

MOBILE BUYING BEHAVIOR DURING THE COVID-19 PANDEMIC – THE CASE OF POLAND

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Purpose: This pilot study aimed to understand the mobile buying behavior of Polish respondents in terms of the number of transactions per month during the Covid-19 pandemic time. The respondents' gender and place of residence were taken into consideration as chosen socio-demographic characteristics.

Design/methodology/approach: The field survey method was applied to collect the primary data. Descriptive and inferential statistics that include the matched-pair test, the Wilcoxon signed-rank test, and the chi-square test of independence were applied for the primary data analysis.

Findings: According to the chi-square test of independence, such socio-demographic characteristics as gender, place of residence, women's place of residence and men's place of residence in relation to mobile buying behavior are independent. The results of the matched-pair test and the Wilcoxon signed-rank test in the large and medium cities show that there is a significant difference in the average number of mobile shopping transactions per month before and during pandemic time.

Research limitations/implications: The authors suggest conducting the same analysis with a larger sample size to generalize the phenomena.

Practical implications: In order to stay competitive on the market, enterprises should constantly develop mobile distribution channels. Moreover, while communicating with a mobile shopper, enterprises can create similar messages, despite the gender and / or place of residence of the receivers.

Originality/value: The findings will be helpful to FMCG-related marketing decision-makers and mobile shopping-related app developers.

Keywords: Covid-19 pandemic time, consumer behavior, mobile shopping, gender, place of residence.

Category of the paper: Research paper.

1. Introduction

Back in the first quarter of 2020, the world was unprepared to cope with an unpredictable and sudden human health-related catastrophe. Nevertheless, human society is trying to cope with the ongoing Covid-19 pandemic through different adaptations. This pilot study focused on understanding the mobile buying behavior of Polish respondents in terms of the number of transactions per month during the Covid-19 pandemic time. The respondents' gender and place of residence were taken into consideration as chosen socio-demographic characteristics. Thus, the first objective was to determine whether the respondents' are demonstrating a significant increment in the average mobile shopping transactions per month during the Covid-19 pandemic time based on their place of living. The second objective was to determine whether there is an association between gender and mobile shopping usage during the Covid-19 pandemic time. The third objective was to determine whether there is an association between gender-based places of residence and mobile shopping usage during the Covid-19 pandemic time. To create a foundation for further research studies focusing on the same scenario, however, in-depth behavioral analysis is also one of the objectives of this research study (Wiścicka-Fernando, 2021).

Online shopping and mobile shopping is not a new term in the modern economy. However, digitalization is changing the form of the retail industry and it has the potential to gain competitive advantages (Frishammar et al., 2018). The Covid-19 epidemic caused unusual customer buying behavior such as large-scale panic buying, resulting in an imbalance in supply and demand of goods and threatening social stability. Moreover, the study found that epidemic information about Covid-19 intensity has a significant impact on the emergence of group rush buying behavior. Government intervention also plays a significant role in reducing the scale of group rush buying (Chen et al., 2022).

Nevertheless, novel Covid-19-related news dissemination by media led to an increase in the level of anxiety among humans and opting for unorthodox consumption behaviors as consumers (Çelik, Köse, 2021). According to the qualitative study conducted during the Covid-19 lockdown in China, three overarching dimensions related to consumers' online purchasing behaviors during the Covid-19 pandemic time were identified: triggers of enhanced digital engagement, transformative capacity of digital technologies, and socio-economic adaptability during crises (Jiang, Stylos, 2021). To cope with the Covid-19 outbreak Chinese citizens took the advantage of available modern information and communication technology to work, teach, learn and shop online (Tiejun, 2021; Gao et al., 2020). An investigated structural equation model of three shopping channels including physical, web, and mobile reveals that haptic traits act differently across channels and consumers with strong haptic traits prefer physical and mobile channels (De Canio, Fuentes-Blasco, 2021). Results of initial studies conducted in

China also indicate the increasing significance of online channels (Guo et al., 2020; Li et al., 2020).

Contemporary mobile phone devices are much more sophisticated and go beyond their voice communication ability and modern mobile technologies can provide hi-tech solutions to cope with the ongoing Covid-19 pandemic time (Wiścicka-Fernando, 2021). The Covid-19 pandemic time has forced people to limit their regular day-to-day activities including physical interactions, which has led to explosive growth in online grocery shopping rather than shopping physically. However, there is no clear argument in the retailing literature on whether consumers prefer to buy groceries online or offline. This paper tries to fill in that research gap.

2. Methods

For the purpose of the study, three conceptual frameworks were created.

According to the conceptual framework of study I (Figure 1) the authors investigated the average mobile shopping transactions per month before and during the Covid-19 pandemic time taking into consideration the place of residence (big versus medium cities). Matched-pair t-test and Wilcoxon signed-rank test were used for the investigation (sections 3.2, 3.3 and 3.4).

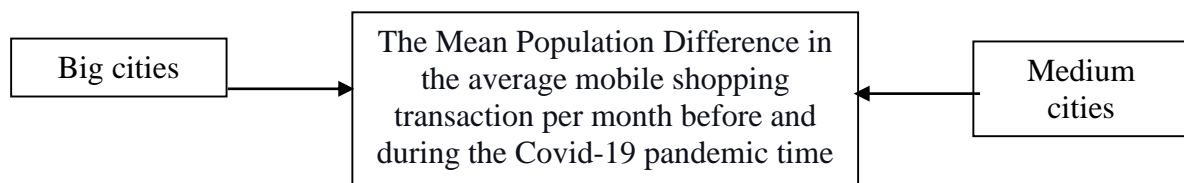


Figure 1. Conceptual framework of study I.

Source: own elaboration.

Further, the authors verified the independence of mobile buying behavior (dependent variable) and gender, place of residence, women's place of residence and man's place of residence (independent variable). Guided by conceptual framework of study II (Figure 2), the authors ran the chi-square test I and II (section 3.5).

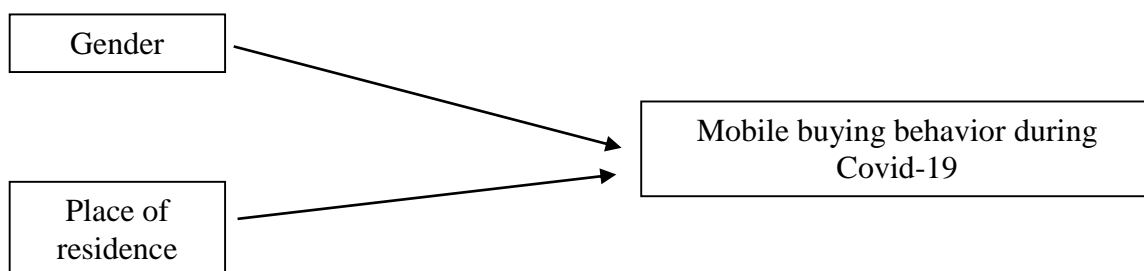


Figure 2. Conceptual framework of study II.

Source: own elaboration.

Moreover, women's place of residence (chi-square test III, section 3.5) and man's place of residence (chi-square test IV, section 3.5) were analyzed in relation to mobile buying behavior, as shown in conceptual framework of study III (Figure 3).

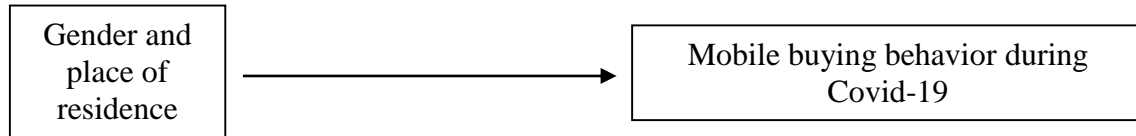


Figure 2. Conceptual framework of study III.

Source: own elaboration.

The population of this pilot study was Polish respondents. The field survey method was applied to collect the primary data. The research questionnaire was in the Polish language to ensure that all the participants are Polish respondents. The research questionnaire was able to collect nominal, ordinal, and ratio scale data from the respondents. On the 10th of April 2021, the online social media survey was launched based on the Microsoft Teams platform and reached 102 respondents by the end of the 13th of April 2021. The researchers used a quantitative approach for the analysis. Descriptive and inferential statistics including the matched-pair test ($\alpha = 0.01$), the Wilcoxon signed-rank test ($\alpha = 0.05$), and the Chi-Square test of independence ($\alpha = 0.01$) were applied for the primary data analysis. The Shapiro-Wilk test was performed to explore the normality of the relevant distributions. Microsoft Excel and SPSS were utilized for data analysis.

3. Results

3.1. Mobile and non-mobile shoppers by gender and place of residence

In this pilot study, the total number of respondents was 102 Polish individuals. Out of 102 total respondents, 71 respondents are mobile shoppers. Out of 102 respondents, 74 respondents are female respondents and 28 respondents are male respondents. Out of 71 total mobile shoppers, 53 respondents (approximately 75%) are female respondents and 18 respondents (approximately 25%) are male respondents (Table 1).

Table 1.

Mobile and Non-mobile shoppers by gender

Specification	Female		Male		Total
	in numbers	in %	in numbers	in %	

Respondents	74	73%	28	27%	102
Mobile shoppers	53	75%	18	25%	71
Non-mobile shoppers	21	68%	10	32%	31

Source: own study base on the survey.

Taking into consideration the aim of the paper, the authors analyzed the data considering mobile shoppers by place of residence (Table 2).

Table 2.

Mobile shoppers by place of residence

Place of Residence	Female mobile-assisted shoppers		Male mobile-assisted shoppers	
	in numbers	in %	in numbers	in %
Big cities	19	36%	12	67%
Medium-size cities	16	30%	1	6%
Small-size cities	9	17%	3	17%
Villages	9	17%	2	11%
Total	53	100%	18	100%

Source: own study base on the survey.

Out of 71 total mobile shoppers, 31 respondents (approximately 44%) live in big cities, 17 respondents (approximately 24%) live in medium-sized cities, 12 respondents (approximately 17%) live in small-size cities, and 11 respondents (approximately 15%) live in villages.

3.2. The matched-pair t-test – I (big cities)

The matched-pair t-test I was conducted to determine whether the respondents' from the big cities are demonstrating a significant increment in the average mobile shopping transactions per month before and during the Covid-19 pandemic time. According to the field survey data, 31 out of 71 respondents (approximately 44%) belong to big cities, while all are mobile shoppers.

Descriptive analysis for big cities' mobile shoppers shows that the average mobile shopping transaction per month before the Covid-19 pandemic time was about 2.58, the median mobile shopping transaction per month before the Covid-19 pandemic time was 2, and the standard deviation was about 2.50. Moreover, the average mobile shopping transaction per month during the Covid-19 pandemic time was about 5.39, the median mobile shopping transaction per month during the Covid-19 pandemic time was 4, and the standard deviation was about 5.01. The matched-pairs test was performed as a statistical test to determine whether the big city residents' are demonstrating a significant increment in the average mobile shopping transactions per month before and during the Covid-19 pandemic. Moreover, the mean sample difference was about -87.

The Shapiro-Wilk test was performed to explore the normality of the difference between mobile shopping transactions per month before the Covid-19 pandemic time and mobile shopping transactions per month during the Covid-19 pandemic time. According to the Shapiro-

Wilk test, the p-value was .000. Thus, it was concluded that the data did not come from a normal distribution.

D denoted as a Mean Population Difference of the average mobile shopping transaction per month before and during the Covid-19 pandemic. Accordingly formulated hypotheses are:

$$H_0 : D = 0$$

$$H_a : D \neq 0$$

The decision rule was if the observed test statistic is greater than 2.75 or less than -2.75, then the null hypothesis will be rejected. Because the observed t value was less than the critical t table value in the lower tailed ($t = -4.21 < t = -2.75$) value it was in the rejection region (see Table 3). Thus, the null hypothesis can be rejected.

3.3. The matched-pair t-test – II (medium-size cities)

The matched-pair t-test II was conducted to determine whether the respondents' from medium-size cities are demonstrating a significant increment in the average mobile shopping transactions per month before and during the Covid-19 pandemic. According to the field survey data, 17 out of 71 respondents (approximately 24%) belong to medium-size cities, while all are mobile shoppers.

Descriptive analysis for medium-size cities' mobile shoppers shows that the average mobile shopping transaction per month before the Covid-19 pandemic time was about 3.29, the median mobile shopping transaction per month before the Covid-19 pandemic time was 3, and the standard deviation was about 2.69. Moreover, the average mobile shopping transaction per month during the Covid-19 pandemic time was about 6.76, the median mobile shopping transaction per month during the Covid-19 pandemic was 5, and the standard deviation was about 6.02. The matched-pairs test was performed as a statistical test to determine whether the big city residents' are demonstrating a significant increment in the average mobile shopping transactions per month before and during the Covid-19 pandemic. Moreover, the mean sample difference was about -59.

The Shapiro-Wilk test was performed to explore the normality of the difference between mobile shopping transactions per month before the Covid-19 pandemic and mobile shopping transactions per month during the Covid-19 pandemic. According to the Shapiro-Wilk test, the p-value was .006. Thus, it was concluded that the data did not come from a normal distribution.

D denoted as a Mean Population Difference of the average mobile shopping transaction per month before and during the Covid-19 pandemic. Accordingly formulated hypotheses are:

$$H_0 : D = 0$$

$$H_a : D \neq 0$$

The decision rule was if the observed test statistic is greater than 2.92 or less than -2.92, then the null hypothesis will be rejected. Because the observed t value was less than the critical t table value in the lower tailed ($t = -3.28 < t = -2.92$) value it was in the rejection region (see Table 3). Thus, the null hypothesis can be rejected.

Table 3.

Summary of the matched-pair t-test I and II

Place of residence	n	Hypothesis	α	The critical table t value	Observation
Big City	31	$H_0 : D = 0$	0.01	$t_{0.005,30} = \pm 2.75$	(t = -2.75 < t = -4.21)
		$H_a : D \neq 0$			
Medium City	17	$H_0 : D = 0$	0.01	$t_{0.005,16} = \pm 2.92$	(t = -2.92 < t = -3.28)
		$H_a : D \neq 0$			

Source: own study base on the survey.

According to the Shapiro-Wilk test, it was concluded that the data did not come from a normal distribution. Thus, the matched-pair t-test results are arguable. To overcome this debatable situation the authors ran the Wilcoxon signed-rank test as an immediate statistical solution (influentialpoints.com, 2022).

3.4. Wilcoxon signed-rank test

The Wilcoxon signed-rank test was conducted to determine whether the respondents' from the big cities and medium cities are demonstrating a significant increment in the average mobile shopping transactions per month before and during the Covid-19 pandemic.

Test for big cities

Hypotheses

H_0 : Monthly average mobile shopping is equal between the two situations (before and during Covid-19 pandemic)

H_a : Monthly average mobile shopping is not equal between the two situations (before and during Covid-19 pandemic)

The calculated test statistic was 0 and the critical value was 147 (see Table 4). Thus, the observation was $0 < 147$ and the null hypothesis can be rejected.

Test for medium cities

Hypotheses

H_0 : Monthly average mobile shopping is equal between the two situations (before and during Covid-19 pandemic)

H_a : Monthly average mobile shopping is not equal between the two situations (before and during Covid-19 pandemic)

The calculated test statistic was 1 and the critical value was 34 (see Table 4). Thus, the observation was $1 < 34$ and the null hypothesis can be rejected.

Table 4.
Summary of the Wilcoxon Sign Rank Test

Test for	Hypotheses	α	n	Test statistic	Critical value	Observation
Big Cities	H_0 : Monthly average mobile shopping is equal between the two situations (before and during Covid-19)	0.05	31	0	147	$0 < 147$
	H_a : Monthly average mobile shopping is not equal between the two situations (before and during Covid-19)					
Medium Cities	H_0 : Monthly average mobile shopping is equal between the two situations (before and during Covid-19)	0.05	17	1	34	$1 < 34$
	H_a : Monthly average mobile shopping is not equal between the two situations (before and during Covid-19)					

Source: own study base on the survey.

3.5. The chi-square test of independence

Test I

The researchers have performed the chi-square test of independence using the following hypotheses:

H_0 : Gender and mobile buying behavior during Covid-19 are independent.

H_a : Gender and mobile buying behavior during Covid-19 are not independent.

A chi-square test of independence (Test I) showed that there was no significant association between gender and mobile buying behavior during the Covid-19 pandemic time, $\chi^2(1, N=102)=0.472$, $p > .001$ (see Table 5). Thus, the researchers failed to reject the null hypothesis.

Test II

Hypotheses:

H_0 : Place of residence and mobile buying behavior during Covid-19 are independent.

H_a : Place of residence and mobile buying behavior during Covid-19 are not independent.

A chi-square test of independence (Test II) showed that there was no significant association between place of residence and mobile buying behavior during the Covid-19 pandemic time, $\chi^2(3, N=102)=0.318$, $p>.001$ (see Table 5). Thus, the researchers failed to reject the null hypothesis.

Test III

Hypotheses:

H_0 : Women's place of residence and mobile buying behavior during Covid-19 are independent.

H_a : Women's place of residence and mobile buying behavior during Covid-19 are not independent.

A chi-square test of independence (Test III) showed that there was no significant association between women's place of residence and mobile buying behavior during the Covid-19 pandemic, $\chi^2(3, N=74)=0.840$, $p>.001$ (see Table 5). Thus, the researcher failed to reject the null hypothesis.

Test IV

Hypotheses:

H_0 : Mans' place of residence and mobile buying behavior during Covid-19 are independent.

H_a : Mans' place of residence and mobile buying behavior during Covid-19 are not independent.

A chi-square test of independence (Test IV) showed that there was no significant association between a Man's place of residence and mobile buying behavior during the Covid-19 pandemic, $\chi^2(3, N=28)=0.529$, $p>.001$ (see Table 5). Thus, the researcher failed to reject the null hypothesis.

Table 5.
Summary of the chi-square test of independence

Test ID	Chi-Sq test Statistic	df	α	p-value	Observation	Decision
Test I	0.516	1	0.01	0.472	$p\text{-value} > \alpha$	Fail to reject the null hypothesis
Test II	3.514	3	0.01	0.318	$p\text{-value} > \alpha$	Fail to reject the null hypothesis
Test III	2.155	3	0.01	0.540	$p\text{-value} > \alpha$	Fail to reject the null hypothesis
Test IV	2.210	3	0.01	0.529	$p\text{-value} > \alpha$	Fail to reject the null hypothesis

Source: own study base on the survey.

4. Discussion

The research results led to many conclusion, that can be discussed. First of all, according to the matched-pair t-test I and the Wilcoxon Sign Rank Test, there is enough evidence from the data to declare a significant difference in the average mobile shopping transactions per month before the epidemic and average mobile shopping transactions per month during the epidemic based on the respondents from the big cities. Moreover, it is visible that there is an incremental usage pattern of mobile shopping transactions during the Covid-19 epidemic than before the epidemic. Further, according to matched-pair t-test II and the Wilcoxon sign-rank test, there is enough evidence from the data to declare a significant difference in the average mobile shopping transactions per month before the epidemic and average mobile shopping transactions per month during the epidemic based on the respondents from the medium-sized cities. Moreover, it is visible that there is an incremental usage pattern of mobile shopping transactions during the Covid-19 epidemic than before the epidemic.

The authors also analyzed the basic socio-demographic factors such as gender and place of residence in relation to mobile buying behavior:

- According to the chi-square test of independence test I, there is enough evidence from the data to declare that there is no association between gender factors and mobile buying behavior among the respondents during Covid-19.
- According to the chi-square test of independence test II, there is enough evidence from the data to declare that there is no association between place of residence and mobile buying behavior among the respondents during Covid-19.
- According to the chi-square test of independence test III, there is enough evidence from the data to declare that there is no association between women's place of residence and mobile buying behavior among the respondents during Covid-19.
- According to the chi-square test of independence test III, there is enough evidence from the data to declare that there is no association between a man's place of residence and mobile buying behavior among the respondents during Covid-19.

With the research results authors tried to fill in a research gap regarding mobile behaviors of consumers in Poland. However, it is worth it relate to other studies conducted in different countries. The US-based study found the mechanisms behind the increase in online grocery shopping during the Covid-19 pandemic time by presenting a decrease in the importance of its strongest determinants (i.e., perceived usefulness and attitude) (Tyrväinen, Karjaluoto, 2022). Moreover, panic buying during Covid-19 pandemic time is most associated with the need for control, the belief that it is the smart thing to do, and the urge to minimize the number of trips to grocery stores (Kassas, Nayga, 2021).

Behavioral gender differences have been found in a wide range of human activities and according to the Austrian study, women showed a stronger tendency to avoid shopping centers and more men frequented recreational areas during the Covid-19 lockdown (Reisch et al., 2021). The Finish study investigates the demographic and household characteristics of adapters to online grocery shopping due to the Covid-19. According to this study a typical adopter of

online grocery shopping has a higher household size, higher household earnings, and/or is more likely to live in the capital region of the country. Further analyses indicate that in the older age group 45+, women and those with some degree of worry over their health and/or that of a loved one are a little more likely to be adopters than the rest (Eriksson, Stenius, 2022). Another study found that consumer demographic factors such as education and income significantly increase their number of mobile purchases meanwhile males have been found to spend more on mobile shopping than females (Hou, Elliott, 2021).

It is also worth to mention that digitalization is one of the evolving trends and will shape not only future global trade but also investment (Euromonitor, 2022). This report that shows 'The World Beyond the Pandemic' also indicates the importance of more people-centered and less geographically-centered global manufacturing. The study conducted in USA also shows that since January 2020 an increase by approximately 20% in online spending was noted (McKinsey, 2022). Convenience was definitely redefined by ecommerce, and even grocery shopping became much more popular in analyzed society.

To summarize with research conducted in EU-27 countries, it needs to be underlined that Covid-19 determined an increase not only in online retail turnover, but also in its market share (Szasz et al., 2022).

5. Summary

The aim of this paper was to understand the mobile buying behavior of Polish respondents in terms of the number of transactions per month during the Covid-19 pandemic time. The authors considered respondents' gender and place of residence as chosen socio-demographic characteristics. This paper also tries to fill in a research gap regarding whether consumers prefer to buy groceries online or offline.

Results of this pilot study show that the place of residence does not influence mobile shopping usage among Polish respondents. However, there is an incremental mobile shopping usage pattern during the Covid-19 epidemic than before the epidemic in both - respondents from big cities and the respondents from medium-sized cities.

The limited sample size is one of the main limitations of this study. Thus, the researchers are not in a position to generalize those findings. However, this study has shown the reality of the mobile shopping transaction behavior of Polish respondents based on their gender and the place of living during the Covid-19 pandemic time. Thus, the researchers would suggest conducting the same analysis with a larger sample size to generalize the phenomena. A study based on the stimulus-organism-response (S-O-R) theory found that the significant impact of mobility, personalization, product assortment, and hedonic motivation on impulsiveness, except for the app's visual appeal (Chopdar et al., 2022). A novel DIT-based evaluation method for the

convenience of mobile apps in e-commerce retailing from the perspective of consumer online shopping behavior patterns is proposed (Li et al., 2020). Thus, the findings of this pilot study will be helpful to business managers, marketers, mobile solution developers, and any other stakeholders of e-commerce in their business decision-making.

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