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Article

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Impact of Coronavirus Pandemic on Changes in e-Consumer Behaviour: Empirical Analysis of Slovak e-Commerce Market[1]

Peter MARKOVIČ – František POLLÁK** – Roman VAVREK*** – Yaroslava KOSTIUK***

Abstract

The issue of the impacts of the COVID-19 pandemic on the economy is highly topical at a time of gradual economic recovery. The study presents the results of more than a year and a half of empirical research on changes in consumer behaviour patterns of Slovaks obtained through an analysis of their online interactions with the five main representatives of the e-commerce industry. During both pandemic waves B2C and C2B interactions of a sample of more than half a million customers in the Facebook social network environment were systematically recorded. Subsequently, the data were compared with the reference period one year after the historically first lockdown. The results suggest that during the pandemic, customers switched into completely new patterns of consumer behaviour aimed at maximizing benefits. However, as the pandemic progressed, these patterns combined with the pre-pandemic standard behaviour and created a new, relatively stable evolving trend. This economically significant trend must be considered in business practice.

Keywords: *COVID-19, pandemic, e-commerce, Facebook, internet, innovation, business management*

JEL Classification: A12, M21, O32

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* Peter MARKOVIČ, University of Economics in Bratislava, Faculty of Business Management, Department of Business Finance, Dolnozemská cesta 1, 852 35 Bratislava, Slovak Republic; e-mail: peter.markovic@euba.sk

** František POLLÁK – Yaroslava KOSTIUK, Institute of Technology and Business in České Budějovice, Faculty of Corporate Strategy, Department of Management, Nemanická 436/7, 370 10 České Budějovice, Czech Republic; e-mail: frantisek.pollak@mail.vstecb.cz; kostiuk@mail.vstecb.cz

*** Roman VAVREK, VŠB – Technical University of Ostrava, Faculty of Economics, Department of Public Economics, Sokolská třída 2416/33, 702 00 Ostrava, Czech Republic; e-mail: roman.vavrek@vsb.cz

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Introduction

The global crisis caused by the COVID-19 pandemic is one of the most significant peace challenges both businesses and governments have had to face in this century (Hall et al., 2021). The new coronavirus pandemic has severely disrupted economic, social, and health systems (Veselovska, Zavadsky and Bartkova, 2021), provoking widespread panic caused by uncertainty across the global market (Talwar et al., 2021). In addition to threats, each crisis creates new opportunities. This crisis has also brought great challenges in the form of digitization or regionalization. Coronavirus disease became a serious problem that has significantly affected the physical and mental health of individuals, as well as financial health and the basic survival of companies within national economies. Moreover, the deteriorating financial health of individuals, households and small and medium-sized enterprises threatens the stability of the entire financial sector (NBS, 2020a). The crisis has affected all sectors of the economy and has resulted in economic recession in national economies around the world (Veselovska, Zavadsky and Bartkova, 2021). The economic impact of the pandemic on individual sectors and companies is diverse. It depends on factors such as the degree of adaptability. The way companies can adapt to supply chain outages, created financial and material stocks, or whether their production and operating processes were based on a just-in-time approach only, have had a significant impact on their survival in the market (European Commission, 2021). While some companies faced problems, other companies were successful (Donthu and Gustafsson, 2020). The supply shock has primarily affected customers of manufacturing companies, while companies providing services managed to handle the economic pitfalls of the pandemic more successfully. This is true for many online merchants and companies, as well as for brick-and-mortar companies with developed digital infrastructures. However, it is predominantly a sphere of services related to online shopping, education, entertainment, or teleworking solutions. Under turbulent market conditions, consumer habits have also changed (Wlodarczyk, 2021). The first wave of the pandemic turned out to be the most influential catalyst for change in societies, economies and consumer behaviour. It was in this period of uncertainty when the global panic arose, with relatively similar external manifestations across the world market. Findings from various surveys show how customers of different ages, gender and income levels have changed their shopping habits (kinds and quantities of items they buy, frequency of shop visits, kinds of shop) and even lifestyle or work rituals (working from home, hybrid office, sustainable local travelling, increased mental health care) (Aloufi, 2020; Veselovska, Zavadsky and Bartkova, 2021). It is known from history that such changes which occur in times of uncertainty, are often persistent after the transition from imminent threat, i.e.

they contribute to the creation of new market trends and thus to the emergence of new business opportunities (Veselovska, Zavadsky and Bartkova, 2021). The way individuals and economies behave during this global socio-economic problem is influenced by a number of cultural factors, such as nationality, religion, education, occupation, social class, gender, family or colleague influence, and others (Huggins et al., 2020; Veselovska, Zavadsky and Bartkova, 2021). Business success and often even business survival depend on the extent to which business supply is able to adapt to the requirements and changes in consumer behaviour (Oana, 2020). The changes in the markets that occurred in 2020 have not been examined in detail yet, as the situation is still unstable and each new wave of the pandemic, affected by new virus mutations, brings new changes. The global COVID-19 pandemic has increasingly serious socio-economic consequences, creating an unprecedented opportunity for the manufacturing and services sectors to understand the responses to such crises and thus contribute to improvements in their future research and practice (Hall et al., 2021).

The aim of the study is to map selected changes that have occurred in the patterns of e-consumer behaviour of the Slovaks in the individual waves of the pandemic. The main research problem identified on the basis of the current state of knowledge is the need to empirically investigate the extent of changes in stereotypes within the patterns of consumer behaviour. The purpose of this research is then the need to examine whether the initial shock change has stabilized across the individual waves, or whether it is possible to predict the trends in e-consumer behaviour that would be applicable in the post-pandemic period. The presented study is also one of the final outputs of extensive research on the issue of open innovations in the management of their impact on economic entities in terms of mitigating the effects of the pandemic in business practice.

1. Research Problem and Its Theoretical Background

The effects of crises and disasters are uneven over time and space (Hall, 2013; Hall et al., 2021). Therefore, knowledge of crisis management, crisis marketing, crisis communication with customers and market psychology should be included in the strategic plans of any successful company. Knowledge of consumers, concerning especially their needs, decision-making methods, values and habits, is an important factor which ensures basic functioning of companies and their success in the market (Wlodarczyk, 2021). In the context of the researched topic, it should be noted that the traditional understanding of the initial concept of the topic is relatively ambiguous in the case of the digital market. This is especially the case regarding the demand side of the market (Bačík and Gburová, 2016).

The division of consumer and customer roles overlaps (Cho and Park, 2001; Leung et al., 2022). For the purposes of our study, we assume that the term consumer is superior to the term customer. And the customer, especially in the time of social distancing, is usually also the final consumer of the acquired goods. This is how we approach the issue in its holistic form. That is, through the optics of e-consumer behaviour of Slovak consumers.

The issue of the adaptation to new challenges is the main topic of the presented study. The theoretical overview is structured chronologically to present the issue in thematic as well as in logical sequence.

1.1. State of the Market in the Pre-pandemic Phase

The pre-pandemic phase of the national as well as global economy is marked by the coming recession caused by slower productivity growth, which, according to the IMF (2017), is not only a result of the global economic financial crisis (2000 – 2008) but also a consequence of structural economic problems. Structural problems in the economies, which included a fading ICT boom as well as a slower process of technological convergence, began to be visible as early as in the run-up to the global pandemic. It reflected both the aging of the workforce and slow-down in the global trade and weaker human capital accumulation. In the short term, the recovery in productivity growth was conditioned by addressing the problems that appeared as a result of the previous recession. In the long run, the recovery in productivity growth was conditioned by the implementation of structural reforms (NBS, 2019). The National Bank of Slovakia (NBS, 2019) states that while in the period 2000 – 2008, the average potential growth of the Slovak economy reached 4.9%, in the period 2019 – 2026 (before the crisis caused by the COVID-19 pandemic), the value is expected to decrease to ca. 2.8%. Before the outbreak of the pandemic, approximately 7% of companies in Slovakia had a negative operating margin and were also unable to cover their fixed costs with short-term financial resources (NBS, 2020b).

Even in times of crisis, consumers create potential and real demand, thus determining the functioning of other market players in local and global markets. In the inter-crisis period (2008 – 2019), some significant trends in consumer behaviour emerged, as described in the research by Wlodarczyk (2021). The research shows that in the period preceding the global pandemic, these trends can be divided into several categories: shopping, social relations and contacts, healthcare, providing and using opinions. When analysing customer behaviour since 2015, researchers have observed a significant shift towards e-shopping. Consumers started to look for new shopping channels. The second shopping trend observed in 2018 was associated with visualization. This is a state where

customers can visualize product images through digitization before purchasing them in an online store. In the analysis of social relations and contacts in 2016, a significant trend was the permanent internet connection of the consumer, i.e. using smart phones to establish social relationships. Another milestone in social trends is the year 2019, in which consumers and businesses were more "digitally together" thanks to modern technologies, through which it was possible to easily communicate and share experience or comments on a specific product with other potential customers.

Based on these findings, it can be stated that the crisis caused by the outbreak of the global pandemic has only accelerated the processes leading to a gradual shift within the global market, both in terms of supply and demand side of the market (Ba and Bai, 2020; Fu, Zhang and Wang, 2020; Liu, Xu and Skare, 2021). Already in the pre-crisis period, the supply side of the market was struggling with the coming recession, which requires fundamental reforms of both processes and the system, while the demand side of the market is gradually moving towards digitization. These assumptions are the basis for formulating the initial research questions to analyse changes in e-consumer behaviour (Dorčák and Pollák, 2016). The results of this effort represent Phase Zero of the research presented in the current study. As it was this stage, that defined the initial variables and also outlined the standard pattern of user behaviour during the pre-pandemic period.

1.2. Pandemic Onset and Pandemic Outbreak

At the end of 2019, the first information about the problems caused by the new coronavirus began to appear. China was the first country to take strict measures. The closure of the Chinese economy had only a modest impact on the Slovak economy in the initial phase of the pandemic. After the outbreak, the epidemic spread rapidly to other countries and gradually the Slovak economy began to receive unfavourable news from its main trading partners in the European market (NBS, 2020c). The first confirmed case of the new disease was recorded in Slovakia on 6 March 2020 (MZSR, 2020a) and as early as on 15 March, the state of emergency was declared in Slovakia (UVZSR, 2020b). This was the official beginning of the first wave of the pandemic, which closed most of the operations and which also had a direct impact on the Slovak economy and irreversibly affected the development of the Slovak market or the behaviour of its customers. It was a global trend rather than a local problem, a similar situation could be observed to some extent in the reference markets, where the governments of the affected countries gradually adopted strict measures to slow down the spread of the new coronavirus (KPMG, 2020a).

With the first wave in the second half of March 2020, businesses in Slovakia closed and a large part of the Slovak economy was temporarily stopped (NBS, 2020c). The crisis staff took several stringent measures, including a hard lock-down, closure of borders, and the closure of businesses. As a result of the gradual adoption of measures, trade growth almost stopped. Of course, this was also due to a significant drop in the economic activity, which depends mainly on foreign demand, as the Slovak economy is largely open (NBS, 2020c).

The first to respond to this situation were households responded firstly; those health and political changes took the form of panic buying, for which the business sector was not prepared. Panic buying proved to be a significant global phenomenon during the COVID-19 pandemic (Prentice, Quach and Thaichon, 2022). In the first half of March, before the closure of businesses, retail sales showed an increase in revenues (data on eKasa revenues are supported by the Financial Administration of the Slovak Republic and are among the most up-to-date indicators of the development and turnover in the business sector). The reason for the increase in sales was due to a more intensive stock up households on basic foodstuff and medicine before the announcement of quarantine (NBS, 2020c). Research by Roy et al. (2020) revealed that about one-third of customers had the urge to stock up on basic goods at home. Prentice, Quach and Thaichon (2022) report that panic buying has a negative impact on society and the economy, as excessive customer purchases in the short term cause an immediate shortage of goods or time to replenish stocks by retailers, and thus a lack of available supply. The impact of the pandemic gradually spread to all areas of the economic industry and significantly affected the operation of those companies that did not have to suspend their activities under government regulations in order to slow down the spread of the virus (NBS, 2020d). The sharp decline and foreclosure were also reflected in labour market indicators, with employment falling by 0.5% in the first quarter of 2020 and redundancies in much of the economy gradually passing to the unemployment. The long-term stagnant industry in which redundancies were one of the ways to survive, the so-called production freeze contributed most to it. The closure of operations during March 2020 was significantly reflected in the decrease in hours worked, which caused a slowdown in year-on-year wage growth (NBS, 2020e). Households affected by considerable uncertainty concerning the development of the pandemic were the first to cut spending on consumer durables. This trend in people's purchasing decisions is also confirmed by the significant drop in the number of cars registered (more than 60% year-on-year decrease). Households were the first to postpone purchases of non-urgent and often more expensive goods (NBS, 2020c). A similar result was described in the study of the impact of the COVID-19 pandemic

on consumer behaviour in the digital age (Rahmanov, Mursalov and Rosokhata, 2021), which confirms that the events associated with the pandemic, which have led to increased social distance, feelings of physical danger and complete closure influenced the behaviour of each individual. Customers retreated to the safety of family bubbles, where they had the possibility to rethink what products and services they really need for their lives (KPMG, 2020b). In the comfort of their family bubbles, consumer interaction with businesses has moved from the physical to the online environment. Digital sales channels have become key in many industries. Although online business often fails to fully replace the outage of mortar and brick shops, digitized companies have a better chance of survival (KPMG, 2020b). Digitization has become a key competitive advantage and opportunity for the business sector to survive. E-commerce has become the only secure form of purchasing goods. Businesses whose activities allowed remote work switched to a system of so-called home offices, where employees suddenly faced the need to manage their own time, specifically its division between personal and work life. Combined with market uncertainty, this has logically resulted in the efforts to maximize the benefits of this situation where certain non-work activities have begun to disturb the time allotted for work, and vice versa. This all resulted in a step change in consumer behaviour described in previous studies (Pollák et al., 2021; Pollák et al., 2022a). Based on the study of the current state of knowledge, as well as the results of our own empirical research, it was possible to proceed to the final phase of the research presented in the study.

2. Methodology

The aim of the study is to identify significant changes that occurred in the patterns of e-consumer behaviour of the Slovaks in individual observations during the COVID-19 pandemic. The main research problem identified based on the current state of knowledge (Pollák et al., 2021; Pollák et al., 2022a) is the need to empirically investigate the extent of changes in stereotypes within e-consumer behaviour patterns.

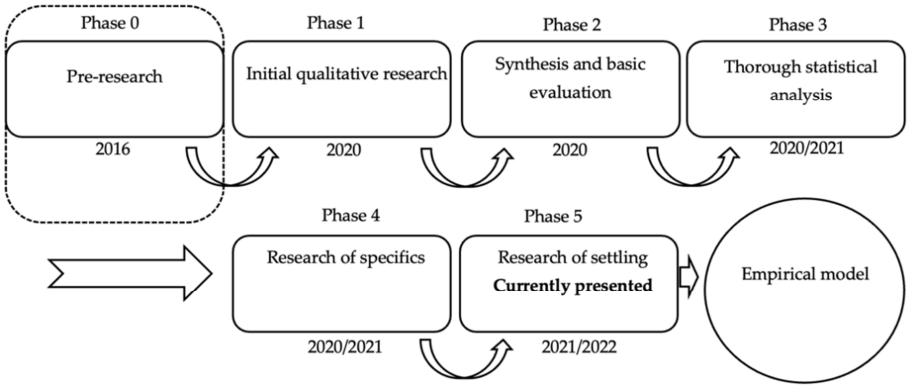
The research question is formulated as follows:
How has the covid pandemic affected e-consumer behaviour in Slovakia?

This research question is assessed from two points of view. The first one is represented by consumer activities/interactions, namely the number of posts, likes and shares on the Facebook. The second one evaluates trend and differences in the activities of companies by means of the number of posts.

From the point of view of the genesis of the research (presented through the following scheme), study is the product of Phase 5 of the complex research.

Scheme 1

Timing of Research Phases



Legend: Preliminary research (Phase 0) forms the reference knowledge base for defining the monitored variables.
Source: Author based on Pollák, Konečný and Ščeulovs (2021).

The study compares 3 monitored periods, namely:

a) 1st observation (first wave): from 15 March 2020 to 13 June 2020,
b) 2nd observation (second wave/Christmas season): from 27 November 2020 to 14 January 2020,
c) 3rd observation (reference): from 15 March 2021 to 13 June 2021.

The research was carried out by monitoring the Facebook activity on the official profiles/fan pages of the 5 largest Slovak e-shops, ranked based on the order published by the journal e-commerce bridge (2020), specifically profiles of Alza.sk, Mall.sk, Nay.sk, Martinus.sk and Bonprix.sk. The research sample therefore includes more than 500,000 users (represents an indicative indicator that does not affect the results of the analysis). The structure of the sample is shown in Table 1 below:

Table 1

Structure of the Research Sample

Facebook profile	**Users/fans**
Alza.sk	78,013
Mall.sk	112,789
Nay.sk	109,045
Martinus.sk	134,860
Bonprix.sk	6,779,699*
Total	Approx. 500,000**

Note: *international profile; **the sum of fan bases, in the case of the last of the profiles we extrapolated the approximate number of local users

Source: Author.

The data were collected for the period of thirteen months by means of recording the number, type and nature of user interactions, as well as the number and

nature of contributions (posts) published on the Facebook profiles of selected e-commerce entities.

The interactions of customer groups (for the purposes of the analysis) represent the interaction of the individuals to the e-marketing communication/posts/, which the subject/profile manager of the e-commerce entity published during the monitored period on the official profile of the company under review. The reactions (in our case referred to as user interactions) had the following forms: comment, like, post and sharing.

The analysis is performed in several stages using the following mathematical-statistical methods including:

• Shapiro-Wilk test

$$SW = \frac{(\sum u_i x_i)^2}{\sum u_i^2 \sum (x_i - \overline{x})^2}$$

where

u_i – constant,
x_i – value of i^{th} statistical unit,
$\overline{x}$ – average value.

• Kruskal-Wallis test

$$Q = \frac{12}{n(n-1)} \sum_{i=1}^{I} \frac{T_i^2}{n_i} - 3(n+1)$$

where

n – number of observations,
n_i – number of observations in the i^{th} group,
T_i^2 – total sum of ranks in the i^{th} group.

• Levene test

$$LE = \frac{(N-k)}{(k-1)} \frac{\sum_{i=1}^{k} N_i (Z_i - Z_{..})^2}{\sum_{i=1}^{k} \sum_{j=1}^{N_i} (Z_{ij} - Z_{i.})^2}$$

where

k – number of values in the monitored variable category,
N – total number of observations,
N_i – number of observations in the i^{th} group,
Y_{ij} – measured value of the *j-th* unit of the i^{th} group,
$\overline{Y_i}$ – average value of the i^{th} group,
$\tilde{Y}_i$ – median of the i^{th} group,
$Z_{..}$ – average of the groups $Z_{ij,}$
$Z_{i.}$ – average of Z_{ij} for the i^{th} group.

- Simple regression analysis using OLS method which is verified by the coefficient of determination

$$R^2 = \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \overline{y}_i)^2}$$

where

y_i – measured value of the dependent variable,

$\hat{y}_i$ – estimated value of the dependent variable,

$\overline{y}_i$ – average value of the dependent variable.

The results of the analysis and statistical evaluation are processed in MS Excel, Statistica 13.4 and Statgraphics XVIII.

3. Results and Discussion

The analysis is performed in two levels. The first is a comparison of 4 e-commerce parameters in individual observations using selected moment characteristics and the corresponding tests (Section 3.1). In the second part (Section 3.2) we take a closer look at the trends in individual observations observed separately at weekdays (Section 3.2.1) and on weekends (Section 3.2.2). The purpose of the double processing is to point out the absolute differences between the level of e-consumer behaviour parameters between the observations and, consequently, their development over time. We close the chapter by discussing the findings.

3.1. Comparison between Observations

As part of the processing of the obtained results, 3 observations of data collection are compared using the statistical methods mentioned above. The analysis itself is therefore processed at the level of 4 e-commerce indicators, namely:

a) number of posts,

b) number of likes,

c) number of comments,

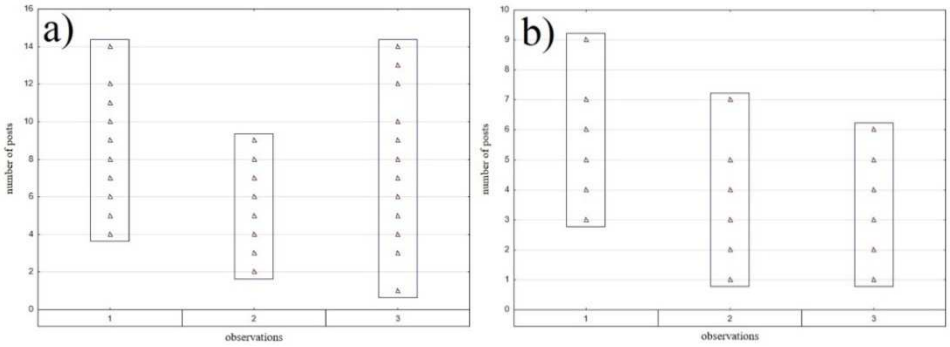
d) number of shares.

In terms of the number of posts, we observe lower values within the second "winter" observation of the data collection. Nevertheless, the differences in the mean value are not statistically significant on weekdays ($Q = 41.897$; $p < 0.01$). However, the values of weekend observations are significantly higher ($Q = 20.081$; $p < 0.01$). A similar conclusion is reached when evaluating the homoskedasticity of these results. Both on weekdays ($LE = 1.411$; $p = 0.247$) and during the weekend

(LE = 0.178; p = 0.837), the variance is the same. The numbers of posts in the "spring" observation of the data collection are thus balanced. During the weekends, however, the absolute number of posts decreases.

F i g u r e 1

Comparison of Number of Posts during 3 Monitored Observations

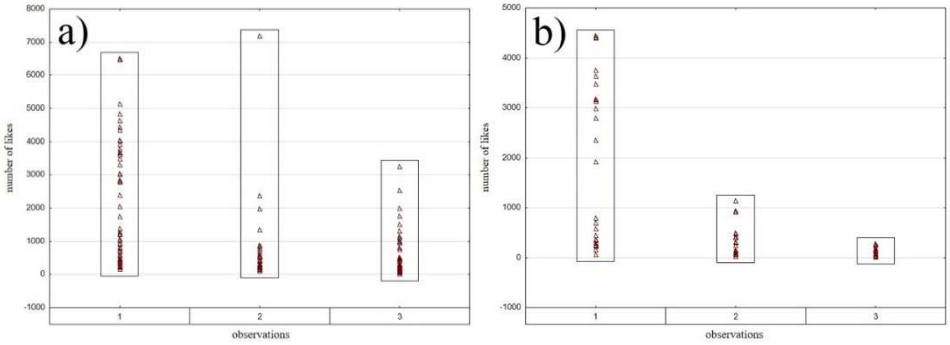


Note: a) weekdays, b) weekend.

Source: Own processing.

F i g u r e 2

Comparison of Number of Likes during 3 Monitored Observations



Note: a) weekdays, b) weekend.

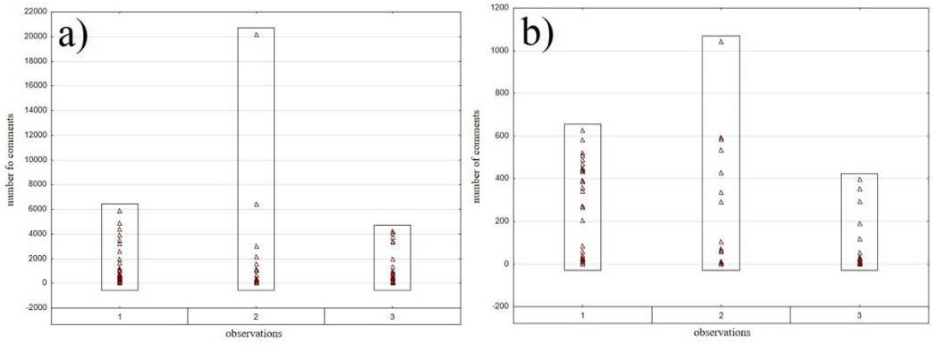
Source: Own processing.

At first glance, the number of likes (see Figure 2) shows significant differences in absolute values both on weekdays and during the weekend. On weekdays, differences in both monitored parameters were confirmed (Q = 46.797; p < 0.01; LE = 35.666; p < 0.01). Statistically significant differences in the mean and variance can also be observed at weekends (Q = 31.859; p < 0.01; LE = 116.027; p < 0.01). The number of likes is declining, with this trend even more pronounced for weekends.

During the winter data collection, a sudden and isolated increase in the interest in new information is observed, which is reflected in the increased number of comments. This resulted in a rejection of homoskedasticity for weekdays (LE = 4.941; $p < 0.01$). However, this fact does not affect the overall structure of the results, which indicates a significant decrease in the number of comments, especially in 2021 (Q = 33.234; $p < 0.01$). These differences were also confirmed for weekends (Q = 19.770; $p < 0.01$; LE = 13.502; $p < 0.01$).

F i g u r e 3

Comparison of Number of Comments during 3 Monitored Observations

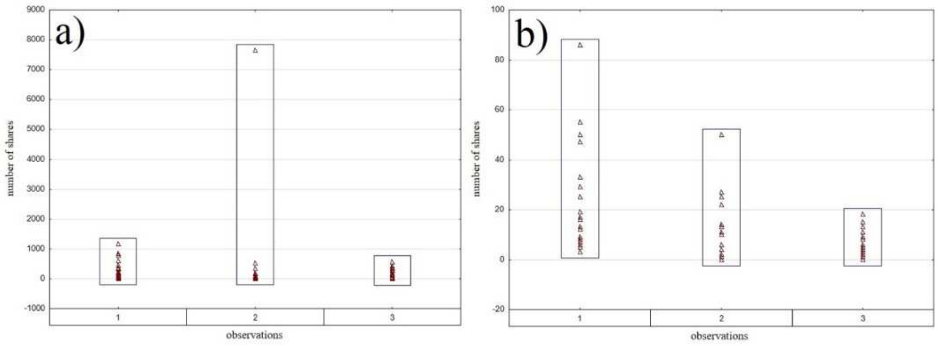


Note: a) weekdays, b) weekend.

Source: Own processing.

F i g u r e 4

Comparison of Number of Shares during 3 Monitored Observations



Note: a) weekdays, b) weekend.

Source: Own processing.

The number of shares on weekdays follows the structure of the previous e-commerce parameter, i.e. the number of comments. The number of comments is constantly decreasing (Q = 26.523; $p < 0.01$); there are also statistically significant differences in the variance of these results (LE = 5.770; $p < 0.01$). The same

conclusions can be drawn when evaluating the results for weekends, i.e. the number of shares is constantly decreasing (Q = 17.898; p <0.01; LE = 8.183; p <0.01).

3.1.1. Comparison between Observations – Conclusion

The main findings of the comparison of individual observations can be summarized as follows:

- during the weekends, the number of posts decreases in 3 observations,
- the number of likes decreases across 3 observations of data collection, with this trend being even stronger at weekends,
- the number of comments and shares decreases both on weekdays and during the weekends.

3.2. Comparison across Observations

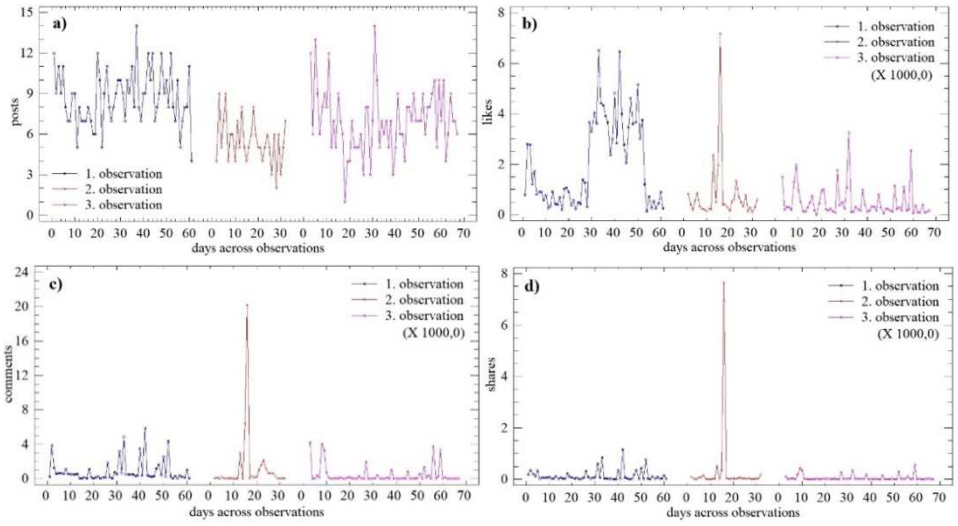
The previous chapter describes the differences at the level of monitored e-commerce parameters during weekends and weekdays. These results are also considered in the cross-observations analysis. The analysis is performed separately for the weekend and weekdays data.

3.2.1. Comparison across Observations – Weekdays

The development of individual e-commerce parameters on weekdays is shown in Figure 5.

F i g u r e 5

Scatter Plot of Individual e-Commerce Parameter across Observations on Weekdays



Note: a) posts, b) likes, c) comments, d) shares.

Source: Own processing.

It follows from the figure there were significant differences observed. Based on this graphical illustration, the trend in the number of posts can be described as continuous within all three observations. The biggest differences are recorded in the case of likes, which in the 3rd (post-covid) observation do not even reach the value of the first observation. The differences in comments and shares are distorted by the outliers that represented the Christmas holidays (highly above-standard results).

The graphical results are supported by a simple regression model (based on the OLS method), the results of which are presented in Table 2. The growth of individual e-commerce parameters before and after the pandemic is positive, but significant differences can be found in the growth rate. The pandemic has had the most significant impact on the number of likes, where the values in the 3rd observation reached about 7% of the results in the 1st observation. We also see a significant decrease in the number of shares and comments. We can talk about the "smallest" decrease in the case of the number of posts, which, however, stagnates significantly in the 3rd observation.

T a b l e 2

Linear Regression Model for Each e-Commerce Parameter on Weekdays of 1st and 3rd Observation

Parameter	Observation	Regress. function	R^2	Regressor comparison
Posts	1.	posts = 0.21265 * days	72.19	0.2579
	3.	posts = 0.054851 * days	87.37	
Likes	1.	likes = 55.4556 * days	56.19	0.0670
	3.	likes = 3.7186 * days	36.31	
Comments	1.	comments = 21.5916 * days	25.82	0.1497
	3.	comments = 3.23334 * days	13.82	
Shares	1.	shares = 3.44226 * days	22.66	0.1208
	3.	shares = 0.416132 * days	17.85	

Source: Author.

The impact of the pandemic on e-commerce activities on weekdays is significant. There is a bigger drop on the customer side (likes, comments, shares). An early increase cannot be expected also due to reduced e-commerce activities of the companies under review.

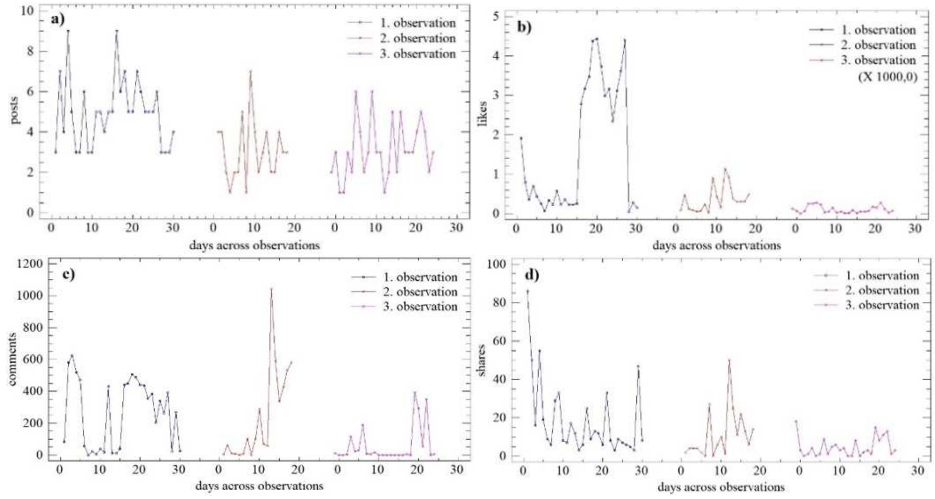
3.2.2. Comparison across Observations – Weekends

As in the case of weekdays, similar analysis as performed for weekends in individual observations (see Figure 6). The continuously declining trend can be observed in the number of posts on the side of companies, and in the number of shares on the side of customers. During the weekends, the number of likes decreases significantly in the 2nd observation, while in the case of the number of

comments, this can be noticed in the 3rd observation. The impact of holidays can be identified in the form of outliers only in the number of likes (Easter) and the number of comments (Christmas).

F i g u r e 6

Scatter Plot of Individual e-Commerce Parameter across Observations during Weekends



Note: a) posts, b) likes, c) comments, d) shares.

Source: Author.

Comparison of simple regression models (based on the OLS method) shows similar results for weekends as in the case of weekdays. In the 3rd observation, the activity of companies in the form of posts on social networks is declining (reaching approximately 20% of the first observation). However, there is a more significant drop on the customer's side. The most significant decline was recorded in the number of likes, while the results of other e-commerce parameters do not reach the values of the 1st observation (see Table 3).

T a b l e 3

Linear Regression Model for Each e-Commerce Parameter during Weekends in 1st and 3rd Observation

Parameter	Observation	Regress. function	R^2	Regressor comparison
Posts	1.	posts = 0.241142 * days	66.80	0.2097
	3.	posts = 0.0505807 * days	84.27	
Likes	1.	likes = 100.441 * days	61.38	0.0162
	3.	likes = 1.63236 * days	55.14	
Comments	1.	comments = 12.9482 * days	46.39	0.0770
	3.	comments = 0.997575 * days	23.82	
Shares	1.	shares = 0.662612 * days	19.89	0.1134
	3.	shares = 0.0751495 * days	47.52	

Source: Author.

The impact of the pandemic on e-commerce activities during weekends was significant. We can see a larger decline on the customer side (in terms of likes, comments, shares). An early increase cannot be expected also due to reduced e-commerce activities of the companies under review.

3.2.3. Comparison across Observations – Conclusion

The obtained results pointed to statistically significant differences of individual observations in the data collection, which were also demonstrated in the evaluation of time trends. After the pandemic (3rd observation), companies focused on weekdays, with activities taking place on weekends in the background. The activities of companies decreased rapidly not only in absolute terms; there was also a significant decrease in terms of the growth of these activities. An even more significant decline in the activity can be observed on the customer side, with changes and growth across the third observation being very modest and gradual. The pandemic has thus affected the customers more significantly.

3.3. Construction of Empirical Model

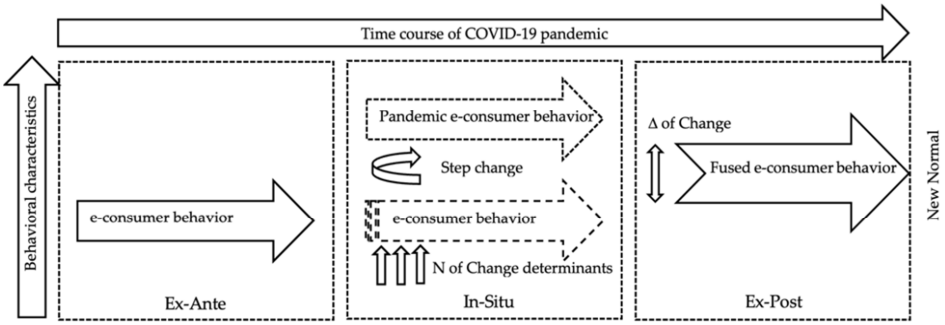
Based on the examined context, it is possible to answer the main research question. As the aim of the study was to describe selected changes that occurred in the patterns of e-consumer behaviour of the Slovaks in the individual waves of the COVID-19 pandemic, this chapter will be complemented by visualization of an empirical model of changes in stereotypes in the patterns of e-consumer behaviour. The model was constructed on the basis of a synthesis of knowledge accumulated in individual phases of research visualized in Figure 1.

The research question of how the pandemic has affected the e-consumer behaviour of the Slovaks, can be answered at several levels. From the basic perspective, in its basic form, an almost dichotomous and unambiguous answer is possible, specifically, that the pandemic has affected the behaviour to a large extent. While in the reference research (Dorčák and Pollák, 2016), the values of customer interactions fluctuated around the average, in the three observations mapping the course of the pandemic in 2020 and 2021, there was a sharp increase and subsequent stabilization of interactions in the new post-pandemic standards.

The slowdown in the interactions compared to the beginning of the pandemic can be observed both on the supply and the demand side. On the demand side, pandemic customers have significantly reduced their panic e-commerce activities recorded during the first lockdown. However, the new standards still differ significantly from the pre-crisis standards. The following scheme visualizes the whole situation as follows.

S c h e m e 2

Model of the Impact of the COVID-19 Pandemic on e-Consumer Behaviour



Source: Author based on Pollák, Konečný and Ščeulovs (2021).

The scheme shows gradual changes in e-consumer behaviour, with the new standards created by the combination of pre-pandemic and pandemic e-consumer behaviour patterns showing a gradual change, with the COVID-19 pandemic acting as a significant evolutionary accelerator of the necessary digitization. With this statement, we can draw a conclusion, where we comprehensively evaluate the results of the study presented in the context of holistic research.

3.4. Discussion of Overall Findings

From the point of view of summarizing of the research effort across the entire two-year period, it is possible to proceed to a broader discussion of the overall findings. Within the individual research phases, all relevant studies that mapped the course of the pandemic over time were continuously analysed. In the first months of the pandemic, there was a sharp onset of trends in consumer behaviour, which by their nature corresponded to panic behaviour. We also followed these trends in the market conditions of the Slovak internet market, whose infrastructure replaced the traditional brick-and-mortar market infrastructure at the time of the first economic downturn. In the first partial study, in which we proceeded to a thorough analysis of the initial data in phase 3 (Pollák et al., 2022a), we noticed a sharp deviation from the usual trends expressed through the observed parameters identified and described in the pre-crisis study (Pollák and Dorčák, 2016). Prior to the outbreak of the pandemic, the digital market was only a supporting infrastructure for a large part of its users. User interactions on the marketing communication of content producers on the social network Facebook corresponded to this. During the day, the average values of the monitored indicators of user activity fluctuated around the mean value, while the maximums were reached in the early and late evening. The comparison of interactions

during the working week and the weekend also showed a considerable complementary to leisure character of the digital market in the pre-pandemic period. The onset of the pandemic has changed the usual rules quite significantly. At the time of the first closure of the economy in the spring of 2020, we are seeing a sharp increase in Slovaks' interactions during the working week, while moving the maximum in user-producer interactions on the social network Facebook in the time interval, which can be described as working time. At the same time, we monitor maxima well above the pre-pandemic averages for each of the monitored interactions. With the progress of the pandemic until the second closure of the economy during the Christmas holidays, we observe a partial stabilization of trends in user behaviour. Panic signs in behaviour expressed through maxima within individual monitored parameters have stabilized. As the pandemic progresses into its second year, we are monitoring the gradual return of users to weekend interactions for content producers' marketing communications as part of the third measurement. From the point of view of the working week, we follow a relatively interesting trend, where the panic behaviour from the first lockdown expressed by the maximum of user interactions at the beginning of the working day with the passage of time loses its urgency. Interactions during the third lockdown are dominantly recorded during the working day, but in terms of time frames they are much more evenly distributed within that day. With a certain degree of abstraction, it could be stated that users, in our case e-consumers, have lost their imaginary shyness and during the working day have set aside some time to maximize their benefits from working from home represented by maximizing the benefits of purchasing goods over the Internet. We are following this trend across the markets of Central Europe (Pollák, Konečný and Ščeulovs, 2021). At the same time, we record the creation of new patterns of e-consumer behaviour, which is a synthesis of pre-pandemic and pandemic patterns. Based on the findings, it is possible to assume that part of the customer-seller interactions will take place in the digital environment even after the end of the pandemic. Not only will there be a market exchange of sophisticated goods and services, but transactions in everyday consumer products will also be digitized. Overall, it can be stated that the market has undergone an accelerating development from offline to online. With this statement, it is possible to proceed to the conclusion of the study.

Conclusions

The supply shock put enormous pressure on the entire infrastructure, but the main players in the market had been relatively well-prepared. Accelerated digitization has brought several paradoxes. Of particular note is the digitization of the

procurement processes of daily consumer products. The specific conditions have also brought relatively innovative approaches to ensuring the basic activities of commercial companies. Employees were given the opportunity to work from home, where the initial euphoria was replaced by everyday reality. Both sides of the market tried to maximize their benefits in the hectic conditions, on the supply side it took the form of more intensive work with data, on the demand side by monetization of customers' own time (Pollák et al., 2022a).

Customers, for whom e-commerce was the safest (and often the only) way to buy goods and services, were looking for the benefits they found in virtual meeting places during social distancing. Social networks, in our geographical conditions represented mainly by the Facebook platform, were an affordable substitute for the world's brick-and-mortar meeting places. These networks have become the domain of interaction exchange, both in the form of B2C and C2B. Producers have optimized their communication channels and e-marketing communication. This took the form of motivating the customer in the form of a direct benefit or additional benefit. It was only a logical step that consumers, under the pressure of opportunity, would begin to maximize their benefits by monetizing their time. Interactions have shifted to workdays (Pollák et al., 2021) and e-consumer behaviour has undergone both a qualitative and a quantitative step change. With the gradual disappearance of individual waves of the pandemic, it is possible to observe a trend of stabilization both in the behaviour of producers and consumers. This identified trend takes the form of a fusion of pre-pandemic and pandemic patterns of behaviour. Although the available data do not enable accurate determination of the impact of the delta variant, it is possible to notice an accelerating digitization trend. This trend is particularly evident compared to the period examined in the zero phase of our research efforts. It can also be stated that from the point of view of the new coronavirus pandemic, this is an evolutionary rather than a revolutionary step where the pandemic represents a significant accelerating factor of the necessary changes that individual economies faced even before the outbreak of the pandemic. From the point of view of applying the findings in business practice, it is necessary to point to the necessity of applying digital infrastructures in business processes.

The new consumer standard brings a significant shift from brick-and-mortar stores. This trend is also noticeable in areas such as service provision or education. Much of the process is shifting from the traditional world to the digital environment, with significant benefits for both sides of the market, mainly due to the reduction of costs. At the same time, the area of research on the effects of a pandemic on the economy is a key area not only for the managerial but also for the economic sciences.

Limitations and Future Direction of Research

As for possible limitations of the research, especially the local nature of the data should be mentioned. Preliminary results point to the strongly local nature of the changes, although the main trends are noticeable in most of the markets surveyed. Much of the research effort has also been dedicated to removing limitations in the form of seasonality in the trends. Some of these limitations are removed in the presented study through the second observation that took place during the winter lockdown, which includes the Christmas season. Finally, it is necessary to point out that, despite the considerable quantitative nature of the dataset, the findings are predominantly qualitative in nature. Further research in this area is thus recommendable. As regards the terminology of the basic concepts, it is necessary to mention in particular the limitations arising from the overlapping nature of the concepts consumer and customer in terms of their interactions in the digital market environment. In our study, we assume that the customer in the digital market environment at the time of social distance is also the final consumer of the acquired goods. Thus, we approach the issue in its broader form than the issue of changes in e-consumer behaviour. We take this limitation into account both when describing and discussing the partial results of the study in the third chapter, as well as when formulating general conclusions.

The issue of the impact of the COVID-19 pandemic on consumer behavior is evolving over time. From the first recorded cases to the partial disappearance of the pandemic in its first and second year, researchers around the world have been conducting studies to examine and understand the effects of this phenomenon. The constant development of the knowledge base reveals new perspectives for research. The perspective we have identified for further research is, in particular, the stabilization of trends arising from panic manifestations in consumer behaviour (Hall, 2021; Rahmanov, Mursalov and Rosokhata, 2021), which arose as a market reaction to a high-nonstandard situation. We also consider it promising to examine the creation of new norms in consumer behaviour (Pollák et al., 2022b), which arose from the accelerated digitization of the market during the pandemic.

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