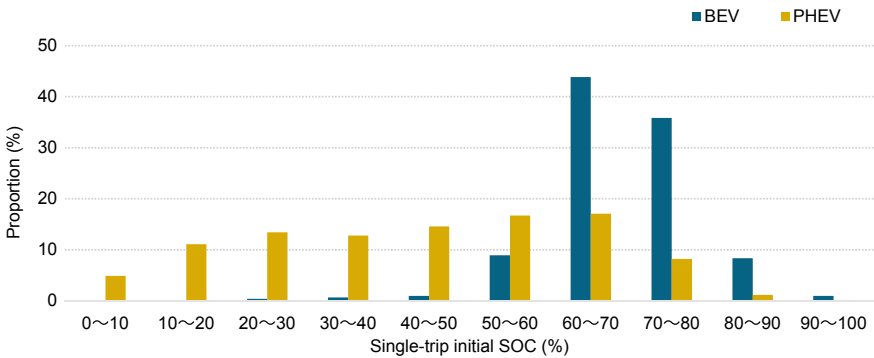


Fig. 4.9 Distribution of single-trip initial SOC of private cars-by driving type

(2) Average daily travel characteristics of private cars

At the beginning of 2020 when the epidemic prevention and control was in its most tough stage, the average daily travel duration of private cars was very low, but it was quickly restored after the epidemic was controlled.

The average daily travel duration of private cars has been maintained at about 1.5 h with slow increase in the past three years. In 2020, the average daily travel duration of private cars was 1.58 h, which is 6.04% and 2.60% higher than that of 2018 and 2019, respectively (Table 4.8).

The average daily travel duration of private cars is mainly 1–2 h. According to the distribution over the years (Fig. 4.10), the private cars with an average daily travel duration of 1–2 h in 2020 accounted for 55.19% of the number of private cars accessed to the National Monitoring and Management Platform, which is significantly higher than that in 2018 and 2019.

The travel of private cars was curbed in early 2020 due to the COVID-19 outbreak, but after March, it was recovered and was generally higher than that of the same period last year.

According to the monthly changes over the years (Fig. 4.11), the average daily mileage of private cars was very low in early 2020 due to the COVID-19 outbreak, but after March when the epidemic was well controlled, the average daily mileage of private cars increased rapidly, and even exceeded the level of the same period in 2019. According to the monthly average over the years (Table 4.9), the average daily mileage of private cars in 2020 was 45.73 km, which is 8.9% higher than that of 2019.

Table 4.8 Average daily travel duration of private cars-average

Year	2018	2019	2020
Average daily travel duration (h)	1.49	1.54	1.58

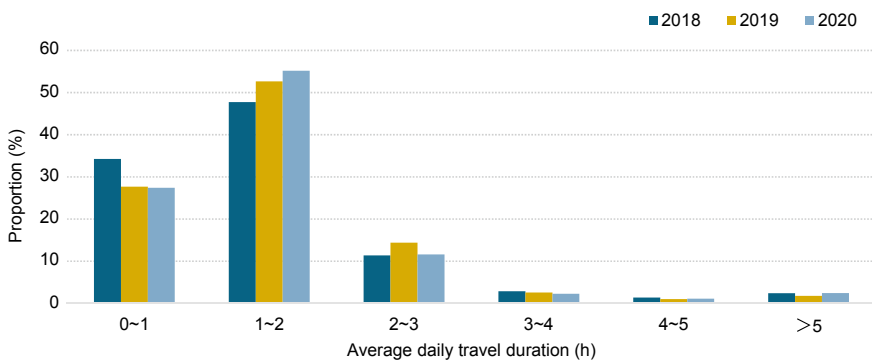


Fig. 4.10 Distribution of average daily travel duration of private cars-by year

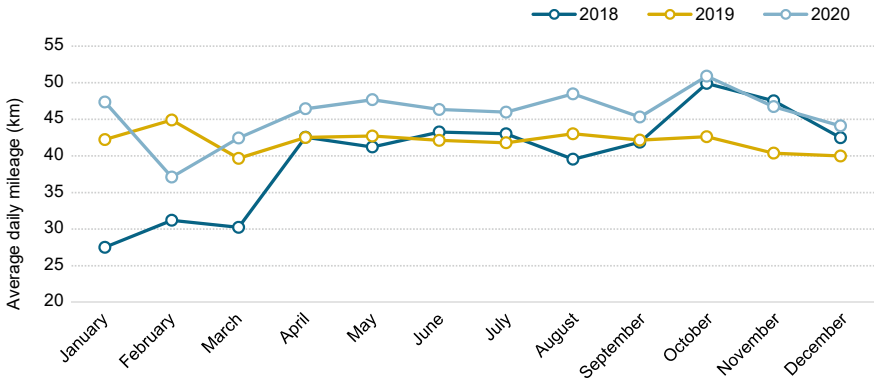


Fig. 4.11 Monthly average of average daily mileage of private cars over the years

Table 4.9 Average daily mileage of private cars-average

Year	2018	2019	2020
Average daily mileage (km)	40.02	42	45.73

As shown in Fig. 4.12, the average daily mileage of private cars in first-tier cities is significantly higher than that in other cities. Specifically, the average daily mileage in first-tier cities is more than 40 km, and the proportion of private cars with such average daily mileage is 59.5%, while in other cities, the proportion of private cars with an average daily mileage of more than 40 km is 46.9% at maximum, suggesting that the size of first-tier cities has a certain impact on driving intensity.

The driving time of private cars is mainly concentrated in the morning and evening commuting period, and thus it shows obvious “double-peak” characteristics.

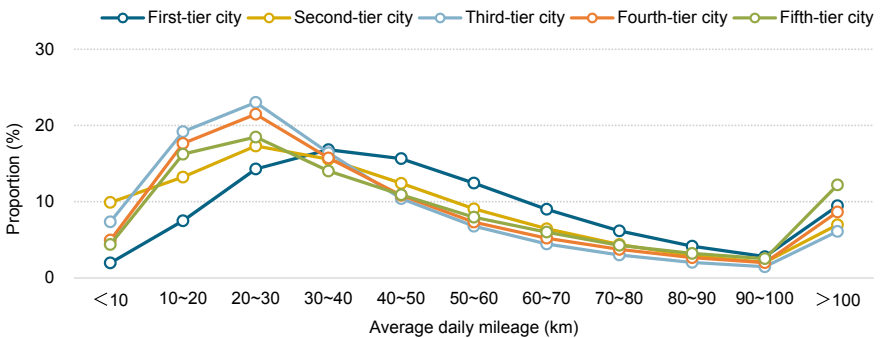


Fig. 4.12 Distribution of average daily mileage of private cars in 2020-by city tier

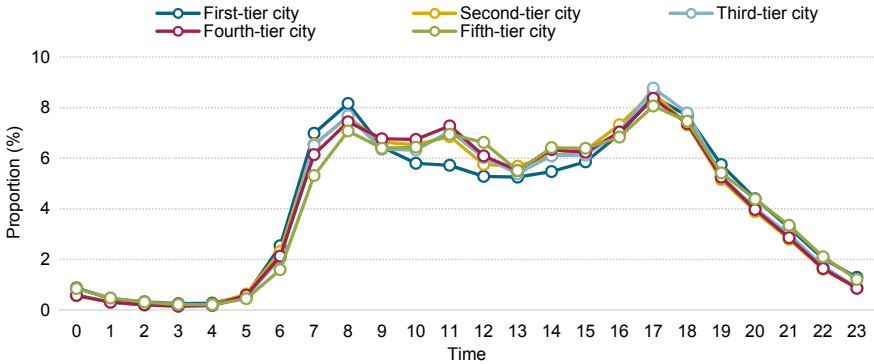


Fig. 4.13 Distribution of driving time of private cars in 2020-by city tier

As the distribution shows (Fig. 4.13), the traffic of private cars mainly peaks at two time points, namely 8:00 and 17:00. During the morning rush hour, the traffic of private cars climbs rapidly after 5:00, especially from 6:00 to 7:00, and reaches the peak at 8:00; during the evening rush hour, the traffic of private cars is mainly concentrated around 17:00. Considering from the city tier, the travel of private cars in first-tier cities shows more obvious morning peak characteristics, with the proportion of private cars traveling during the morning rush hour significantly higher. In addition, the proportion of private cars traveling in the period from 10:00 to 15:00 in first-tier cities is lower.

(3) Average monthly travel characteristics of private cars

In 2020, the average monthly travel days of private cars was less limited by the COVID-19 outbreak and even increased.

According to the average monthly travel days of private cars over the years, users’ dependence on new energy private cars has steadily increased. As shown in Table 4.10, the average monthly travel days in 2020 was 18.68, which is 7 days and 3 days more than that in 2018 and 2019, respectively.

As the distribution shows (Fig. 4.14), the average monthly travel days of private cars in the past two years is mainly 15–20 and 20–25, and the proportion of private cars with average monthly travel days in these two sections increased greatly in the past two years, which reflects to a certain extent the gradual improvement of the operation environment of NEVs, and also the gradual increase in the user’s stickiness to NEVs.

Table 4.10 Average monthly travel days of private cars-average

Year	2018	2019	2020
Average monthly travel days	11.97	15.62	18.68

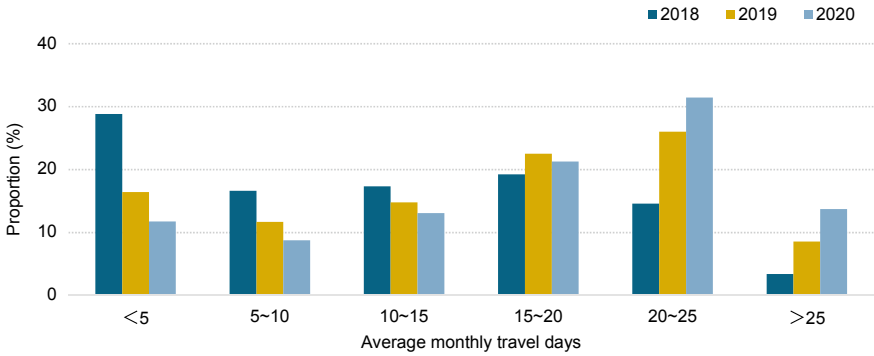


Fig. 4.14 Distribution of average monthly travel days of private cars-by year

The average monthly mileage of private cars is increasing year by year, and in 2020, it was 918.54 km, increasing by 25.2% compared with last year (Table 4.11).

According to the average of monthly average mileage over the years (Fig. 4.15), in early 2020 when the residents’ willingness to travel decreased and the work resumption was delayed due to the COVID-19 outbreak, the average monthly mileage of passenger cars in February was extremely low, but after the epidemic was quickly brought under control, residents’ travel was quickly recovered, and since March, the average monthly mileage of private cars exceeded the level of the same period in 2019.

As the distribution shows (Fig. 4.16), the proportion of passenger cars with an average monthly mileage of less than 1000 km is the highest, and has increased greatly in the past two years. The proportion of private cars with a monthly average mileage of more than 1,000 km increased from 14.5% in 2018 to 27.2% in 2020.

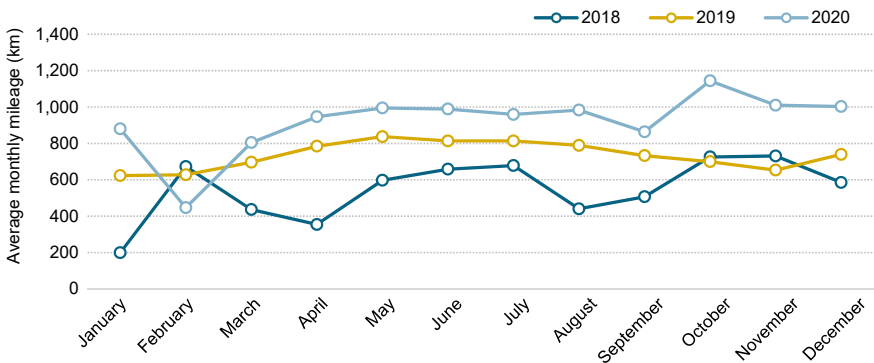


Fig. 4.15 Average of average monthly mileage of private cars over the years

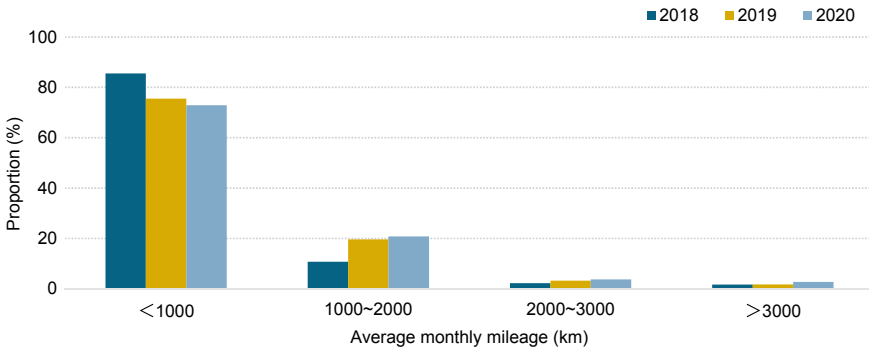


Fig. 4.16 Distribution of average monthly mileage of private cars-by year

Table 4.11 Average monthly mileage of private cars-average

Year	2018	2019	2020
Average monthly mileage (km)	548.44	733.84	918.54

4.2.2 Operation Characteristics of E-taxis

(1) Average daily travel characteristics of e-taxis

Due to the COVID-19 outbreak, the daily travel duration of e-taxis in 2020 decreased compared with 2019.

In the past three years, the average daily travel duration of e-taxis has been maintained at about 6 h. In 2020, the average daily travel duration of e-taxis was 6.1 h (Table 4.12), which is slightly lower than that in 2019.

According to the data over the years (Fig. 4.17), in February and March 2020, the travel of e-taxis was curbed due to the COVID-19 outbreak, and in February, it was as low as 2.62 h; then since May 2020, the average of the average daily travel duration was almost the same as that of the same period in 2019, and after September, it declined slightly.

As the distribution shows (Fig. 4.18), the proportion of e-taxis with a daily average travel duration of more than 6 h in 2020 was 62.7%, which is 4.1% lower than that in 2019 but still higher than that in 2018.

The average daily mileage of e-taxis is mainly 100–250 km, and in 2020 due to the COVID-19 outbreak, it reduced slightly compared with 2019.

Table 4.12 Average daily travel duration of e-taxis-average

Year	2018	2019	2020
Average daily travel duration (h)	5.88	6.99	6.1

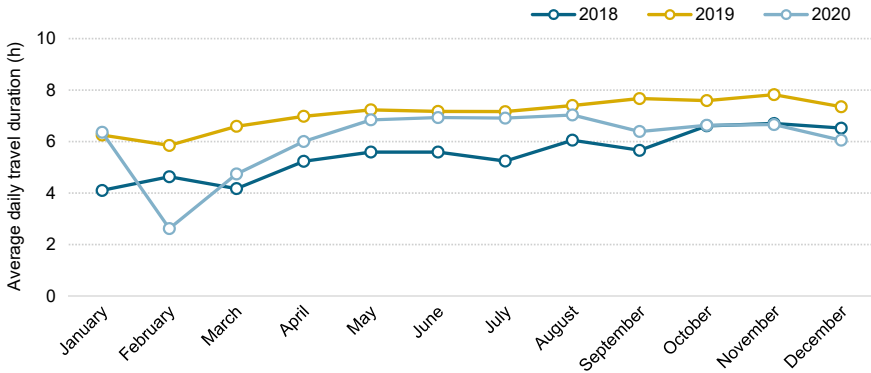


Fig. 4.17 Monthly average of average daily travel duration of e-taxis over the years

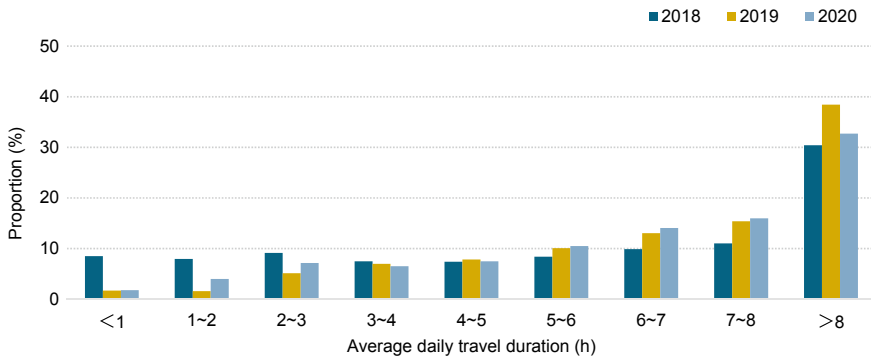


Fig. 4.18 Distribution of average daily travel duration of e-taxis-by year

According to the data over the years, the average daily mileage of e-taxis in 2020 was 157.81 km, decreasing by 5.6% compared with last year (Table 4.13). According to the monthly changes in the average daily mileage over the years (Fig. 4.19), in February, the travel of e-taxis was curbed by the epidemic, and the average daily mileage was only 84.84 km, but after the epidemic was quickly controlled, the monthly average of daily mileage average was almost recovered to the level of the same period in 2019, and after September, it was lower than that of the same period in 2019.

The average daily mileage of e-taxis is mainly 100–250 km. As the distribution shows (Fig. 4.20), the proportion of e-taxis with an average daily mileage of 100–250 km was up to 74.4% (nearly 3/4).

Table 4.13 Average daily mileage of e-taxis-average

Year	2018	2019	2020
Average daily mileage (km)	141.67	167.25	157.81

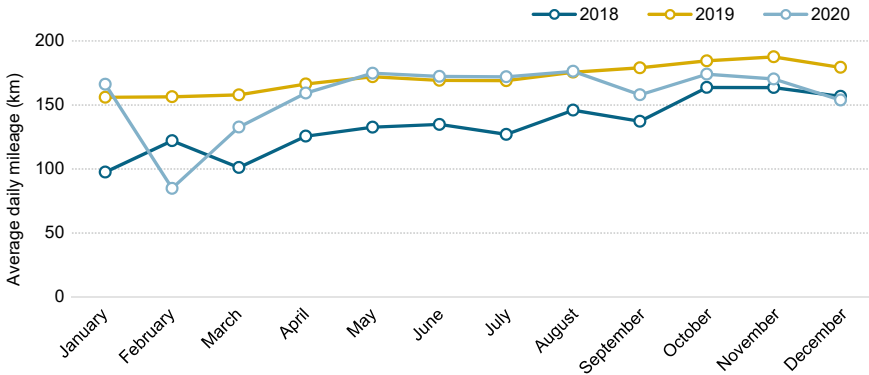


Fig. 4.19 Monthly average of average daily mileage of e-taxis over the years

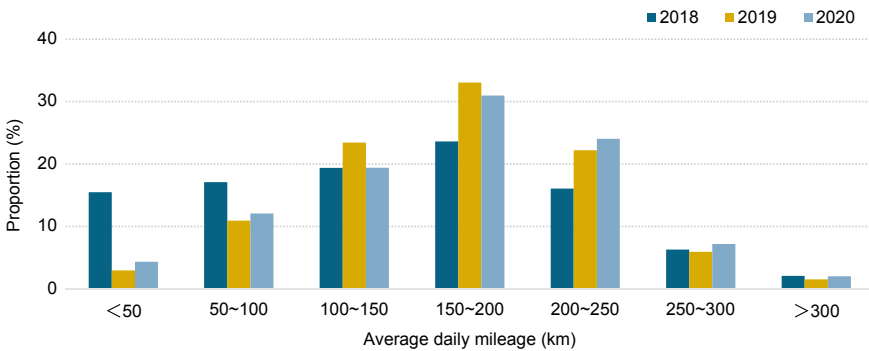


Fig. 4.20 Distribution of average daily mileage of e-taxis-by year

The driving time of e-taxis is mainly 7:00–21:00, and the proportion of vehicles traveling at night is relatively high.

According to the distribution of driving time, the driving time of e-taxis is mainly 7:00–21:00, and in this period, the distribution is relatively balanced with small fluctuation. According to the distribution of driving time of e-taxis in different cities (Fig. 4.21), the proportion of e-taxis travelling at night (23:00 to 5:00 the next day) in first-tier cities is 11.9%, which is significantly higher than that in the other cities.

(2) Average monthly travel characteristics of e-taxis

The average monthly travel days of e-taxis market is increasing year by year, and in 2020, it was 21.6, which is 0.83 days more than that in 2019.

In the past three years, the average monthly travel days of e-taxis has increased year by year. Specifically, in 2020, the average monthly travel days of e-taxis was 21.6 days, which is 4.69 days and 0.83 days more than that in 2018 and 2019, respectively

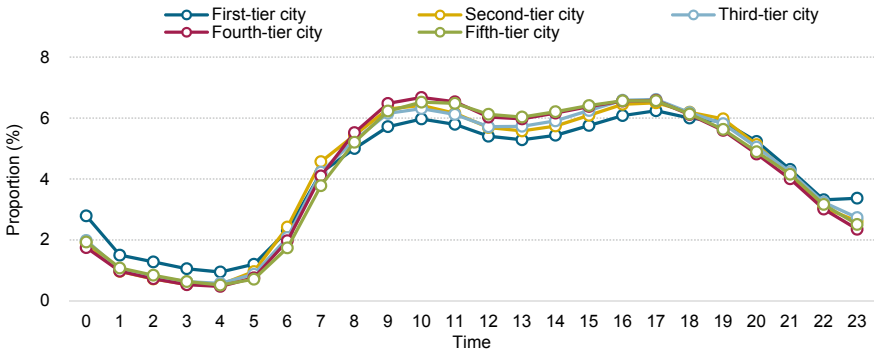


Fig. 4.21 Distribution of driving time of e-taxis in 2020-by city tier

Table 4.14 Average monthly travel days of e-taxis-average

Year	2018	2019	2020
Average monthly travel days	16.91	20.77	21.6

(Table 4.14). As the distribution shows (Fig. 4.22), the proportion of e-taxis with an average monthly travel days of 20–25 in 2020 was 38.96%, which is 1.27% lower than that in 2020, but still 4.76% higher than that in 2018.

In 2020 due to the outbreak of epidemic, the average monthly mileage of e-taxis decreased compared with 2019.

According to the data over the years, the average of average monthly mileage of e-taxis in 2020 was 3580.24 km, which is 5.6% lower than that in 2019 (Table 4.15), but still 22.6% higher than that in 2018.

According to the average of average monthly mileage over the years (Fig. 4.23), in February and March 2020, the average of average monthly mileage of e-taxis was

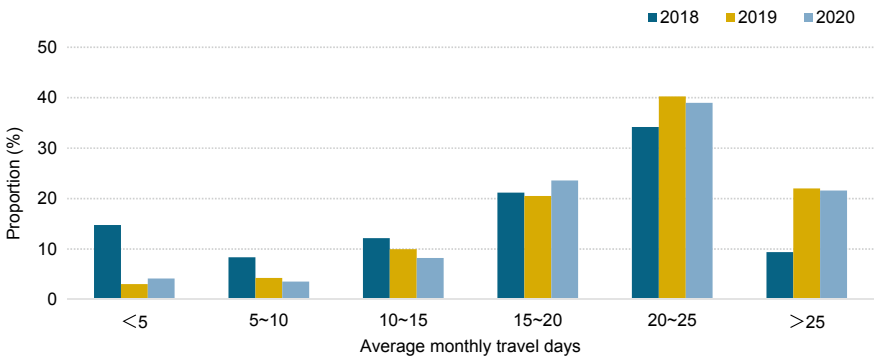


Fig. 4.22 Distribution of average monthly travel days of e-taxis-by year

Table 4.15 Average monthly mileage of e-taxis-average

Year	2018	2019	2020
Average monthly mileage (km)	2921.32	3854.08	3580.24

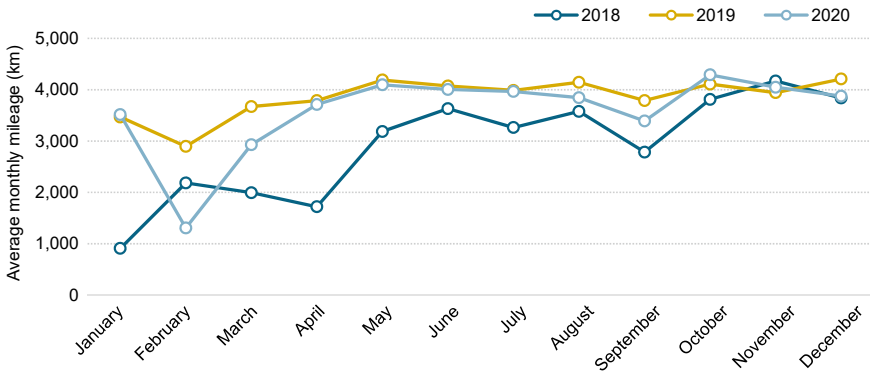


Fig. 4.23 Average of average monthly mileage of e-taxis over the years

very low, but since April 2020 when people’s willingness to travel was gradually restored, the average monthly mileage of online ride-hailing was almost recovered to the level of the same period in 2019.

As the distribution shows (Fig. 4.24), the proportion of e-taxis with an average monthly mileage of more than 2000 km in 2020 was 79.3%, which is lower than the 84.5% in 2019, but still higher than the 60.7% in 2018.

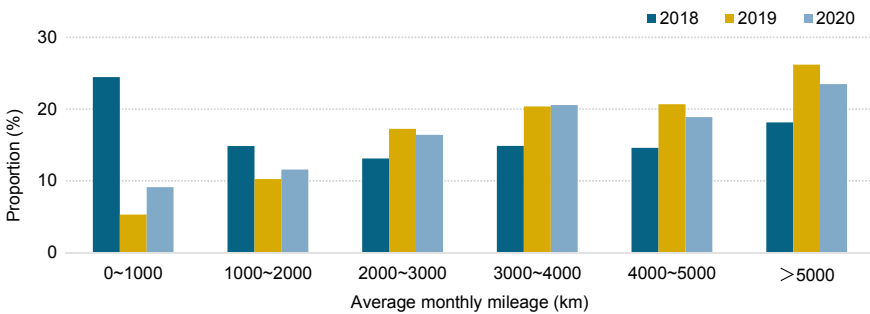


Fig. 4.24 Distribution of average monthly mileage of e-taxis-by year

4.2.3 Operation Characteristics of Taxis

(1) Average daily travel characteristics of taxis

Due to the COVID-19 outbreak, the average daily travel duration of taxis in 2020 decreased compared with 2018 and 2019.

In the past three years, the average daily travel duration of taxis was mainly about 8 h, and in 2020, it was only 7.36 h, decreasing by 16.6% compared with last year (Table 4.16).

According to the monthly average of average daily travel duration over the years (Fig. 4.25), the outbreak of the COVID-19 epidemic in early 2020 had a significant impact on the travel of taxis, and in February and March, the average daily travel duration was very low, but after the epidemic was quickly controlled, in June 2020, the monthly average of average daily travel duration of taxis almost recovered to the level of the same period in 2019, and by November 2020, it was higher than that of the same period in 2019.

Due to the COVID-19 outbreak, the average daily mileage of taxis in 2020 was reduced compared with 2019.

According to the data over the years, the average daily mileage of taxis in 2020 was 186.46 km, which is 14.95 km and 23.61 km lower than that in 2018 and 2019, respectively (Table 4.17).

According to the monthly change of average daily mileage of taxis over the years (Fig. 4.26), the average daily mileage of taxis from February to April 2020 was very low., but after the epidemic was quickly brought under control, it gradually returned

Table 4.16 Average daily travel duration of taxis-average

Year	2018	2019	2020
Average daily travel duration (h)	8.66	8.82	7.36

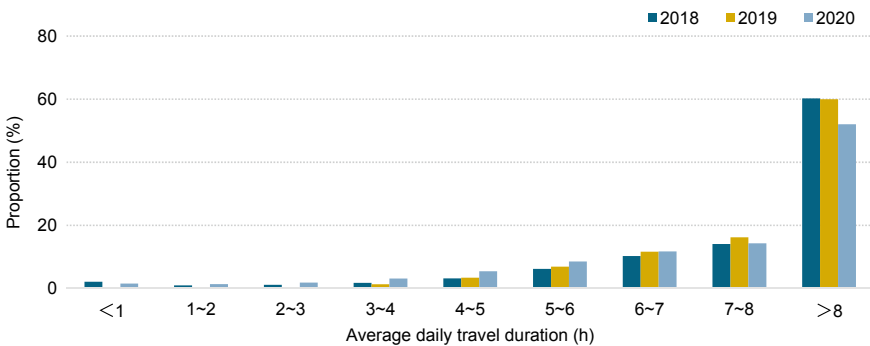


Fig. 4.25 Distribution of average daily travel duration of taxis-by year

Table 4.17 Average daily mileage of taxis-average

Year	2018	2019	2020
Average daily mileage (km)	201.41	210.07	186.46

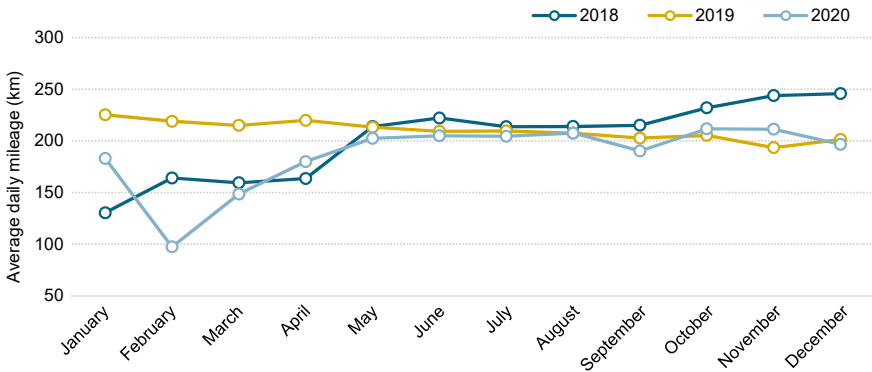


Fig. 4.26 Monthly average of average daily mileage of taxis over the years

to the level of the same period last year, and by May 2020, it is almost at the same level of the same period in 2019.

As the distribution shows (Fig. 4.27), the proportion of taxis with an average daily mileage of more than 200 km decreased from 47.5% in 2019 to 44.4% in 2020, indicating that the operation intensity of taxis decreased.

In 2020, the proportion of taxis traveling from 0:00 to 5:00 the next day was higher than that in 2018 and 2019, and considering from the city tier, the proportion of taxis traveling at night in first-tier cities is higher.

According to the distribution of driving time of taxis, the driving time of taxis is mainly 7:00–19:00, in which the proportion of operating taxis fluctuates less. The

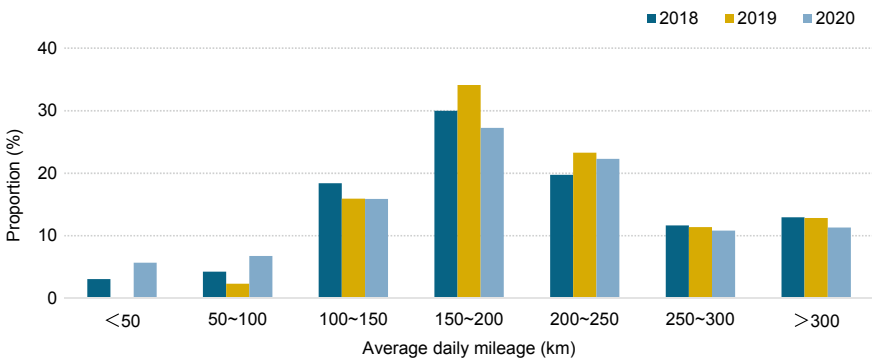


Fig. 4.27 Distribution of average daily mileage of taxis-by year

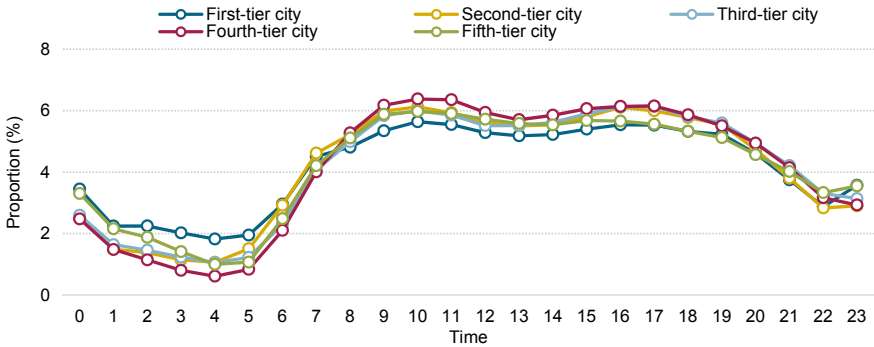


Fig. 4.28 Distribution of driving time of taxis in 2020-by city tier

proportion of taxis traveling from 0:00 to 5:00 the next day in 2020 was higher than that in 2018 and 2019. Considering from the city tier (Fig. 4.28), the proportion of taxis traveling from 0:00 to 5:00 the next day in first-tier cities is 13.72%, which is significantly higher than that in cities of other cities mainly due to the blooming commercial and entertainment activities in first-tier cities at night.

(2) Average monthly travel characteristics of taxis

The average monthly travel days of taxis is mainly 20+, and in 2020, it reduced slightly (Table 4.19).

According to the data over the years, the average travel days of taxis in 2020 was 22.28, with a YoY decrease of 3.4% (Table 4.18). According to the distribution of average monthly travel days of taxis over the years, the proportion of taxis with an average monthly travel days of more than 20 decreased in 2020. According to the distribution of average monthly travel days of taxis (Fig. 4.29), in 2020, the proportion of taxis with an average monthly travel days of more than 20 was 65.4%, which is nearly 10% lower than that in 2019, and indicates that the travel frequency of taxis decreased.

Due to the COVID-19 outbreak, the average monthly mileage of taxis in 2020 was 4159.89 km, which is lower than that in 2018 and 2019.

As the distribution shows (Fig. 4.30), the proportion of taxis with an average monthly mileage of more than 4000 km in 2020 was 54.7%, which is lower than the value of 68.5% in 2019 and also 61.2% in 2018.

Table 4.18 Average monthly travel days of taxis-average

Year	2018	2019	2020
Average monthly travel days	21.93	23.07	22.28

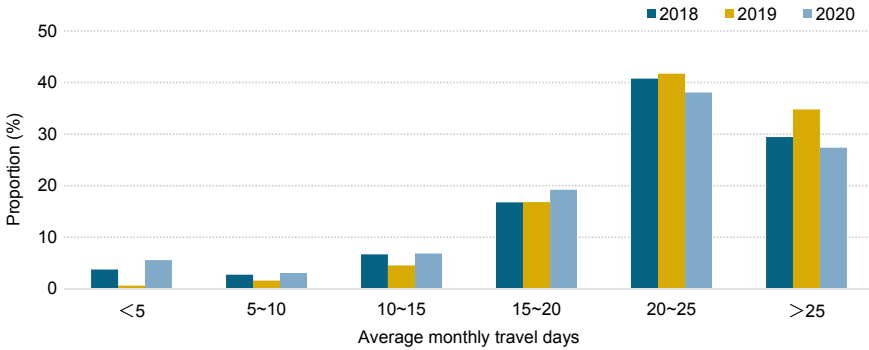


Fig. 4.29 Distribution of average monthly travel days of taxis-by year

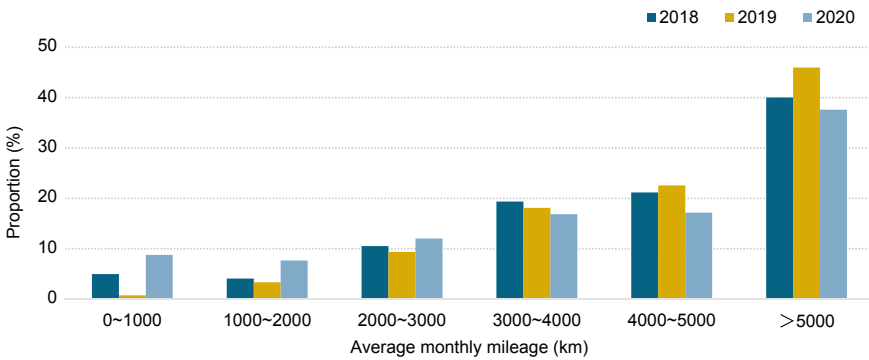


Fig. 4.30 Distribution of average monthly mileage of taxis-by year

Table 4.19 Average monthly mileage of taxis-average

Year	2018	2019	2020
Average monthly mileage (km)	4794.66	5154.38	4159.89

4.2.4 Operation Characteristics of Cars for Sharing

(1) Average daily travel characteristics of cars for sharing

The average daily travel duration of cars for sharing is mainly 1–3 h, and in 2020, it was basically the same as that of the last year.

The average daily travel duration of cars for sharing is more than 2 h, and compared with 2018, it increased in 2019 and 2020 (Table 4.20).

According to the distribution over the years (Fig. 4.31), the average daily travel duration of cars for sharing is mainly 1–3 h, with the proportion of cars for sharing with such an average daily travel duration up to 64.9% in 2020.

Table 4.20 Average daily travel duration of cars for sharing—average

Year	2018	2019	2020
Average daily travel duration (h)	2.46	2.78	2.74

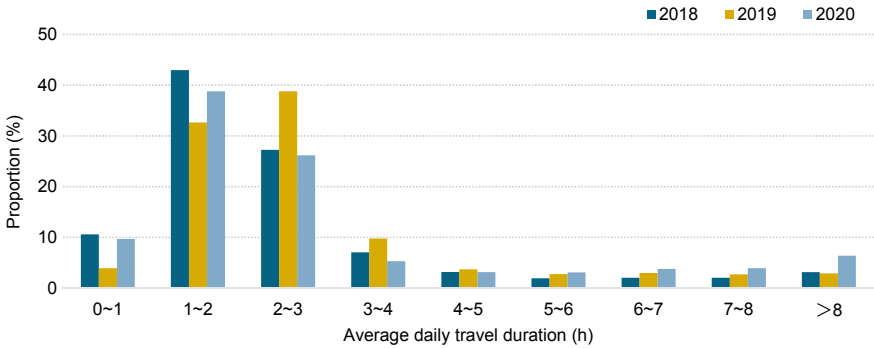


Fig. 4.31 Distribution of average daily travel duration of cars for sharing-by-year

The average daily mileage of cars for sharing in 2020 was 99.63 km, which is significantly higher than that in 2019.

In the past three years, the average daily mileage of cars for sharing in China has increased year by year, and in 2020, it reached 99.63 km, increasing by 28.9% compared to last year (Table 4.21). According to the monthly average over the years (Fig. 4.32), the monthly average of average daily mileage of cars for sharing increased rapidly after the epidemic, and exceeded the level of the same period in 2019 after April.

As the distribution shows (Fig. 4.33), the average daily mileage of cars for sharing is mainly less than 100 km. In 2020, the proportion of cars for sharing with an average daily mileage of more than 200 km was increased by 13.81% to 15.89% compared with 2019, indicating that the daily mileage of vehicles gradually transitioned to a high mileage range.

(2) Average monthly travel characteristics of cars for sharing

The average monthly travel days of cars for sharing is mainly 15–25.

According to the data over the years (Table 4.22), the average monthly travel days of cars for sharing in China, compared with 2018, has increased rapidly since 2019.

Table 4.21 Average daily mileage of cars for sharing-average

Year	2018	2019	2020
Average daily mileage (km)	65.80	77.30	99.63

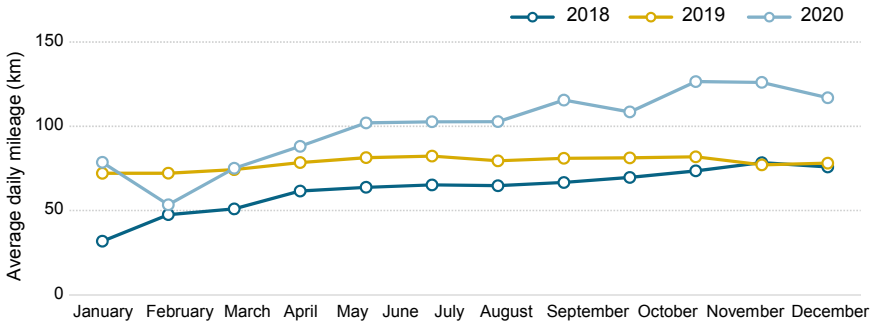


Fig. 4.32 Monthly average of average daily mileage of cars for sharing over the years

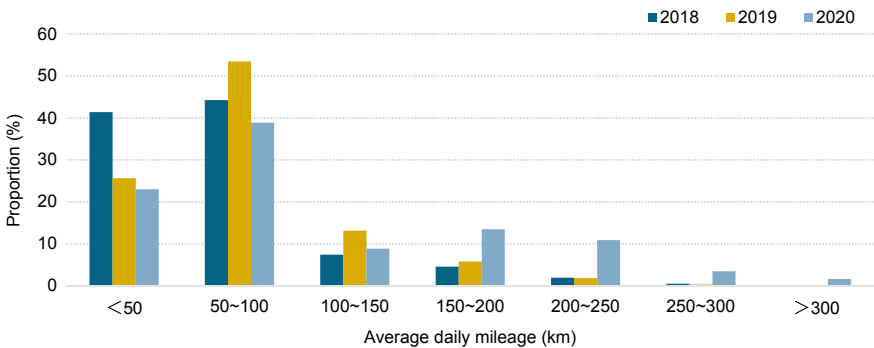


Fig. 4.33 Distribution of average daily mileage of cars for sharing-by year

Table 4.22 Average monthly travel days of cars for sharing-average

Year	2018	2019	2020
Average monthly travel days	14.77	18.57	18.43

As the distribution shows (Fig. 4.34), the average monthly travel days of cars for sharing is mainly 15–25, with the proportion of cars for sharing, with such average monthly travel days, up to 57.27% in 2020.

The average monthly mileage of cars for sharing is increasing year by year.

In the past three years, the average monthly mileage of cars for sharing has increased year by year, and in 2020, it reached 2612.85 km, increasing by 65.1% compared with last year (Table 4.23).

According to the average over the years (Fig. 4.35), the average monthly mileage of cars for sharing far exceeded the level of the same period in 2019 since March 2020, and it maintained at a high level throughout the year.

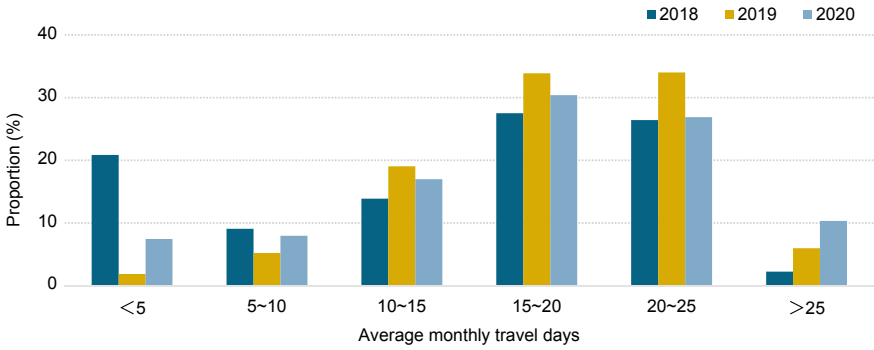


Fig. 4.34 Distribution of average monthly travel days of cars for sharing-by year

Table 4.23 Average monthly mileage of cars for sharing-average

Year	2018	2019	2020
Average monthly mileage (km)	1159.07	1582.7	2612.85

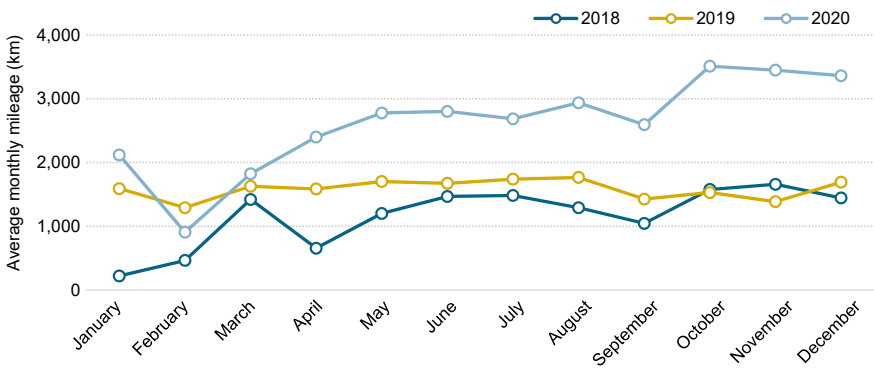


Fig. 4.35 Average of average monthly mileage of cars for sharing over the years

As the distribution shows (Fig. 4.36), the average monthly mileage of cars for sharing is mainly 1000–2000 km; in 2020, the proportion of cars for sharing with an average daily mileage of more than 3000 km increased to 28.3% from 7.3% in 2018, which indicates that the operation environment of cars for sharing has improved.

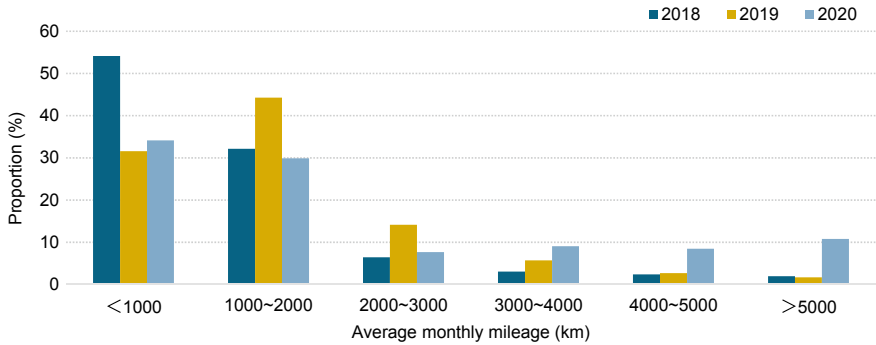


Fig. 4.36 Distribution of average monthly mileage of cars for sharing-by year

4.2.5 Operation Characteristics of Logistics Vehicles

(1) Average daily travel characteristics of logistics vehicles

The average daily travel duration of logistics vehicles is increasing year by year.

In the past three years, the average daily travel duration of logistics vehicles in China has increased year by year; in 2020, it reached 3.24 h, which is 0.91 h and 0.39 h longer than that in 2018 and 2019, respectively (Table 4.24).

As the distribution shows (Fig. 4.37), the proportion of logistics vehicles with an average daily travel duration of more than 3 h has increased gradually, and in 2020, it increased by 23.5 to 55.5% compared with 2018, indicating that the average daily travel duration of logistics vehicles increased significantly.

In 2020, the average daily mileage of logistics vehicles increased significantly, and in the fight against the COVID-19 epidemic, the logistics vehicles played an important role in the smooth operation of transportation.

According to the data over the years (Table 4.25), the average daily mileage of logistics vehicles in 2020 was 86.62 km with an increase of 57.8% and 24.6% compared with 2018 and 2019 respectively, indicating that the average daily mileage of logistics vehicles has been rapidly improved.

According to the monthly average over the years (Fig. 4.38), the average daily mileage of logistics vehicles in each month of 2020 was higher than that of the same period in 2019, and especially during the period from February to March 2020 when the fight against the epidemic was in the crucial stage, logistics vehicle played an important and active role in the smooth operation of transportation.

Table 4.24 Average daily travel duration of logistics vehicles-average

Year	2018	2019	2020
Average daily travel duration (h)	2.33	2.85	3.24

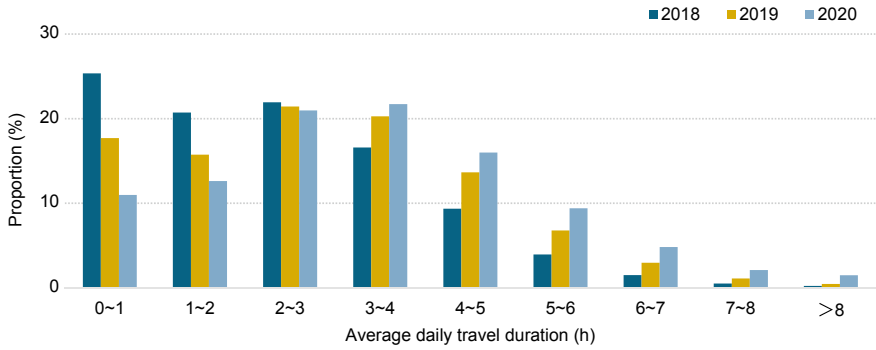


Fig. 4.37 Distribution of average daily travel duration of logistics vehicles-by year

Table 4.25 Average daily mileage of logistics vehicles-average

Year	2018	2019	2020
Average daily mileage (km)	54.89	69.53	86.62

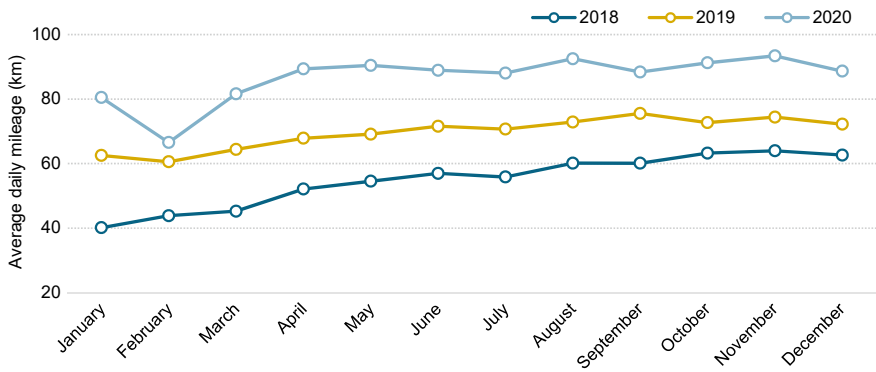


Fig. 4.38 Monthly average of average daily mileage of logistics vehicles over the years

As the distribution shows (Fig. 4.39), the average daily mileage of logistics vehicles is mainly below 150 km, and the proportion of logistics vehicles with an average daily mileage of more than 100 km increased significantly from 13.1% in 2018 to 36.9% in 2020.

(2) Average monthly travel characteristics of logistics vehicles

The average monthly travel days of logistics vehicles in 2020 increased significantly compared with 2018 and 2019.

In the past three years, the average monthly travel days of logistics vehicles has increased year by year, and in 2020, it reached 19.65 days with an increase of 6.55

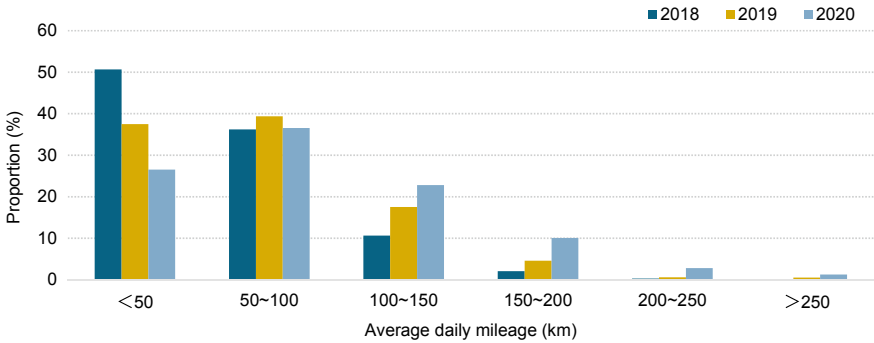


Fig. 4.39 Distribution of average daily mileage of logistics vehicles-by year

Table 4.26 Average monthly travel days of logistics vehicles-average

Year	2018	2019	2020
Average monthly travel days	13.1	15.62	19.65

and 4.03 days compared with 2018 and 2019, indicating that the travel frequency of logistics vehicles has increased significantly (Table 4.26).

According to the average over the years (Fig. 4.40), the travel days of logistics vehicles in each month of 2020 were higher than that of the same period in 2019, indicating that the epidemic drove but not curbed the increase of the times of travel of logistics vehicles.

As the distribution shows (Fig. 4.41), the proportion of logistics vehicles with an average monthly travel days of more than 15 increased from 44.5% in 2018 to 67.1% in 2020, and the operation days of logistics vehicle has increased significantly, indicating that the operation mode of new energy logistics vehicles has gradually matured.

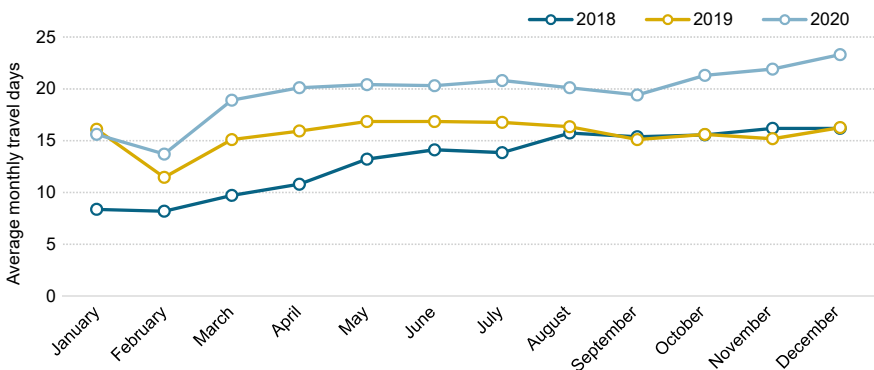


Fig. 4.40 Average of average monthly travel days of logistics vehicles over the years

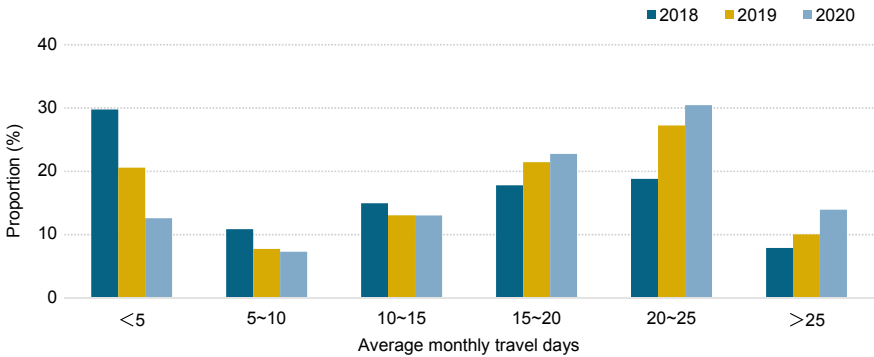


Fig. 4.41 Distribution of average monthly travel days of logistics vehicles-by year

The average monthly mileage of logistics vehicles has steadily increased over the years, and in 2020, it rose above 2000 km.

In the past three years, the average monthly mileage of logistics vehicles has shown a rapid growth trend. In 2020, it reached 2169.17 km, increasing by 52.2% compared to last year (Table 4.27). According to the data over the years (Fig. 4.42), the average monthly mileage of logistics vehicles in the months of 2020 other than April was more than that of the same period in 2019.

As the distribution shows (Fig. 4.43), the proportion of logistics vehicles with an average monthly mileage of more than 2000 km has been significantly increased,

Table 4.27 Average monthly mileage of logistics vehicles-average

Year	2018	2019	2020
Average monthly mileage (km)	1009.02	1425.45	2169.17

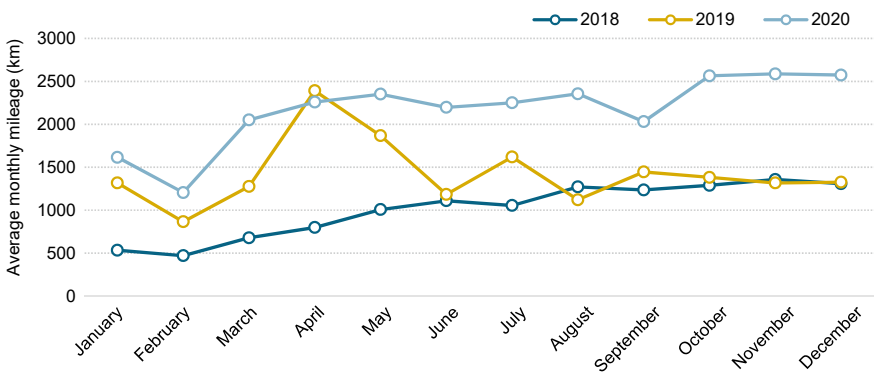


Fig. 4.42 Average of average monthly mileage of logistics vehicles over the years

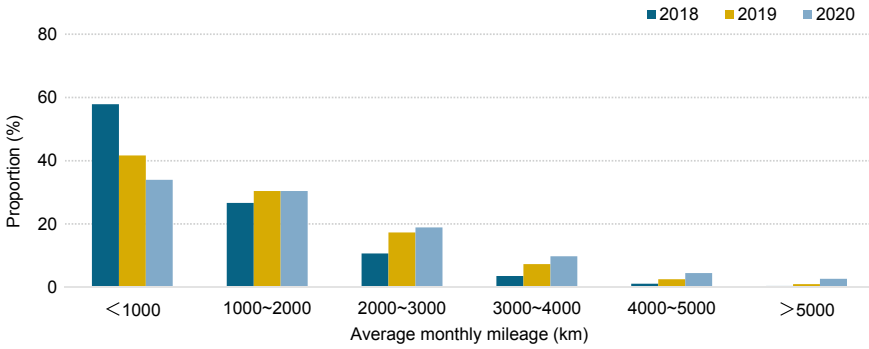


Fig. 4.43 Distribution average monthly mileage of logistics vehicles-by year

i.e., from 15.53% in 2018 to 35.65% in 2020, indicating that the operation of new energy logistics vehicles has gradually improved.

4.2.6 Operation Characteristics of Buses

(1) Average daily travel characteristics of buses

The daily operation of buses is very regular, and their daily travel duration is mainly above 8 h.

In 2020, the average daily travel duration of buses was stabilized at 6.75 h (Table 4.28). According to the distribution of the average daily travel duration (Fig. 4.44), the proportion of buses with an average daily travel duration of more than 8 h is the highest, i.e., more than 30%; according to the distribution over the years, the proportion of buses with an average daily travel duration of more than 6 h has increased slightly, i.e., from 59.9% in 2018 to 67.1% in 2020.

In the past three years, the average daily mileage of buses has gradually increased.

In 2020, the average daily mileage of buses reached 148.29 km, increasing by 1.4% compared with last year (Table 4.29). According to the monthly average over the years (Fig. 4.45), the average daily mileage of buses in months of 2020, except for February when the epidemic was in prevention and control stage, was basically the same as that of the same period in 2019.

Table 4.28 Average daily travel duration of buses-average

Year	2018	2019	2020
Average daily travel duration (h)	6.62	7.01	6.75

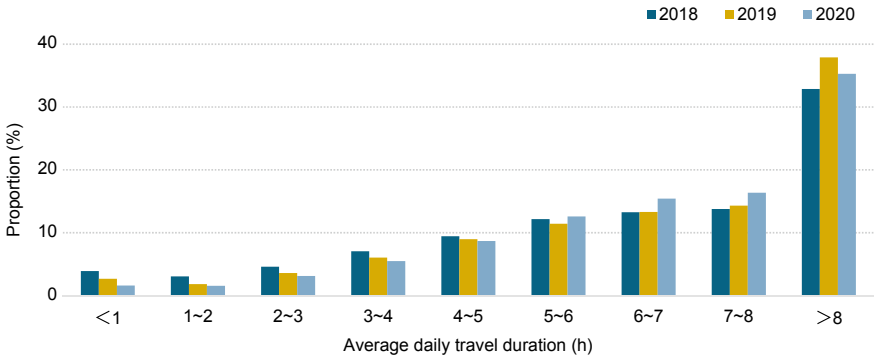


Fig. 4.44 Distribution of average daily travel duration of buses-by year

Table 4.29 Average daily mileage of buses-average

Year	2018	2019	2020
Average daily mileage (km)	135.26	146.21	148.29

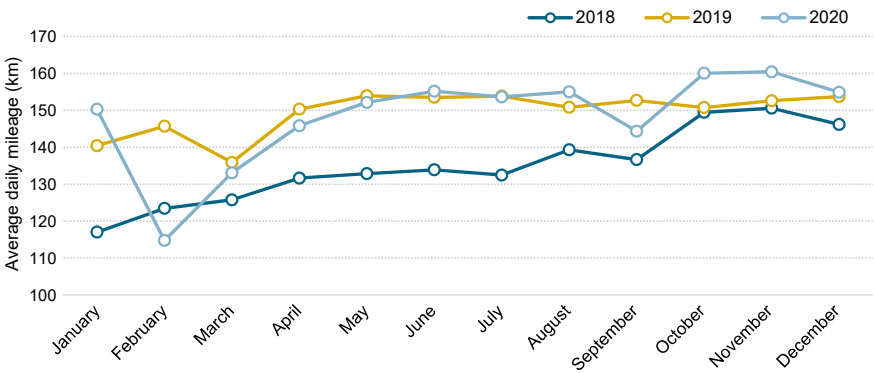


Fig. 4.45 Monthly average of average daily mileage of buses over the years

As the distribution shows (Fig. 4.46), the proportion of buses with an average daily mileage of 100–200 km is relatively higher; the proportion of buses with an average daily mileage of more than 150 km increased from 38.1% in 2018 to 51.5% in 2020.

(2) Average monthly travel characteristics of buses

The average monthly travel days of buses is more than 22 days, and in first-tier cities, the proportion of buses with longer travel days is relatively high.

In the past three years, the average monthly travel days has remained above 22 (Table 4.30). According to the monthly average over the years (Fig. 4.47), the average monthly travel days of buses in the months of 2020, except for February when the epidemic broken out, was basically the same as that of the same period in 2019.

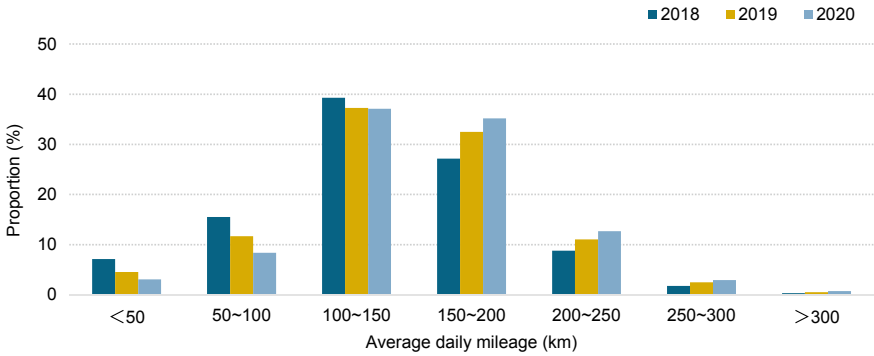


Fig. 4.46 Distribution of average daily mileage of buses-by year

Table 4.30 Average monthly travel days of buses-average

Year	2018	2019	2020
Average monthly travel days	21.37	22.15	22.55

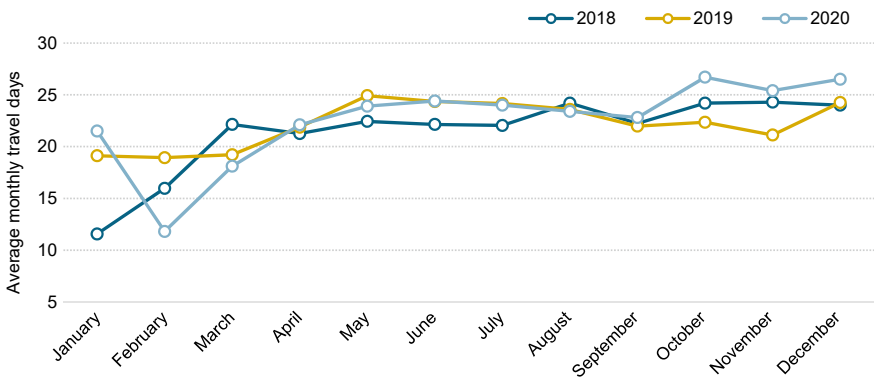


Fig. 4.47 Average of average monthly travel days of buses over the years

As the distribution shows (Fig. 4.48), the proportion of vehicles traveling for 20–25 days per month increased significantly, i.e., from 32.61% in 2018 to 43.4% in 2020.

The average monthly mileage of buses has increased year by year, and in 2020, it reached 3682.57 km (Table 4.31).

According to the average over the years (Fig. 4.49), the travel of buses was curbed in February due to the outbreak of the epidemic, and since March 2020, it was almost recovered to the level of the same period in 2019, and after October, it rose above the level of the same period in 2019. The average monthly mileage of buses throughout

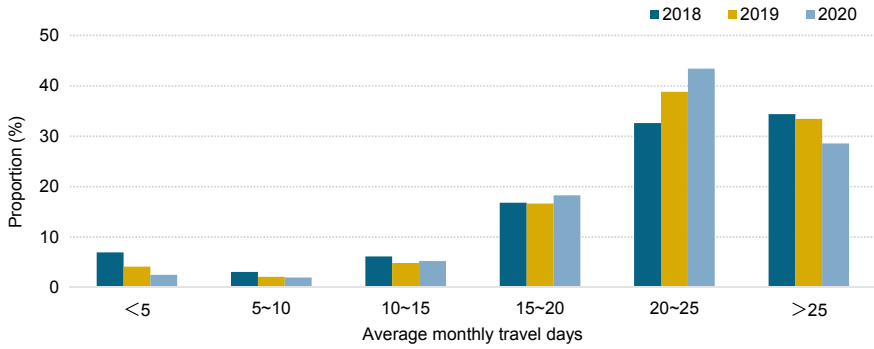


Fig. 4.48 Distribution of average monthly travel days of buses-by year

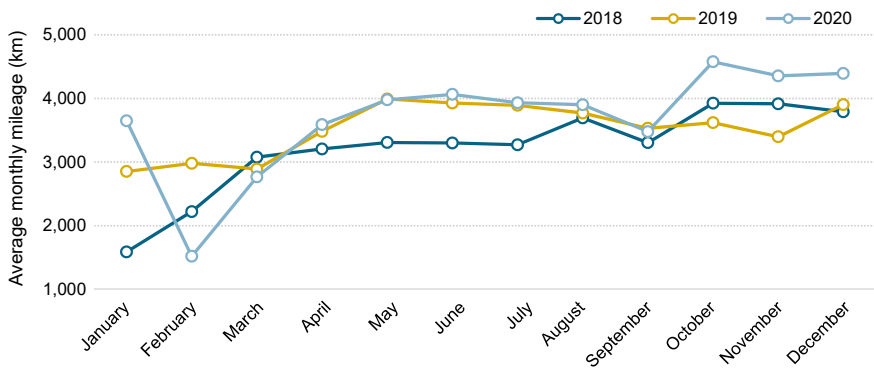


Fig. 4.49 Average of average monthly mileage of buses over the years

2020 was higher than that of the same period in 2019; as the distribution shows (Fig. 4.50), the average monthly mileage of buses is mainly more than 2000 km.

4.2.7 Operation Characteristics of Heavy-Duty Trucks

(1) Average single-trip travel characteristics of heavy-duty trucks

The average single-trip travel duration of heavy-duty trucks is mainly within 1 h, and the average single-trip mileage is within 20 km.

According to the distribution of average single-trip travel duration (Fig. 4.51), the proportion of heavy-duty trucks with an average single-trip travel duration of less than 0.5 h is relatively high, i.e., 45.7%. As for the average single-trip mileage, the average of average single-trip mileage of heavy-duty trucks in 2020 was 24.4 km, increasing by 23.8% compared with 2019 (i.e., 19.7 km). According to the distribution of average

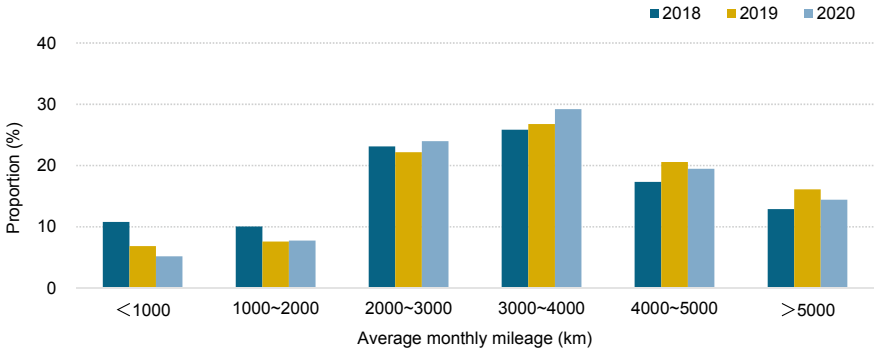


Fig. 4.50 Distribution of average monthly mileage of buses-by year

Table 4.31 Average monthly mileage of buses-average

Year	2018	2019	2020
Average monthly mileage (km)	3216.02	3519.06	3682.57

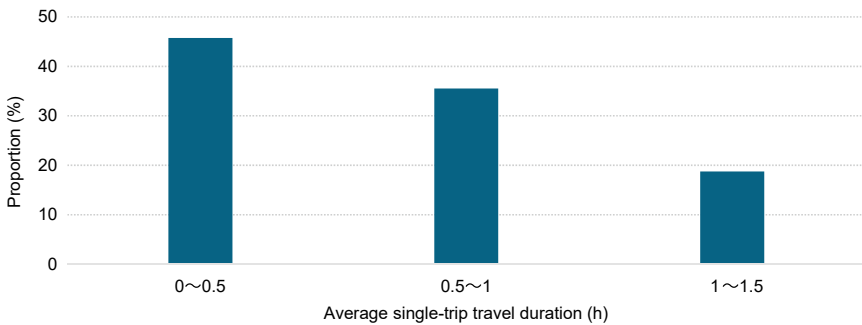


Fig. 4.51 Distribution of heavy-duty trucks of different average single-trip travel durations in 2020

single-trip mileage (Fig. 4.52), the proportion of heavy-duty trucks with an average single-trip mileage of less than 20 km is the highest, i.e., 60%.

According to the distribution of the average single-trip speed (Fig. 4.53), the average single-trip speed of heavy-duty trucks is mainly 20–50 km/h, in which the proportion of heavy-duty trucks with an average single-trip speed of 20–30 km/h is 32.9%, and that of heavy-duty trucks with an average single-trip speed of 30–40 km/h is 29.3%.

According to the distribution of the single-trip initial SOC (Fig. 4.54), the single-trip initial SOC of heavy-duty trucks is mainly 70–80%, and the proportion of heavy-duty trucks with such a single-trip initial SOC is 58.3%.

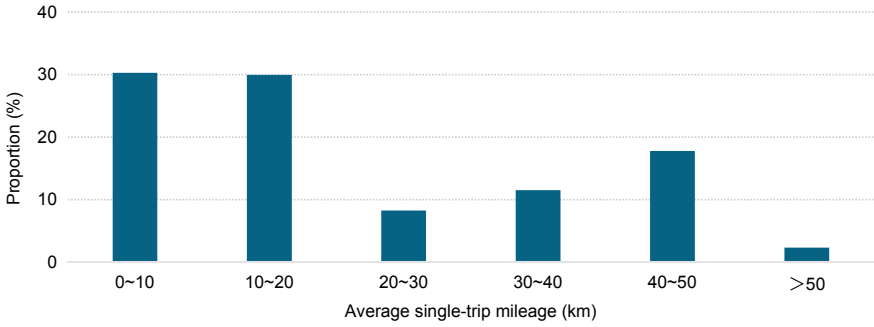


Fig. 4.52 Distribution of heavy-duty trucks of different average single-trip mileages in 2020

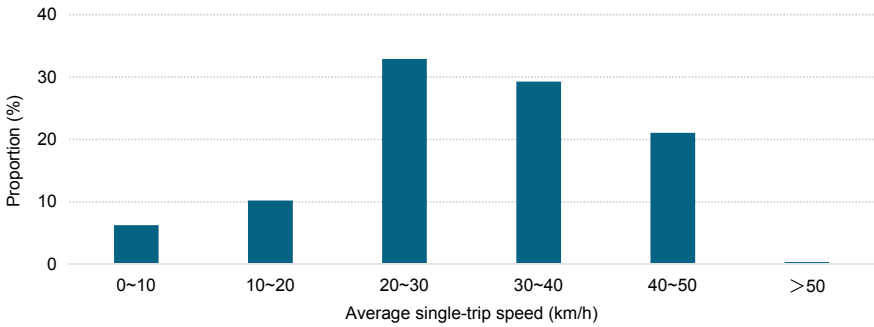


Fig. 4.53 Distribution of heavy-duty trucks of different average single-trip speeds in 2020

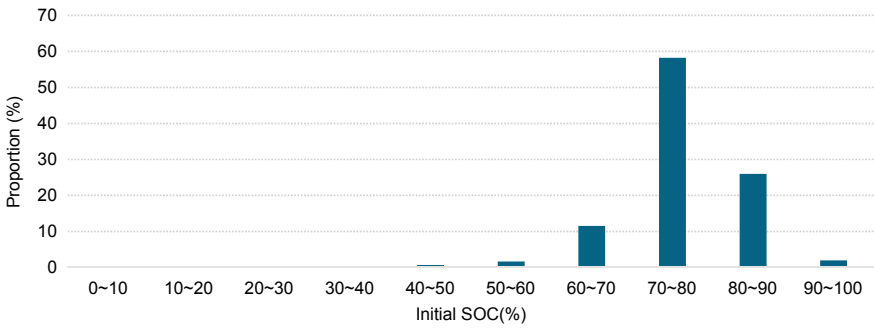


Fig. 4.54 Distribution of heavy-duty trucks of different single-trip initial SOC in 2020

(2) Average daily travel characteristics of heavy-duty trucks

The average daily travel duration of heavy-duty trucks is mainly more than 8 h.

The average of average daily travel duration of heavy-duty trucks in 2020 was 4.77 h. As the distribution shows (Fig. 4.55), the proportion of heavy-duty trucks with an

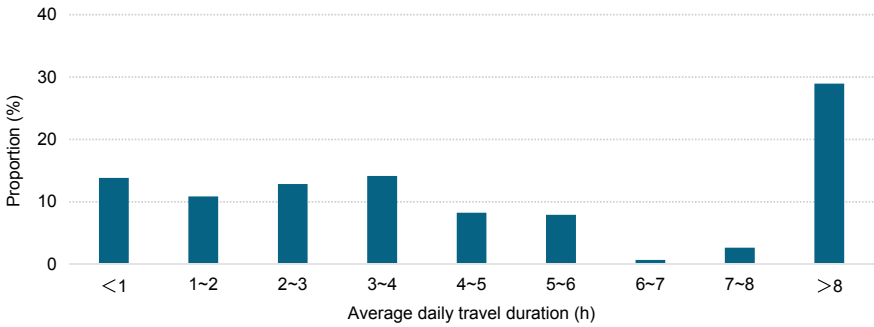


Fig. 4.55 Distribution of heavy-duty trucks of different daily average travel durations in 2020

average daily travel duration of more than 8 h is the highest, i.e. 29%, and the heavy-duty trucks of other average daily travel durations are distributed in a relatively discrete way.

The average daily mileage of heavy-duty trucks is mainly below 100 km and above 300 km.

In 2020, the average of average daily mileage of heavy-duty trucks is 170.2 km. As the distribution shows (Fig. 4.56), heavy-duty trucks with an average daily mileage of 50 km and 50–100 km account for 52.32%. The heavy-duty trucks with an average daily mileage of 50 km take the highest proportion of 29.3%, which is followed by the heavy-duty trucks with an average daily mileage of more than 300 km with a proportion of 26.6%.

The driving time of heavy-duty trucks is mainly concentrated during the daytime working hours, with only a small number of heavy-duty trucks running at night.

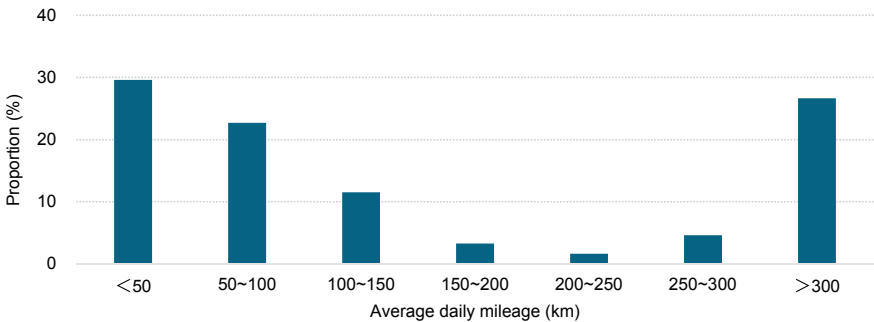


Fig. 4.56 Distribution of heavy-duty trucks of different average daily mileages in 2020

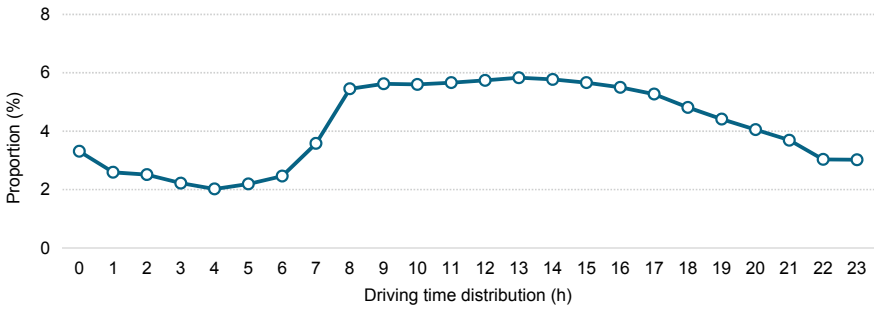


Fig. 4.57 Distribution of heavy-duty trucks of different driving times in 2020

From the distribution of daily driving time of heavy-duty trucks (Fig. 4.57), the proportion of heavy-duty trucks which travel during 8:00–17:00 is high up to 56.1%; there are also certain heavy-duty trucks running at night.

(3) Average monthly travel characteristics of heavy-duty trucks

The overall online rate of heavy-duty trucks in 2020 was significantly higher than that in 2019. In early 2020, the online rate of heavy-duty trucks was affected by the outbreak of the epidemic, but since March when the epidemic was mitigated, it steadily increased (Fig. 4.58).

The average monthly travel days of heavy-duty trucks is mainly 20–25, and the average monthly mileage is mainly below 1000 km and above 5000 km.

According to the distribution of the average monthly travel days of heavy-duty trucks (Fig. 4.59), the proportion of heavy-duty trucks driving for 20–25 days per month is

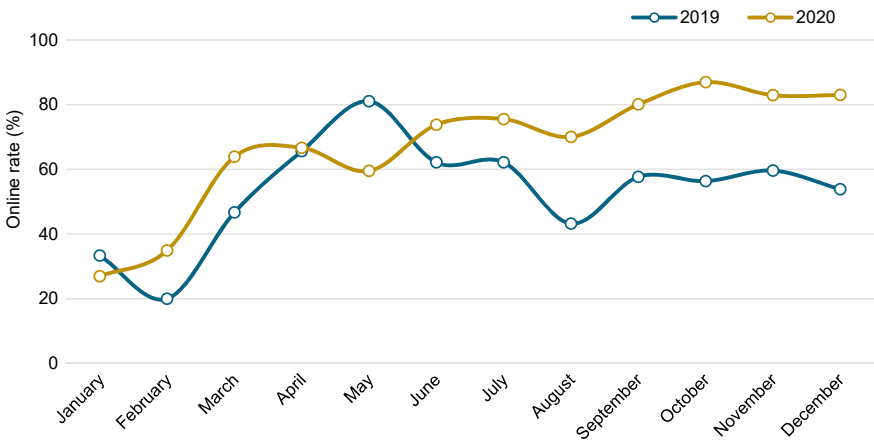


Fig. 4.58 Online rate of heavy-duty trucks in different months

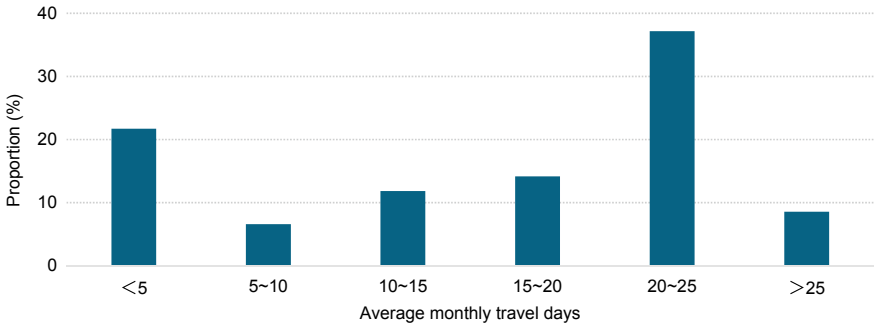


Fig. 4.59 Distribution of heavy-duty trucks of different average monthly travel days in 2020

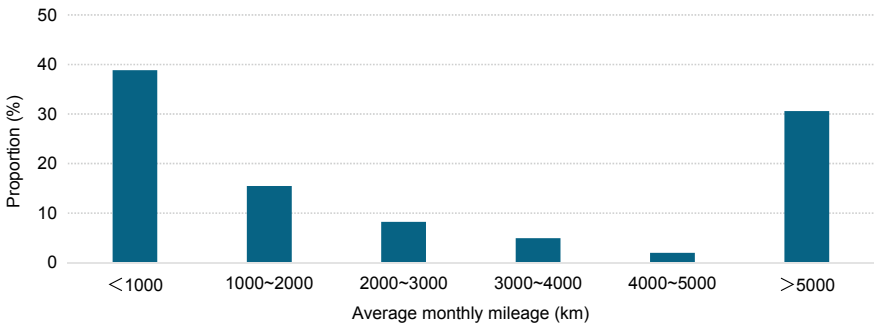


Fig. 4.60 Distribution of heavy-duty trucks of different monthly average mileages in 2020

the highest, i.e. 37.2%; according to the distribution of the average monthly mileage (Fig. 4.60), the heavy-duty trucks with an average monthly mileage of less than 1,000 km take the highest proportion of 38.8%, followed by heavy-duty trucks with an average monthly mileage of more than 5,000 km with a proportion of 30.6%.

4.3 Summary

This chapter makes a comprehensive analysis to the operation laws of vehicles in different segments, and is of great significance for improving the traffic management system and promoting the enterprise product development and market. Through the perspective analysis of the data on operation characteristics of vehicles of each segment in the National Monitoring and Management Platform, the following conclusions are made.

(1) Passenger cars

• Private cars

As for the single-trip travel characteristics, the average single-trip travel duration of new energy private cars is distributed in a relatively concentrated way and is mainly within 1 h, and the average single-trip mileage is mainly 0–10 km and 10–20 km. The distribution of private cars in the short travel mileage section in cities of low tiers is more concentrated than that in cities of high tiers; the single-trip initial SOC of private cars, as the charging convenience is improved due to the wide application of private charging piles, is mainly 60–80%, and the proportion of private cars with such a single-trip initial SOC is increasing year by year.

As for the daily travel characteristics, the daily travel duration of private cars is mainly 1–2 h, and in 2020, it was 45.73 km, increasing by 8.9% compared with last year. The driving time of private cars is mainly concentrated in the morning and evening commuting period, and thus it shows obvious “double-peak” characteristics. In addition, in February and March 2020 when the residents’ travel was restricted due to the epidemic, the average daily mileage and travel duration of private cars were low, and then after the epidemic was quickly brought under control, the travel of private cars was quickly recovered, and in the second half of 2020, the daily average mileage and travel duration of private cars were far higher than the level of the same period in 2019.

As for the monthly travel characteristic, the average monthly travel days and mileage are increasing year by year.

• Taxis and e-taxis

The travel characteristics of taxis and e-taxis well reflect their attribute as operation cars, and specifically, their average daily travel duration is mainly above 6 h, their average daily mileage is mainly 100–250 km and their average monthly travel days is more than 20. At the beginning of 2020 when the travel frequency of residents decreased due to the COVID-19 outbreak, the market of taxis and e-taxis was somehow affected, and their travel duration and mileage decreased compared with 2019.

Such a short-term decline is only the result of periodical factors. At present, the carsharing concept has won great support, and our travel habits have gradually changed. It is expected that the travel duration and mileage of new energy taxis and e-taxis will continue to grow in the future, and these two segments still have a high development potential.

• Cars for sharing

As for the daily travel characteristics, the average daily travel duration of cars for sharing is mainly 1–3 h, and the average daily mileage is increasing year by year, and reached 99.63 km in 2020. After the epidemic was quickly brought under control, residents’ travel returned to normal, and the average daily mileage and average daily travel duration of cars for sharing were far higher than the level of same period in 2019.

As for the monthly travel characteristics, the monthly travel days of cars for sharing is mainly 15–25, and the average monthly mileage is increasing year by year.

(2) Commercial vehicles

• Logistics vehicles

As for the daily travel characteristics, the average daily travel duration of logistics vehicles is increasing year by year, and in 2020, it reached 3.24 h, which is 0.91 h and 0.39 h longer than that in 2018 and 2019, respectively. Specifically, in February 2020, the travel duration of logistics vehicles was affected due to the outbreak of the epidemic, and after the epidemic was brought into control, the average daily mileage and travel duration of logistics vehicles increased rapidly to a level far higher than those of the same period in 2019.

As for the average monthly travel characteristics, the average monthly travel days of logistics vehicles has increased year by year in the past three years, and in 2020, it reached 19.65 days with an increase of 6.55 and 4.03 days compared with 2018 and 2019. The average monthly mileage of logistics vehicles has increased gradually year by year, and in 2020, it rose above 2000 km. The proportion of logistics vehicles in high mileage sections in first-tier and second-tier cities is significantly higher than that in cities of third-tier and below.

• Buses

The daily operation of buses is very regular, and their daily travel duration is mainly above 8 h. The proportion of buses in long travel duration section in first-tier cities is 49%, which is significantly higher than that in other cities.

The average monthly travel days of buses is more than 22, and in first-tier cities, the proportion of buses with long travel days is relatively high; the average monthly mileage is increasing gradually year by year, and reached 3682.57 km in 2020.

• Heavy-duty trucks

Heavy-duty trucks normally operate under high load for a long time. According to the research results of the State Grid Demonstration Project, the fuel consumption of a 90-ton mine-purpose heavy-duty truck is equivalent to the fuel consumption of 100 passenger cars, and electrification can reduce the diesel consumption by 180,000 L per vehicle per year. Therefore, electrification of heavy-duty trucks is an important measure to achieve the carbon peak goal in 2030 and the carbon neutrality goal in 2060. According to the operation characteristics of heavy-duty trucks, the overall online rate of heavy-duty trucks in 2020 was significantly higher than that in 2019; as for the single-trip travel characteristics of heavy-duty trucks, the average single-trip duration of heavy-duty trucks is mainly within 1 h, the average single-trip mileage is mainly within 20 km, the average single-trip speed is mainly 20–50 km/h, and the average single-trip initial SOC is mainly 70–80%. The average daily travel duration of heavy-duty trucks is more than 8 h, the average daily mileage is more than 300 km, and the monthly travel mileage is more than 5000 km. In a word, the heavy-duty trucks have the capability to meet the actual production needs.

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