

THE IMPACT OF COVID-19 ON CONSUMER'S SHOPPING TRIP PATTERN

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Abstract

The Covid-19 pandemic has significantly affected the lives of all people in the world, with many people staying at home so that online stores are one of the places of choice for shopping. Before the Covid-19 pandemic, consumers carried out shopping activities with 2 methods, conventional shopping or trips to the store and online shopping. This change affects the transportation sector so research is needed on changes in consumer's shopping trip patterns due to Covid-19 which aims to analyze changes in consumer's shopping trip patterns due to the Covid-19 pandemic, post Covid-19 pandemic, the potential end of Covid-19, and the potential effects of Covid-19 interventions, before, during, and after Covid-19 ends, for 2 shopping commodities, namely grocery and fashion. This study shows that the Covid-19 pandemic has had an impact on changes in consumer's shopping trip patterns in each aspect, those are the frequency of conventional shopping trips, modes of trip, types of trip and the frequency of consumer online shopping, but with significant differences for each group of consumer characteristics. To anticipate changes in consumer's shopping trip patterns after the Covid-19 pandemic, city transportation authorities should adjust urban transportation planning in its modeling to be more accurate, especially in planning related to last-mile delivery vehicles and city logistics.

Keywords: shopping activities; conventional shopping; online shopping; shopping trip pattern; Covid-19 pandemic.

Abstrak

Pandemi Covid-19 berdampak signifikan terhadap kehidupan seluruh masyarakat di dunia, dengan banyaknya masyarakat yang berdiam diri di rumah, sehingga toko *online* menjadi salah satu tempat pilihan untuk berbelanja. Sebelum adanya pandemi Covid-19, konsumen melakukan aktivitas belanja dengan 2 metode, yaitu belanja konvensional atau melakukan perjalanan ke toko dan belanja *online*. Perubahan ini berdampak pada sektor transportasi, sehingga diperlukan penelitian tentang perubahan pola perjalanan belanja konsumen akibat Covid-19, yang bertujuan untuk menganalisis perubahan pola perjalanan belanja konsumen akibat pandemi Covid-19, pasca pandemi Covid-19, potensi berakhirnya Covid-19, dan potensi dampak intervensi Covid-19 sebelum, selama, dan setelah Covid-19 berakhir untuk 2 komoditas belanja, yaitu bahan makanan dan fesyen. Penelitian ini menunjukkan bahwa pandemi Covid-19 berdampak pada perubahan pola perjalanan belanja konsumen di setiap aspek, yaitu frekuensi perjalanan belanja konvensional, moda perjalanan, jenis perjalanan dan frekuensi belanja *online* konsumen, dengan perbedaan yang signifikan untuk masing-masing kelompok karakteristik konsumen. Untuk mengantisipasi perubahan pola perjalanan belanja konsumen pascapandemi Covid-19, otoritas transportasi kota harus menyesuaikan perencanaan transportasi perkotaan dalam pemodelannya agar lebih akurat, terutama dalam perencanaan yang terkait kendaraan pengiriman akhir atau *last mile* dan logistik kota.

Kata-kata kunci: aktivitas berbelanja; belanja konvensional; belanja online; pola perjalanan belanja; pandemi Covid-19.

INTRODUCTION

Covid-19 has significantly affected the lives of people globally and has created unprecedented habits. Before the Covid-19 pandemic, consumers carried out shopping

activities using various methods, including conventional and online shopping. In conventional shopping methods, consumers make a trip to shopping facilities, purchase products or receive services, and return to their respective places (Marianov et al., 2018). Popkowski et al. (2004) stated that 30%-50% of all shopping trips are multipurpose trips where consumers make the trip between two known points, such as home and work, follow a known path, and make purchases along the route.

During the Covid-19 pandemic, approximately 80% of Indonesians spent time at home during the quarantine period (Yuswohadi et al., 2020). Also, about 30% of consumers plan to shop online more often after the Covid-19 pandemic ends. With the Covid-19 pandemic and changes in consumer spending patterns, one of the sectors affected is transportation. Fatmi (2020) stated that, overall, individuals made around 1.62 trips/day/person during the Covid-19 pandemic compared to around 3.33 trips/day/person before the Covid-19 pandemic, which has fallen by more than 50%. On average, the highest daily trip frequency found was for routine shopping trips, which was around 0.5/trip/ person.

Along with the increase in online shopping and e-commerce, existing freight transport vehicles also increase. The rapid growth of freight transportation in urban areas due to e-commerce has resulted in an increasing number of deliveries and vehicles in residential areas and has had a significant impact on the preservation and sustainability of cities (Comi, 2020).

The transportation authority currently has not classified motorbikes as freight delivery vehicles, but only private vehicles. This can cause urban transportation planning to be inaccurate and require adjustments in the modeling (Rutter et al., 2017). If this problem is not appropriately managed and anticipated promptly, it will result in negative impacts, as described earlier. Thus, an understanding of changes in shopping trip patterns due to the effects of the Covid-19 pandemic is required to shape the readiness of city transportation authorities, freight forwarders, and retail companies in managing the city's logistics system during the Covid-19 pandemic and in particular for the post-pandemic period.

A shopping trip is a trip taken by an individual to fulfill shopping needs. According to (Meyer and Miller, 2001), shopping trips are trips made to retail companies to carry out purchasing transactions or explore. Consumers carry out shopping activities with various methods, one of which is the conventional method where consumers travel to stores and shop online. Several empirical studies suggest that 30-50% of all shopping trips are multipurpose trips (Popkowski et al., 2004). Multipurpose trips are popular because of higher family income and numerous working women (Nishii et al., 1988).

In Indonesia, online shopping is expected to continue to increase along with the times (Joewono et al., 2020). Online shopping is said to be able to replace or complement conventional shopping. Online shopping has several impacts on shopping trips, particularly substitution or complementary (Lee et al., 2017). Along with the development of online shopping, consumers have reduced the number of conventional shopping trips because online shopping can bring their groceries home through home delivery.

According to Zhou and Wang (2014), product choice and the ease of selecting goods can trigger consumers' desire to take a shopping trip to the store. In the City of Davis, California, age and income are the main factors that affect the likelihood of people doing online shopping activities (Lee et al., 2015). Online shoppers tend to have more interest and understanding of technology. Also, people who shop online tend to be younger, more educated, and have higher incomes. During the Covid-19 pandemic, other factors that influence people's decisions to shop online are the risk perception of Covid-19 of each person (Unnikrishnan and Figliozzi, 2020). Joewono et al. (2020) also showed that generally people do online shopping activities to buy fashion items more than to buy household needs or groceries.

DATA

This research used a Before-and-After studies approach, where the study collected data on the past and present. Variable identification was based on literature studies, and data collection used a closed questionnaire consisting of questions elaborating on the variables and the framework of the research instrument (see Figure 1) that had been previously determined. Validity and reliability tests were carried out on the questionnaire first as a pilot survey and obtained valid and reliable variables. Subsequently, the data processing used descriptive statistical methods to examine the characteristics of the sample and a more uncomplicated form to understand and read. Furthermore, data analysis was carried out using the Chi-Square Test. The results of the Chi-Square Test can determine whether or not there are changes in consumer characteristics and trip characteristics before, during, and after the Covid-19 pandemic ends based on previously determined variables; particularly consumer characteristics and trip characteristics and for 2 shopping commodities, i.e., grocery shopping and fashion shopping.

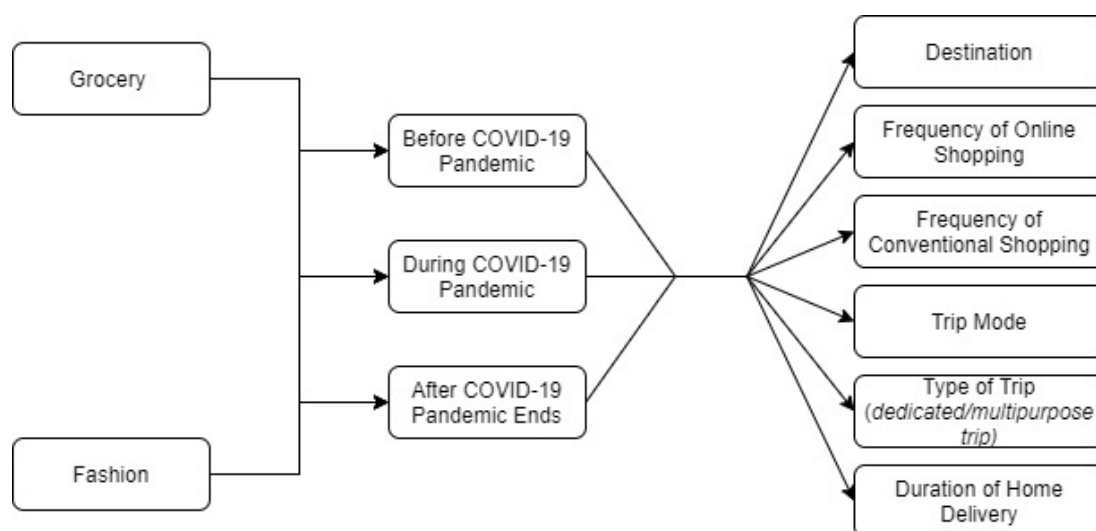


Figure 1 Research Instrument (Questionnaire) Framework

RESULTS AND DISCUSSIONS

Validity Test

Validity test was used to determine whether an instrument was valid or not. In this study, the Rank Spearman Correlation validity test was used. There are 2 criteria to meet the Rank Spearman Correlation validity test if using the SPSS application and a significance of 0.01, namely:

- 1) Correlation Coefficient > r table (0.1142)
- 2) Value of Sig. (2-tailed) < 0.01

Table 1 Consumer Characteristics Validity Test Results

Instrument		Coefficient Correlations	Validity
Code	Description		
K1	Domicile	0.209	Valid
K2	Age	0.361	Valid
K3	Gender	0.353	Valid
K4	Occupation	-0.089	Invalid
K5	Income per month	0.659	Valid
K6	Latest education level	0.461	Valid
K7	Internet usage rate	0.233	Valid
K8	Perception of Covid-19	0.462	Valid

Table 2 Trip Characteristics Validity Test Results-Grocery

Instrument		Coefficient Correlations	Validity
Code	Description		
G1	Grocery shopping destination mileage	0.101	Invalid
G2	Before Covid-19–Frequency of conventional grocery shopping trips	0.491	Valid
G3	Before Covid-19–Trip mode for grocery shopping	0.688	Valid
G4	Before Covid-19–Type of trip for grocery shopping	0.154	Invalid
G5	Before Covid-19–Frequency of online grocery shopping	0.425	Valid
G6	Before Covid-19–Duration of grocery home delivery	0.169	Invalid
G7	During Covid-19–Frequency of conventional grocery shopping trips	0.419	Valid
G8	During Covid-19–Trip mode for grocery shopping	0.621	Valid
G9	During Covid-19–Type of trip for grocery shopping	0.042	Invalid
G10	During Covid-19–Frequency of online grocery shopping	0.455	Valid
G11	During Covid-19–Duration of grocery home delivery	0.158	Invalid
G12	After Covid-19 ends–Frequency of conventional grocery shopping trips	0.511	Valid
G13	After Covid-19 ends–Trip mode for grocery shopping	0.643	Valid
G14	After Covid-19 ends–Type of trip for grocery shopping	0.198	Valid
G15	After Covid-19 ends–Online grocery shopping frequency	0.507	Valid
G16	After Covid-19 ends–Home delivery grocery duration	0.138	Invalid

Reliability Test

Reliability test is a test used to determine the extent to which a research instrument or questionnaire produces reliable or consistent measurements. The criteria to meet the reliability test when using the SPSS application is Cronbach's Alpha Value greater than 0.6. If the Cronbach's Alpha value is below 0.6, then the questionnaire items cannot be used for

further analysis. The value of Cronbach's alpha for the reliability test is 0.776, where it can be concluded that the variables for all shopping commodities are reliable.

Table 3 Trip Characteristics Validity Test Results-Fashion

Instrument		Coefficient Correlations	Validity
Code	Description		
F1	Grocery shopping destination mileage	0.211	Valid
F2	Before Covid-19–Frequency of conventional grocery shopping trips	0.443	Valid
F3	Before Covid-19–Trip mode for grocery shopping	0.668	Valid
F4	Before Covid-19–Type of trip for grocery shopping	0.267	Valid
F5	Before Covid-19–Frequency of online grocery shopping	0.34	Valid
F6	Before Covid-19–Duration of grocery home delivery	0.149	Invalid
F7	During Covid-19–Frequency of conventional grocery shopping trips	0.41	Valid
F8	During Covid-19–Trip mode for grocery shopping	0.667	Valid
F9	During Covid-19–Type of trip for grocery shopping	0.167	Invalid
F10	During Covid-19–Frequency of online grocery shopping	0.492	Valid
F11	During Covid-19–Duration of grocery home delivery	0.067	Invalid
F12	After Covid-19 ends–Frequency of conventional grocery shopping trips	0.482	Valid
F13	After Covid-19 ends– Trip mode for grocery shopping	0.684	Valid
F14	After Covid-19 ends–Type of trip for grocery shopping	0.29	Valid
F15	After Covid-19 ends–Online grocery shopping frequency	0.5	Valid
F16	After Covid-19 ends–Home delivery grocery duration	0.073	Invalid

Similarity Test of Consumer’s Shopping Trip Characteristics

This study aims to analyse changes in consumer’s shopping trip patterns due to the Covid-19 pandemic. Hypothesis Ho occurs if the value of chi-square asymptotic significance greater than 0.05; otherwise, it produces Hypothesis Ha.

Table 4 The Hypothesis of The Chi-Square Similarity Test

Hypothesis	
Ho	Ha
- The characteristics of the consumers' shopping trips before Covid-19 are the same as those of the consumer shopping trip during Covid-19.	- The characteristics of consumer shopping trips before Covid-19 differ from those of consumer shopping trips during Covid-19.
- The characteristics of the consumer shopping trips during Covid-19 are the same as the potential of the consumer shopping trip characteristics after Covid-19 ends.	- The characteristics of the consumer shopping trips during Covid-19 are different from the potential of the consumer shopping trip characteristics after Covid-19 ends.
- The characteristics of the consumer shopping trips before Covid-19 are the same as the potential of the consumer shopping trip characteristics after Covid-19 ends.	- The characteristics of consumer shopping trips before Covid-19 differ from those of consumer shopping trips after Covid-19 ends.

In this study there are 3 analyses for each sub variable. The first analysis is the emergence of the Covid-19 pandemic where it analyses the similarities between the characteristics of trips before the pandemic and during the pandemic. The second analysis is the potential end of the Covid-19 pandemic where it analyses the similarities between the characteristics of shopping trips during the pandemic and the potential for shopping trips after the pandemic ends. The third analysis is the intervention effect of the Covid-19 pandemic itself where it analyses the similarities between the characteristics of trips before

the pandemic and the characteristics of shopping trips after the pandemic ended. (pie chart ring from left to right). Both of these conditions did not have a Covid-19 pandemic, but one of them has been intervened by the pandemic before.

Table 5 Results of the Characteristics Similarity Test of Grocery and Fashion Shopping Trips

Sub-variable	The Emergence of the Covid-19 pandemic		Potential of the ending of the Covid-19 pandemic		Effects of the Covid-19 pandemic intervention	
	Before-During		During-After		Before-After	
	Asymp. Sig.	Hypothesis	Asymp. Sig.	Hypothesis	Asymp. Sig.	Hypothesis
Frequency of conventional shopping trips	0	Ha	0	Ha	0	Ha
Trip mode	0	Ha	0	Ha	0	Ha
Type of trip	0	Ha	0	Ha	0	Ha
Online shopping frequency	0	Ha	0	Ha	0	Ha

The analysis for changes in the characteristics of consumer shopping trips for grocery commodities and differences and similarities of characteristics of consumer shopping trips for fashion commodities from grocery commodities can be observed. For example, the inner ring represents the situation before the pandemic and the outer ring represents the situation during the pandemic. This is done to make it easier to see the percentage transfer of each sub-variable group.

Frequency of Conventional Shopping Trips-Grocery

Before and During Covid-19

Changes in the Frequency of Conventional Grocery Shopping Trips aspect of before and during the Covid-19 pandemic can be observed in Figure 1. It can be assumed that the frequency of consumers taking shopping trips to stores has decreased. This change states that the Covid-19 pandemic has made consumers reduce their shopping trips to buy groceries to the store.

During Covid-19 and After Covid-19 Ends

Changes in the Frequency of Conventional Grocery Shopping Trips aspect during the Covid-19 pandemic and the potential after the Covid-19 pandemic ends and vaccinations have been implemented can be observed in Figure 2, where it can be stated that the frequency of consumers taking shopping trips to stores has the potential to increase. This change states that the end of the Covid-19 pandemic and the implementation of vaccinations have allowed consumers to make shopping trips to buy groceries to the store more often.

Before Covid-19 and After Covid-19 Ends

Changes in the aspect of the Frequency of Conventional Grocery Shopping Trips before the Covid-19 pandemic and the potential after the Covid-19 pandemic ends and

vaccination have been implemented are presented in Figure 3, where it can be stated that the frequency of consumers taking shopping trips to stores has the potential to tend to decrease, although insignificantly. This change states that the two conditions are similar without the Covid-19 pandemic have differences due to having been intervened by the previous Covid-19 pandemic. The difference is that after the Covid-19 pandemic ends and the vaccination has been implemented, consumers tend to have the potential to reduce grocery shopping trips to stores compared to before the Covid-19 pandemic.

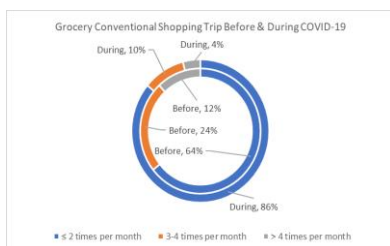


Figure 2 Grocery Conventional Shopping Trip Before and During Covid-19

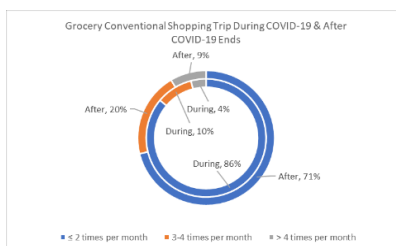


Figure 3 Grocery Conventional Shopping Trip During Covid-19 and After Covid-19 Ends

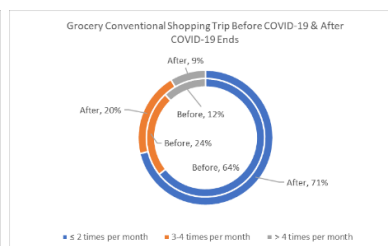


Figure 4 Grocery Conventional Shopping Trip Before Covid-19 and After Covid-19 Ends

Trip Mode-Grocery

Before and During Covid-19

Changes in the Trip Mode aspect of grocery shopping before and during the Covid-19 pandemic can be examined in Figure 4. It can be assumed that the shopping Trip Mode used by consumers has not changed significantly. Consumers tend to prefer private vehicles both before Covid-19 and during Covid-19. However, there has been a less significant increase in the use of private vehicles as Trip Mode for grocery shopping during Covid-19 and also a decrease in the use of public/online transportation and walking as a means of transportation as Trip Mode for grocery shopping during Covid-19. This insignificant change states that the Covid-19 pandemic has made consumers use private vehicles more as Trip Mode for grocery shopping.

During Covid-19 and After Covid-19 Ends

Changes in the Trip Mode aspect of grocery shopping during and after the Covid-19 pandemic ends are presented in Figure 5. The Trip Mode for shopping used by consumers has not changed significantly. Consumers tend to prefer private vehicles both during Covid-19 and later after Covid-19 ends. However, there has been a potential for a less significant decrease in the use of private vehicles as a Trip Mode for grocery shopping after Covid-19 ends and a potential increase in the use of public transportation/online and walking as Trip Mode for grocery shopping after Covid-19 ends. This insignificant change states that the end of the Covid-19 pandemic and the implementation of vaccinations have made consumers have the potential to reduce the use of private vehicles as a trip mode for grocery shopping, although insignificantly.

Before Covid-19 and After Covid-19 Ends

Changes in the Trip Mode aspect of grocery shopping before the Covid-19 pandemic and after the Covid-19 pandemic ends can be observed in Figure 6, where it can be assumed that the shopping Trip Mode used by consumers has not changed significantly. Consumers tend to prefer private vehicles both before Covid-19 and later after Covid-19 ends. However, there has been a potential for an insignificant decrease in the use of private vehicles as a trip mode for grocery shopping after Covid-19 ends. This insignificant change states that these two conditions are similar without the Covid-19 pandemic because they previously intervened by the Covid-19 pandemic. The difference is that after the Covid-19 pandemic ends and the vaccination has been implemented, consumers tend to have the potential to reduce the use of private vehicles as Trip Mode for grocery shopping, although it is insignificant.

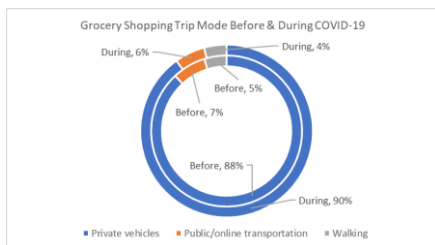


Figure 5 Grocery Shopping Trip Mode Before and During Covid-19

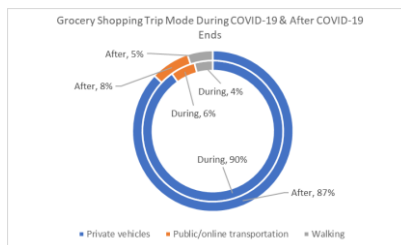


Figure 6 Grocery Shopping Trip Mode During Covid-19 and After Covid-19 Ends

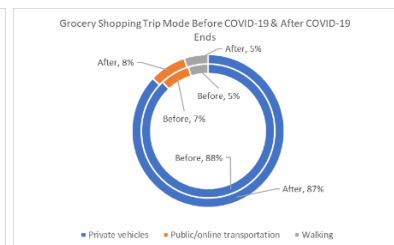


Figure 7 Grocery Shopping Trip Mode Before Covid-19 and After Covid-19 Ends

Type of Trip-Grocery

Before and During Covid-19

Changes in the Type of Trip aspect of grocery shopping before and during the Covid-19 pandemic can be observed in Figure 7. The Type of Trip for grocery shopping carried out by consumers has experienced a very significant change. This change states that the Covid-19 pandemic has made consumers switch from previously taking grocery shopping trips and other trips (multipurpose trips) to taking grocery shopping trips without making other trips (dedicated trips).

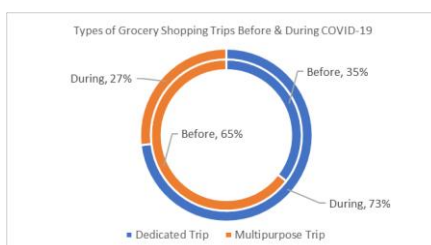


Figure 8 Types of Grocery Shopping Trips Before and During Covid-19

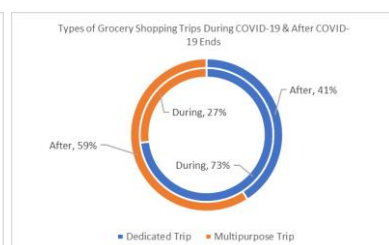


Figure 9 Types of Grocery Shopping Trips During Covid-19 and After Covid-19 Ends

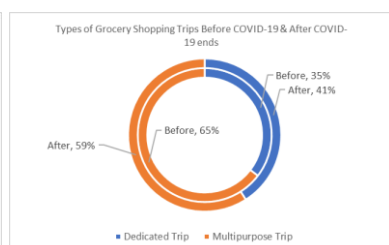


Figure 10 Types of Grocery Shopping Trips Before Covid-19 and After Covid-19 Ends

During Covid-19 and After Covid-19 Ends

Changes in the Type of Trip aspect of grocery shopping during the Covid-19 pandemic and after the Covid-19 pandemic ends are presented in Figure 8. It can be assumed that the Type of Trips for grocery shopping carried out by consumers can experience very significant changes. This change states that the end of the Covid-19 pandemic can make consumers switch from previously taking grocery shopping trips without making other trips (dedicated trips) to taking grocery shopping trips at the same time with other trips (multi-purpose trips).

Before Covid-19 and After Covid-19 Ends

Changes in the Type of Trip aspect of grocery shopping before the Covid-19 pandemic and after the Covid-19 pandemic ends are presented in Figure 9, where it can be stated that the Type of Trip for grocery shopping carried out by consumers has the potential to experience significant changes. This change states that the similar two conditions without the Covid-19 pandemic have differences due to having been previously intervened by the Covid-19 pandemic. The difference is that after the Covid-19 pandemic ends and the vaccination has been implemented, consumers can switch from previously taking grocery shopping trips at the same time with other trips (multipurpose trips) to taking grocery shopping trips without making other trips (dedicated trips).

Frequency of Online Shopping-Grocery

Before and During Covid-19

Changes in the aspect of the Frequency of grocery Online Shopping before and during the Covid-19 pandemic can be observed in Figure 10, where it can be stated that the frequency of consumers doing online shopping is increasing. This change states that the Covid-19 pandemic has made consumers do more online shopping to buy groceries.

During Covid-19 and After Covid-19 Ends

Changes in the aspect of Frequency of grocery Online Shopping during the Covid-19 pandemic and after the Covid-19 pandemic ends are presented in Figure 11, where it can be stated that the frequency of consumers doing online shopping has the potential to decrease. This change states that the end of the Covid-19 pandemic and the implementation of vaccinations have made consumers have the potential to reduce online shopping activities to buy groceries, although not too significantly.

Before Covid-19 and After Covid-19 Ends

Changes in the aspect of the Frequency of grocery Online Shopping before the Covid-19 pandemic and the potential after the Covid-19 pandemic ends are presented in Figure 12, where it can be assumed that the frequency of consumers doing online shopping has the potential to increase. This change states that the two similar conditions without the Covid-19 pandemic have differences due to having been intervened by the Covid-19

pandemic previously. The difference is that after the Covid-19 pandemic ends and the vaccination has been implemented, consumers can do online shopping activities more often to buy groceries as an alternative to making grocery shopping trips to the store.

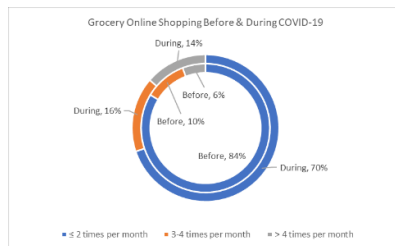


Figure 11 Grocery Online Shopping Before and During Covid-19

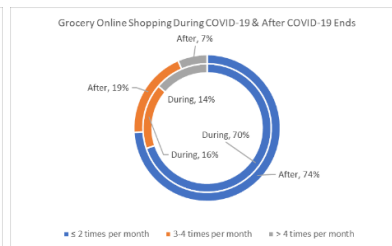


Figure 12 Grocery Online Shopping During Covid-19 and After Covid-19 Ends

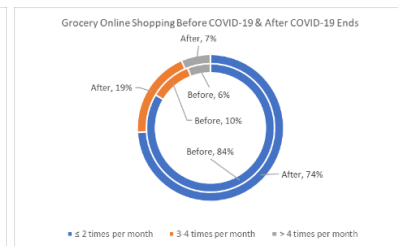


Figure 13 Grocery Online Shopping Before Covid-19 and After Covid-19 Ends

For fashion commodities, in terms of the frequency of conventional shopping trips, types of trips, and frequency of online shopping, there are similar changes as for grocery commodities. However, the intervention from the Covid-19 pandemic (Before Covid-19 and After Covid-19 Ends) actually has the potential to make consumers increase the use of private vehicles to shop for fashion products, which is different from the use of private vehicles to shop for groceries, which is decreasing. This can happen due to places to shop for fashion products is relatively farther from places to shop for groceries.

CONCLUSION

In this study, an analysis of the different effects of Covid-19 before, during, and after the Covid-19 pandemic ends on four variables of Trip Characteristics, i.e., Frequency of Conventional Shopping Trips, Trip Mode, Type of Trip, and Frequency of Online Shopping, for grocery and fashion commodities. This study provides the following results:

- 1) There are significant changes in Frequency of Conventional Shopping Trips for grocery and fashion shopping; Trip Mode for grocery and fashion shopping; Type of trip for Grocery and fashion shopping; Frequency of Online Shopping for grocery and fashion
- 2) Significant changes that occurred are: (a) the Covid-19 pandemic has made consumers reduce the Frequency of Conventional Shopping Trips, increase the use of private vehicles, take more dedicated shopping trips, and do online shopping more often, (b) the end of the Covid-19 pandemic can make consumers increase the Frequency of Conventional Shopping Trips, increase the use of public/online transportation, return to more frequent multipurpose shopping trips, and reduce online shopping activities, and (c) interventions from the Covid-19 pandemic can make consumers reduce the Frequency of Conventional Shopping Trips, increase the use of private vehicles (fashion) and public/online transportation (grocery), be more frequent in making dedicated shopping trips, and be more frequent in online shopping activities.

Therefore, this study proves that the Covid-19 pandemic significantly impacts consumer's shopping trip patterns in Jabodetabek in terms of Frequency of Conventional Shopping Trips, Trip Mode, Type of Trip, and Frequency of Online Shopping. To anticipate changes in consumer's shopping trip patterns due to the impact of the Covid-19 pandemic, city transportation authorities should adjust urban transportation planning in their modelling to be more accurate, especially in planning related to last-mile delivery vehicles and city logistics systems, especially in Jabodetabek. In addition, for future research related to changes in consumer's shopping trip patterns due to the impact of the Covid-19 pandemic, a survey should be conducted to respondents when the Covid-19 pandemic has completely disappeared in order to obtain data on the post-Covid-19 situation, not only on the potential post-Covid-19 situation.

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