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Consumer Purchasing Behaviour during the COVID-19 Epidemic: A Case Study for Poland[1]

With an increase in COVID-19 cases and introduction of studying and working from home, households have begun to change their priorities in shopping behaviours. The source of the data was a survey conducted at the beginning of April 2020. The aim of the study was: (1) to demonstrate changes in respondents' behaviour in the purchasing process and (2) to identify factors determining changes in these behaviours. The paper verified that, in the conditions of the pandemic, consumer shopping behaviour focuses on health safety. From a set of variables containing subjective opinions of respondents regarding factors influencing changes in their purchasing habits, dimensional reduction was carried out using factor analysis. Isolated factors were used to model Confirmatory Factor Analysis (CFA). The obtained assessments of the quality of the models (Hoelter value, CMIN/DF, RMSEA and others) indicate that the proposed models meet statistical standards and acceptability criteria. The models highlight the following factors: safety when shopping, prudence and a desire to protect health. Therefore, the assumptions were corroborated, according to which in a time of crisis and uncertainty (a pandemic is such a time), psychological factors and assumptions of behavioural theories are gaining in importance. This paper aims to complement existing research. The data obtained from the survey concern the level and frequency of expenditure on different product groups. Previous research has focused primarily on the impact of the pandemic on the economic situation. This document focuses on non-economic factors determining changes in consumer behaviour.

Keywords: consumption, coronavirus, COVID-19, households, consumer behaviour, factors determining purchases, health security, rationality of consumer behaviour, factor analysis, confirmatory model

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ИССЛЕДОВАТЕЛЬСКАЯ СТАТЬЯ

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Покупательское поведение потребителей во время эпидемии COVID-19: пример Польши

Рост числа случаев COVID-19 и переход на дистанционный формат работы и обучения привели к смене приоритетов в покупательском поведении. Источником данных послужил опрос, проведенный в начале апреля 2020 г. Цели исследования — продемонстрировать изменения в поведении респондентов при совершении покупок, выявить факторы, влияющие на изменения в покупательском поведении. Анализ данных показал ориентацию потребителей на обеспечение санитарной безопасности в условиях пандемии. С помощью факторного анализа была проведена процедура снижения размерности для оптимизации набора переменных, содержащих субъективные мнения респондентов относительно факторов влияния. Отдельные показатели были использованы в модели подтверждающего факторного анализа (CFA). Полученные оценки качества (Hoelter value, CMIN/DF, RMSEA и др.) свидетельствуют о соответствии предложенных моделей статистическим нормам и критериям приемлемости. В построенных моделях выделяются следующие факторы: безопасность при совершении покупок, предусмотрительность и забота о здоровье. Таким образом, подтвердились предположения о важности психологических факторов и положений поведенческих теорий в условиях кризиса и нестабильности (в том числе и во время пандемии). В результате опроса были получены данные о масштабности и периодичности затрат на различные группы товаров. Эта статья дополняет уже существующие исследования. В предыдущих работах изучалось влияние пандемии на экономическую ситуацию, в то время как в данной статье основное внимание уделяется неэкономическим факторам, определяющим изменения в поведении потребителей.

Ключевые слова: потребление, коронавирус, COVID-19, домохозяйства, поведение потребителей, определяющие покупки факторы, санитарная безопасность, рациональность потребительского поведения, факторный анализ, подтверждающая модель

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Introduction

The emergence of a new reality in connection with the coronavirus epidemic has caused changes in many areas of every society. Initially, all government actions aimed at improving and ensuring the health service. Nevertheless, it was expected that with the need to isolate and to change the work system to working from home, government restrictions aimed at minimising the spread of COVID-19 would greatly affect the state of any economy. In times of globalisation and trade relations, the introduction of restrictions in trade, transport, etc., in one region has widespread consequences.

A large number of companies had to reduce their business contacts to a greater or lesser extent overnight, and households, i.e. consumers, had to face major changes in their daily lives. In Poland, changes following the appearance of the first people sick with COVID-19 started in early March 2020. At that time, most state institutions, educational institutions and some companies were forced to switch to remote work. Simultaneously, the decision-makers worked hard to minimise the economic damage while trying to control the number of coronavirus cases.

Despite previous crises (e.g. in 2008), it was the first time that most households were concerned about their economic situation. It seemed that intermittent economic crises did not affect households directly — as subjectively felt by consumers. The emergence of the pandemic caused many consumers for the first time to feel the need to protect not only their own health but also greater economic flexibility. There have been few papers on behaviour during the epidemic and those published concern individual regions. The impact of COVID-19 has certainly been felt in every region of the world. It can be assumed that the effects of the epidemic will be felt to varying degrees in different economies. Consumers in different countries reacted to restrictions differently. In the United States, household spending increased by about 50 % between 26 February and 11 March 2020. According to Baker et al. (2020), this was caused by the belief that they had to stock up on food, and the fear that retail trade might cease to fully function. Similar consumption behaviour was also observed in India.

This paper aims to complement the literature on household consumption in atypical or

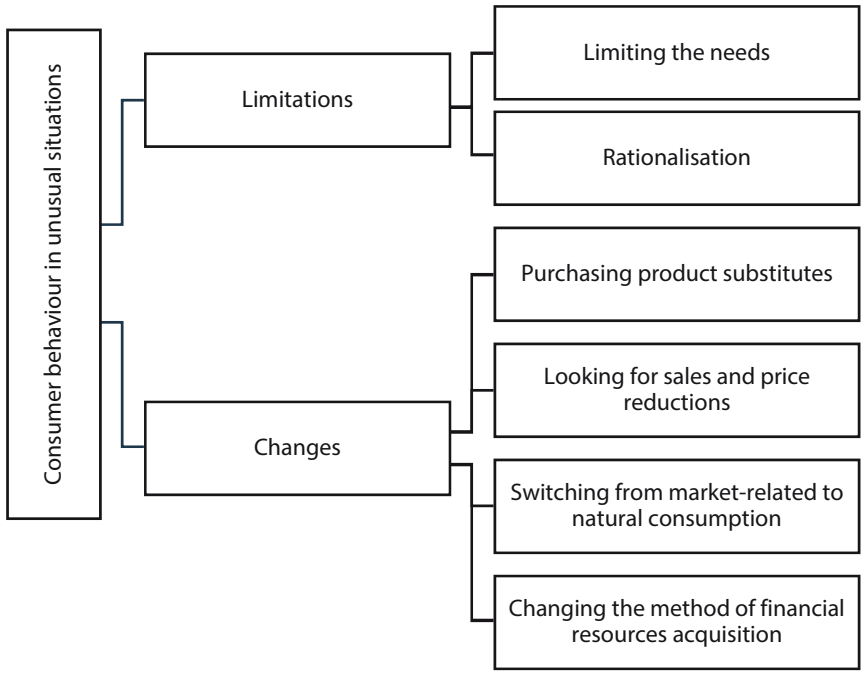


Fig. 1. *Diagram of changes in consumer behaviour in unusual situations (source: Prepared by the author based on: (Smyczek, 2010))*

crisis situations. These issues have been dealt with, for example, in studies by many authors (Zurawicki, Braidot, 2005; Tao, 2018; Pandelica, Pandelica, 2009; Pandelica, Pandelica, 2011; Ang, 2001; Urbonavičius, Pikturnienė, 2010; Smyczek, Matysiewicz, 2015; Duquenne, Vlontzos, 2014; Stoklasa, Starzyczna, Sykorova, 2014; Sowa, 2011; Stanciu et al., 2020). Those authors analysed the factors determining consumers' purchasing behaviour. The majority of studies on household behaviour have been related to expenses, savings, investments in various financial instruments or the purchase of various goods, e.g. luxury goods.

A review of papers devoted to the analysis of consumer behaviour shows that consumer behaviour is defined as the process of making decisions by households or consumers about the processes of obtaining and disposing of goods or services (Światowy, 2006; Engel, Blackwell, Miniard, 2001; Hansen, 1976; Pohorille, 1985; Rudnicki, 2012; Szczepański, 1981; Grzywińska-Rąpca, 2018; Ölander, Thøgersen, 1995; van Raaij, 2016; Welsch, 2007); consumer behaviour is the feeling of the necessity to meet the needs and their hierarchy. Prioritising, and, in consequence, establishing a hierarchy of needs, is also connected with the choice of means through which these needs will be satisfied (Schiffman, Kanuk, Hansen, 2012). The subjectivity of decisions related to satisfying needs has been pointed out by various authors (Fabiunke et al., 1976; Grzywińska-Rąpca, 2019). Consumer behaviour is defined as psychological activities and actions related to the motives and causes of business units, strongly correlated with obtaining information about products, buying and using them (Antonides, van Raaij, 2003). The definition proposed by Kieżel (2004) seems to combine all the above mentioned. According to the author (Kieżel, 2004), consumer behaviour, also in unusual situations, is a whole range of activities from the motive, need, through choices to satisfying them in certain social, cultural and economic conditions (Fig. 1).

Because of the complexity of behaviours and the impact of a combination of various factors on consumers' motives and attitudes, the considerations of the conditions of households' purchasing behaviour in the literature on the subject focus on numerous determinants. In the initial period of development, microeconomic theories presented the consumer as a fully rational person who, having access to comprehensive information, is guided only by economic motives (Zalega, 2007). Over time, however, full rationality has given way to selective rationality, according to which many factors influence human behaviour and the consumer is perceived as an economically rational person (Fig. 2).

The researchers' task is therefore to analyse the rational behaviour of consumers, usually with limited options available. The limitations make it necessary for consumers to choose the order in which their needs are satisfied.

In the context of COVID-19, in order to behave rationally, consumers need to know and be aware of all risks (not only health-related risks, but

Fig. 2. *Selected criteria and measures of rationality of consumer behaviour (source: Prepared by the author based on: (Kieżel, 2004))*

also economic risks) to make the best choices for themselves. In unusual situations (such as an economic crisis, a pandemic or a natural disaster), a consumer rarely has enough information to make rational and timely decisions and must often settle for satisfactory (rather than optimal) choices (Simon, 1997; Kahneman; Tversky, 1979).

According to Zalega (2012), the consumer surveys conducted by various study centres show that, along with an objective economic situation, consumer behaviour is increasingly often influenced by consumers' perception of the situation and their optimistic or pessimistic expectations regarding their own financial situation and the general economic situation (Zalega, 2012). In the context of atypical situations, such as the COVID-19 pandemic, a psychological view of consumer behaviour becomes more important, as it is trying to explain, among other things, the impact of psychological variables on the relationship between a specific economic factor and the household's decision (Antonides, van Raaij, 1998; Falkowski, Tyszka, 2009). The psychological factors determining consumer behaviour are linked to behaviourism. Behavioural research is a source of information that makes it easier to fully understand consumer behaviour and decisions. Many consumers in the same environment may react differently to the coronavirus threat (Coibion, Gorodnichenko, Weber, 2020; Andersen et al., 2020; Stanciu et al., 2020; Chronopoulos, Lukas, Wilson, 2020; Sheth, 2020; Baldwin, Mauro, 2020).

The purpose of this paper is to answer the question of whether the changes brought about by COVID-19 have a significant impact on consumer behaviour and, more specifically, on the structure of household expenditure and (1) What determines the place where purchases are made? (2) What does the consumer take into consideration when shopping during the COVID-19 pandemic?

The author feels that, when analysing consumer behaviour during the pandemic, the main focus should be placed on psychological factors. They are of key importance during the COVID-19 pandemic. During that time, many households are forced to change their habits aimed at satisfying their needs, and the course and duration of the pandemic may have a negative impact on the economy, e.g. through an increase in the number of unemployed or a decrease in income.

Methods & Data

The analysis of consumer behaviour during the COVID-19 pandemic was conducted in order to explore consumer attitudes and motives, and to identify the circumstances that differentiate the consumption behaviour of households in atypical health and economic conditions. With regard to the shaping of purchasing behaviour, the focus was on subjective assessments of households. In order to verify the research questions, primary and secondary source materials were used. The first one specifies data obtained directly from respondents on the basis of a questionnaire prepared by the author. The questions addressed to the respondents concerned the frequency of shopping, the amount of purchased goods in various assortment groups (indicated in the questionnaire by the author) and the level of expenditure on consumer goods and services in two perspectives: before the pandemic and after the outbreak of the disease in Poland. At the time of an atypical situation, and undoubtedly such is a pandemic, in the context of research on consumer behaviour, it seemed important to complete the answers to the questions about the place of shopping, possible change of the place of shopping and indicating factors influencing it. The survey was conducted using the computer-assisted web interviewing (CAWI) method, with the help of which answers were obtained (146 respondents) to the questions formulated in the questionnaire, conducted in the period from 4 April 2020 to 11 April 2020. The sampling was quota based on age, gender and education. In the own research, the

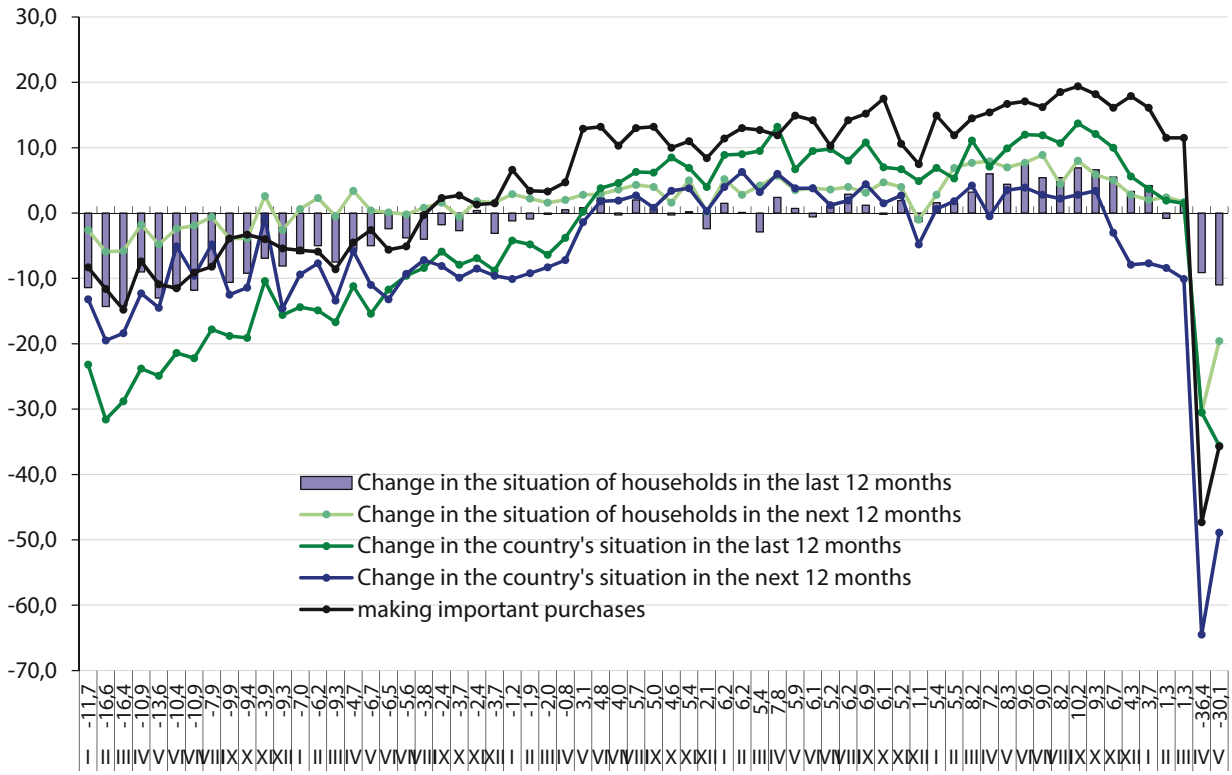


Fig. 3. *Consumer confidence index (CCI) and its components by month between 2017 and 2020 (source: https://stat.gov.pl/obszary-tematyczne/koniunktura/koniunktura/koniunktura-konsumencka-maj-2020-roku,1,87.html (Date of access: 05.06.2020))*

questions were scaled on the Likert scale, meaning that the respondents chose one of the ordered categories. Then the responses were subjected to principal component analysis in order to reduce the variables without losing the information load. Another method used for the analysis was the confirmatory method. The calculations were made using IBM Statistics and AMOS programming. In addition, this paper presents the results of a secondary research carried out by the Central Statistical Office in the period 4 May 2020 to 13 May 2020, using the telephone interview method in a group of 1,376 respondents.

Results & Discussion

The epidemic has had an impact on household behaviour. The conditions of household living also changed. The concept of economic condition contains information related to the material and intangible quality of life of households. The Central Statistical Office provides detailed data on the quality of life in a very broad sense, taking into account the economic situation of consumers (households' subjective assessments of their current and future financial situation) (Fig. 3).

Research on the material and non-material quality of household living is carried out within various scopes and aspects. The following thematic areas are distinguished: material living conditions, health, education, economic activity and economic security. As for the epidemic situation, important information is provided by the data presented in Figure 3. It is notable that there has been a significant drop in respondents' assessments of the change in the financial situation during the next 12 months and the possibility of making purchases at the moment. Assessments of the current domestic economic situation and the households' current financial situation have deteriorated (declined by 5.1 p.p. and 1.9 p.p., respectively)[1]. According to the Central Statistical Office's Household Condition Survey[2], many respondents were afraid of losing their jobs due to the epidemic — 33.1 % in April and 36.1 % in the survey repeated a month later (Table 1).

A large group of respondents saw the epidemic situation as a threat to the economy. As many as 99 % respondents answered the question: What, in your opinion, is the threat posed by the epidemic situation (COVID-19) to the Polish economy? by indicating a major or moderate threat. These assessments improved slightly in May and were 78.2 % (major threat) and 19 % (moderate threat). Respondents participating in the survey conducted by the Central Statistical Office (GUS)

[1] Retrieved from: https://stat.gov.pl/obszary-tematyczne/koniunktura/koniunktura/koniunktura-konsumencka-maj-2020-roku,1,87.html, (Date of access: 05.06.2020).

[2] in connection with the epidemic situation (COVID-19 threat)

Table 1

Respondents' assessment of the impact of the epidemic on their lives and financial situation

ITEM		April	May
To what extent were your responses affected by the current epidemic situation (COVID-19)?	considerable	58.1	46
	moderate	37.3	47
	none	4.6	7
Are you afraid of losing your job or of a decline in your business activities in connection with the epidemic situation (COVID-19)?	yes, very	11.1	5.7
	possibly	16.9	14.2
	rather not	16.3	21.9
	no	11.6	15
	don't know	2.4	1.6
	not applicable (unemployed)	41.7	41.7
What, in your opinion, is the threat posed by the epidemic situation (COVID-19) to the Polish economy?	major threat	88	78.2
	moderate threat	11	19
	small threat	0.9	2.4
	no threat	0.1	0.4
What, in your opinion, is the threat posed by the epidemic situation (COVID-19) to your personal financial situation?	major threat	44.4	29.3
	moderate threat	36.5	42.6
	small threat	14.6	19.8
	no threat	4.5	8.3
What, in your opinion, is the threat posed by the epidemic situation (COVID-19) to everyday life in your local community?	major threat	49.5	29.1
	moderate threat	43.1	51
	small threat	7.3	17.9
	no threat	0.1	2

Source: https://stat.gov.pl/obszary-tematyczne/ceny-handel/handel/dynamika-sprzedazy-detalicznej-w-kwietniu-2020-roku,14,64.html (Date of access: 05.06.2020).

also expressed concerns about the deterioration of their own household's financial situation. In April and May, the indications were 80.9 % and 71.9 % for responses "major threat" and "moderate threat", respectively. It is noteworthy that the change (improvement) is very small — 15.1 percentage points. For 29.3 % of the respondents, the current epidemic posed a major threat to their personal financial situation. Moderate threat was felt by 42.6 % of those answering questions about the consumer's financial situation. A small threat was indicated by 19.8 %, while 8.3 % of the respondents felt no threat.[1]

Responses to the question about the impact of the current epidemic situation on the daily life of the local community are also noteworthy. In April, 49.5 % of the respondents indicated a major threat, with the percentage lower by nearly 20 pp a month later. The respondents' answers could have been influenced by their adaptation to the situation, government actions (e.g. various types of subsidies and relief), as well as by what is closest to health security — a high level of health care resource availability.

A significant drop in retail sales of goods (in fixed prices) was undoubtedly caused by the activity of decision-makers resulting in reduced activity or the total closure of shops, shopping malls and service outlets, except for grocery shops and drugstores. The retail sales were also influenced by decisions to close the borders and to introduce obligatory quarantine for travellers. The changes introduced due to the emergence of the epidemic threat changed the level of online shopping (Table 2).

The data presented in Table 2 show an almost twofold month-on-month increase in the purchase of food and pharmaceuticals and textiles. No such large changes were observed in the remaining product groups.

The starting point for analysing data concerning the identification of factors that determine specific respondents' behaviours was a principal component analysis. Essentially, this analysis aims to identify a new uncorrelated set of variables. The aim of the principal component analysis is to present multiple observable variables as a linear compilation of input variables as one unobservable variable. Pearson (1901) was the forerunner of the principal component method. Another important person dealing with this issue was Hotelling (1933), who applied this method to

[1] https://stat.gov.pl/obszary-tematyczne/koniunktura/koniunktura/koniunktura-konsumencka-maj-2020-roku,1,87.html (Date of access: 05.06.2020).

Table 2

Share of online sales in groups of retail sales

Specification	Share of online sales in groups of retail sales (in %)			
	I 2020	II 2020	III 2020	IV 2020
TOTAL	5.6	5.6	8.1	11.9
Motor vehicles, motorcycles, spare parts	0.8	0.8	1.0	1.8
Food, beverages and tobacco products	0.6	0.6	0.8	1.1
Pharmaceuticals, cosmetics, orthopaedic quipment	4.5	4.9	6.8	10.0
Textiles, clothing, footwear	17.1	17.4	35.6	61.3
Furniture, radio, TV and household appliances	9.9	9.6	24.5	28.6
Newspapers, books, other sale in specialised stores	18.7	17.0	26.2	39.9
Others	5.2	5.1	7.4	8.3

Source: https://stat.gov.pl/obszary-tematyczne/koniunktura/koniunktura/koniunktura-konsumencka-maj-2020-roku,1,87.html (Date of access: 05.06.2020).

random variables (Panek, Zwierzchowski, 2013). Thus, apart from factor analysis, the principal component method is one of the exploratory methods focusing on determining the interrelationships in an analysed data set (Frątczak et al., 2009).

A survey of subjective respondents' assessments of the values important to them was analysed. The respondents in the survey conducted in early April 2020 were 85 % women and 15 % men. The largest group was aged 18–25 years (45 %), followed by those aged 40–55 years (35 %). The respondents were also diverse in terms of the place of residence: 25 % lived in rural areas, 20 % lived in a town with a population of less than 10 thousand, 20 % lived in a town with a population of 10 to 50 thousand, 10 % lived in a town with a population of 50 to 150 thousand and 25 % lived in a town with a population of 150 to 300 thousand. The majority of the respondents (55 %) had an income per capita in the household of PLN 2,000–5,000. The education structure of the group was as follows: 55 % had a university degree and 45 % had secondary education.

The respondents participating in the survey considerably reduced the shopping frequency. Only 5 % of them did shopping every day. The largest group (55 %) reduced the frequency of shopping for groceries and personal hygiene products to once or twice a week. At the same time, 70 % of the respondents increased the quantities of the purchased groceries (70 %) and hygienic products (60 %), as well as reduced the quantities of clothes and footwear (indicated by 65 % of the respondents). The respondents taking part in the survey represented households of diverse socio-economic profiles. When asked: What is the decisive factor in choosing the shopping place, they indicated: (1) availability of goods — 55 %, and (2) health security (85 % mentioned it as important, 10 % — as rather important).

The results were analysed to identify the principal components and, later, to construct the model.

According to its theoretical assumptions, the principal component analysis should be applied when the input set is co-linear since it affects the number of components. The higher the co-linearity, the smaller number of components can be obtained. In effect, the application of the principal component analysis should result in a considerable reduction in the number of variables that characterise the respondents' assessments (Olejnik, 2013). The variables are expected to be reduced to two or three components. The correlation matrix adequacy was assessed using the Kaiser-Meyer-Olkin (KMO) coefficient and the Bartlett sphericity test (Table 3).

The Kaiser-Meyer-Olkin (KMO) measure compares partial correlations with bivariate correlation coefficients. It lies within the interval from 0 to 1. If the measure is close to 0, further analysis is unjustified because the dimensionality reduction will be small. The KMO for this analysis is 0.456, which — combined with the Bartlett sphericity test result — suggests that further actions will produce a sensible effect.

The Bartlett sphericity test for the nine variables under analysis was 19.138 (approximate $\chi 2$) with 10 degrees of freedom and $p = 0.039$. Both measures can be used to identify common factors. To decide how many principal components to focus on in further analysis, a scree plot can be used (Fig. 4).

Scree (Fig. 5), i.e. a set of similar eigenvalues positioned on a nearly horizontal line, starts with the third eigenvalue. It means that the first two principal components can be preserved for the analysis. Table 4 shows the common volatility resources, whereas Table 5 shows the total response variance.

Table 3

Kaiser-Meyer-Olkin and Bartlett tests

KMO measure of sample selection adequacy		0.456
Bartlett sphericity test	Approximate chi-square	19.138
	df	10
	Significance	0.039

Source: prepared by the author with SPSS software.

Table 4

Common volatility resources

Specification	Initial	Isolated
Attractive price	1.000	.450
Suitable offer	1.000	.844
Available purchase place	1.000	.787
Service quality	1.000	.487
The health safety of my family while shopping	1.000	.800

Source: prepared by the author with SPSS software.

Data presented in Table 5 show that the first two components contribute significant information. Table 6 lists significant factorial loads, which comprise a given factor. It was assumed arbitrarily that the factor components are those variables which, when rounded, have absolute values of 0.5 or higher. Ultimately, consistent groups of components were obtained, which created two principal (synthetic) types of factors (Table 6).

The first synthetic type of factors that the respondents indicated as important in their lives was described by the following: suitable offer, service quality and attractive price. For further analysis, this component is referred to as the COMMERCIAL OFFER. The second group of variables, i.e. the health safety of a family while shopping and available purchase place, happy life, is termed as PROTECTION.

Further analysis was conducted by one of the methods in the group of Structural Equation Models (SEM) — Confirmatory Factor Analysis (CFA). The aim was to test the model of respondents' subjective assessments regarding the values they considered as important. The following assumptions were adopted:

— correlations between assessments are possible;

— the principal components obtained in the exploratory analysis are hidden variables in the confirmatory analysis;

— a model was developed for each component according to defined constructs specified in the exploratory factorial analysis;

— the model does not constitute a unique problem solution and its different construction is acceptable;

— the model parameters were estimated by the maximum likelihood method (Olejnik, 2013; Górniak, Wachnicki, 2000; Pleśniak, 2009; Brown, 2015).

The pathway diagram of confirmatory analysis shows the standardised values of regression coefficients (above the direction arrows). An assessment of the model quality shows that it meets the acceptability criteria (Wiktorowicz, 2016; Górniak and Wachnicki, 2000). The Hoelter value shows

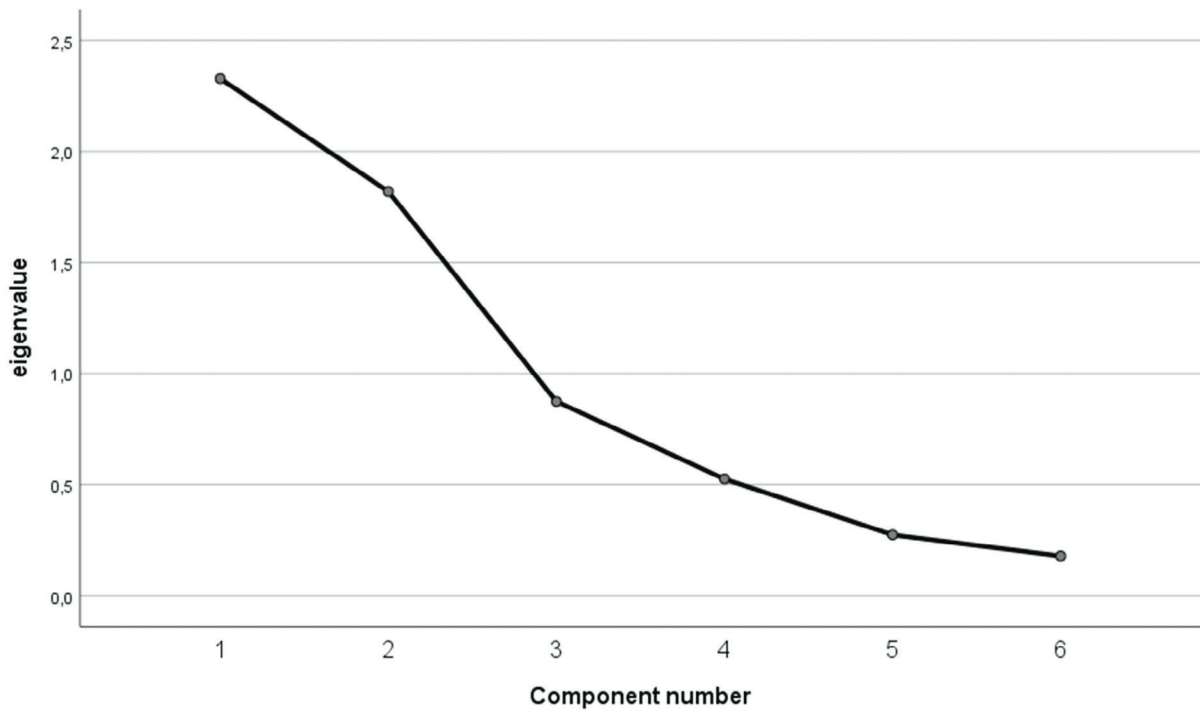


Fig. 4. *Scree plot (source: prepared by the author with SPSS software)*

Table 5

Method for isolation of factors — principal components

Component	Initial eigenvalues			Load square sums following isolation		
	Total	% of variance	% accumulated	Total	% of variance	% accumulated
1	1.797	35.935	35.935	1.797	35.935	35.935
2	1.571	31.412	67.347	1.571	31.412	67.347
3	.936	18.729	86.075			
4	.399	7.970	94.046			
5	.298	5.954	100.000			

Source: prepared by the author with SPSS software.

Table 6

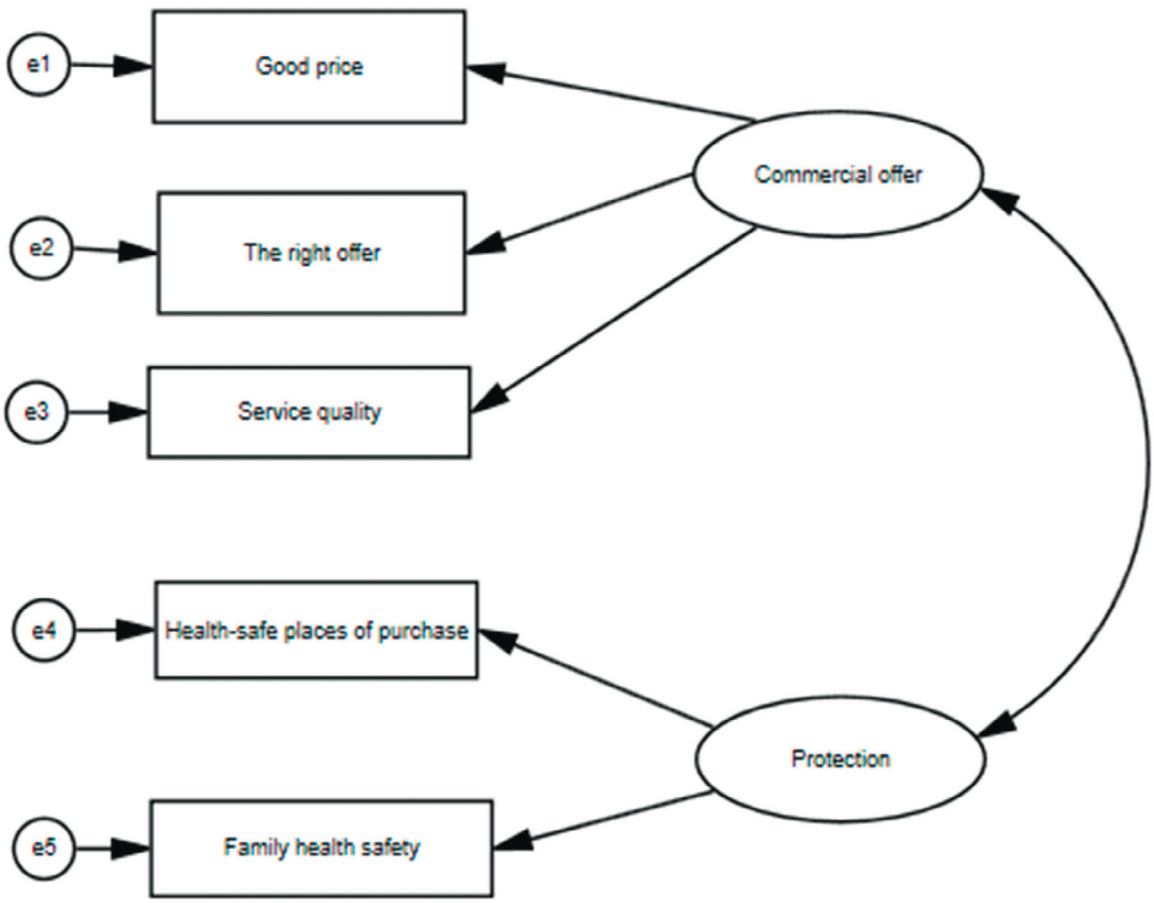
Matrix of rotated components

Specification	Component	
	1	2
Suitable offer	.906	.155
Service quality	.683	–.143
Attractive price	.669	.047
The health safety of my family while shopping	–.044	.893
Available purchase place	.071	.884

Method for isolation of factors — principal components.
Rotation method — Varimax with Kaiser normalisation.
Source: prepared by the author with SPSS software.

that the sample size taken for the model construction is sufficient. The CMIN/DF value of 0.083 (chi-square by degrees of freedom) lies within the acceptance range up to 5. It is noteworthy that the CMIN/DF result is advantageous with respect to the model applicability. An analysis of the other measures of the confirmative model fitting shows that they meet the statistical standards and the model can be accepted.

Table 7 shows the correlation matrix for the respondents' answer to the question: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic?



CMIN/DF = 0.083; RMSEA = 0.989; AIC=32.332; ECVI=1.702; RFI = 0.962; NFI = 0.985; FMIN=0.017; Hoelter for 0.05 = 543

Fig. 5. *Dependence structure in the CFA model for assessment of value during shopping (standardised coefficients) (source: prepared by the author with the IBM SPSS Statistics AMOS package)*

Table 7

What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic?-correlation matrix

specification	I stock up on goods because I am resourceful	I stock up on goods because it gives me a sense of security	I stock up on goods because I fear supply shortages	I stock up on goods because I fear price increases	I like to have goods in stock for a rainy day
I stock up on goods because I am resourceful	1.000	–.245	.509	–.167	.145
I stock up on goods because it gives me a sense of security	–.245	1.000	.206	.681	–.023
I stock up on goods because I fear supply shortages	.509	.206	1.000	–.055	.286
I stock up on goods because I fear price increases	–.167	.681	–.055	1.000	–.055
I like to have goods in stock for a rainy day	.145	–.023	.286	–.055	1.000

Source: prepared by the author with the IBM SPSS Statistics package.

Table 8

Kaiser-Mayer-Olkin and Bartlett tests

KMO measure of sample selection adequacy		,382
Bartlett sphericity test	Approximate chi-square	22,651
	df	10
	Significance	,012

Source: prepared by the author with the IBM SPSS Statistics package.

The KMO and Bartlett tests were further conducted (Table 8) and the common volatility resources were determined (Table 9).

The value of the Kaiser-Meyer-Olkin of 0.382 shows that further analysis is reasonable. The Bartlett sphericity test (approximate $\chi 2$) with 10 degrees of freedom and the significance level of 0.012 can be regarded as sufficient for the factor determination. Therefore, the principal component method was applied to isolate two factors (Table 10 and Figure 6).

The scree (i. e. a set of eigenvalues) starts with the third value, which means that the two principal components can be preserved. These components explain 70 % of the issue under analysis (first component: 35.054 % of variance, second component: 33.162 % of variance).

Further, Tables 11 and 12 show the component matrix for answers to the question: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic? and the rotated component matrix.

The factorial loads for the first component, referred to in this analysis as SAFEGUARD, shown in Table 12, exceed 0.887, whereas for the second component they lay within the interval of 0.554 to 0.876. The second component is termed FORETHOUGHT (Fig. 7).

The structural model of CFA had the following values: CMIN/DF = 1.256; RMSEA = 0.116; AIC = 27.026; ECVI = 1.422; RFI = 0.518; NFI = 0.807; FMIN=0.265; Hoelter for 0.05 = 36. All the results are acceptable for the model structure and they lie within the acceptance range in terms of the model applicability. The model shown in Fig. 7 for the answers to the question: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic? can be accepted as it meets the methodological conditions. Incidentally, these models should not be treated as the only solution.

Table 9

Common volatility resources for: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic?

Specification	Initial	Isolated
I stock up on goods because I am resourceful	1.000	.649
I stock up on goods because it gives me a sense of security	1.000	.879
I stock up on goods because I fear supply shortages	1.000	.789
I stock up on goods because I fear price increases	1.000	.788
I like to have goods in stock for a rainy day	1.000	.307

Method for isolation of factors — Principal components
Source: prepared by the author with the IBM SPSS Statistics package.

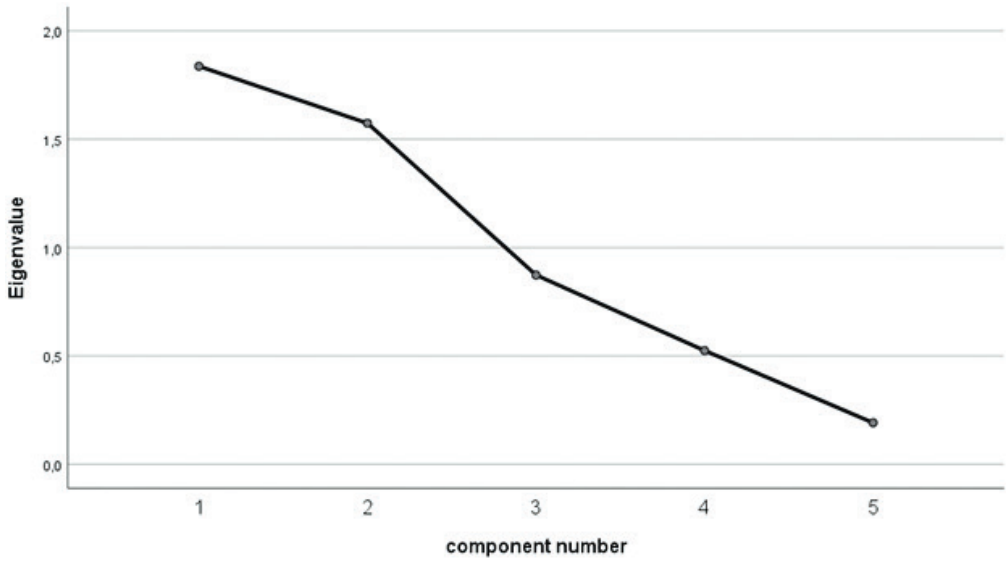


Fig. 6. *Scree plot for: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic? (source: prepared by the author with SPSS software)*

Table 10

Method for isolation of factors — principal components

Total response variable									
Component	Initial eigenvalues			Load square sums following isolation			Load square sums following rotation		
	Total	% of variance	% accumulated	Total	% of variance	% accumulated	Total	% of variance	% accumulated
1	1.83	36.73	36.73	1.83	36.73	36.73	1.75	35.05	35.05
2	1.57	31.48	68.21	1.57	31.48	68.21	1.65	33.16	68.21
3	.873	17.464	85.680						
4	.525	10.494	96.174						
5	.191	3.826	100.000						

Method for isolation of factors — Principal components
Source: prepared by the author with SPSS software.

Table 11

Component matrix for: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic?

Specification	Component	
	1	2
I stock up on goods because I fear price increases	.783	.418
I stock up on goods because it gives me a sense of security	.746	.568
I stock up on goods because I am resourceful	–.656	.468
I stock up on goods because I fear supply shortages	–.373	.806
I like to have goods in stock for a rainy day	–.313	.457

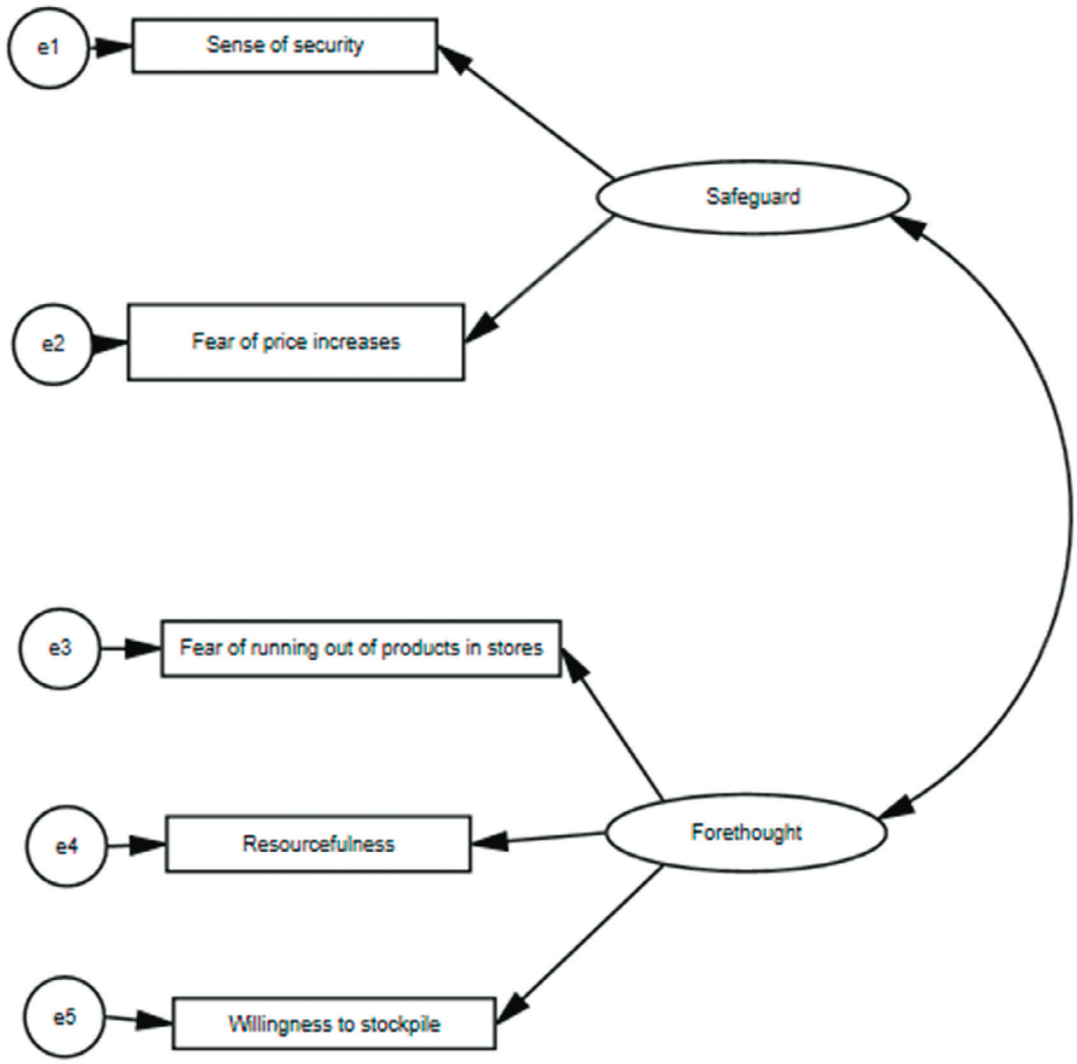
Method for isolation of factors — principal components. a. 2 — number of isolated components.
Source: prepared by the author with SPSS software.

Table 12

Matrix of rotated components for: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic?

Specification	Component	
	1	2
I stock up on goods because it gives me a sense of security	.936	
I stock up on goods because I fear price increases	.882	
I stock up on goods because I fear supply shortages		.876
I stock up on goods because I am resourceful		.756
I like to have goods in stock for a rainy day		.554

Method for isolation of factors — principal components. Rotation method — Varimax with Kaiser normalisation.
a. Rotation is convergent after 3 iterations/
Source: prepared by the author with SPSS software.



CMIN/DF = 1.256; RMSEA = 0.116; AIC=27.026; ECVI=1.422; RFI = 0.518; NFI = 0.807; FMIN=0.265; Hoelter for 0.05 = 36

Fig. 7. *The CFA model relationship structure for the answers to the question: What is the principal factor that you take into consideration when doing major shopping during the COVID-19 pandemic? (standardised coefficients) (source: prepared by the author with the IBM SPSS Statistics AMOS package)*

Conclusions

In conclusion, it can be claimed that the world is facing a great economic challenge because of the pandemic. Each crisis situation is a multidimensional and multifaceted phenomenon, affecting economic stability and social life to a varying degree, and even more so, a pandemic which, like no previous crisis, has affected all continents. Based on the conducted analysis, the effect of which was the proposed models (Fig. 6, 7), it is possible to present possible potential directions for the application of empirical relationships of individual consumer traits, and their subjective assessments and variables describing changes in household behaviours in atypical situations. First, analyses can be proposed on selected consumer segments, taking into account, for example, biological type or a specific professional group. The main issue would be the ability to identify individual segments. The research would then target specific groups. A second potential area could be research focusing on different dimensions of functioning, for instance, on specific dimensions of behaviours. This paper presents the results of the survey that focused on changes in the purchasing habits of households participating in the CAWI survey. Respondents provided answers when a small, as it turned out in retrospect, number of cases occurred in Poland.

Consumer purchase behaviour (perceived as a set of decision-making processes) will certainly affect the outcome of the pandemic. A number of consumers will have to reduce their expenses during the next wave of the pandemic, but the scale of the reduction will vary depending on the households' financial condition.

The following factors were emphasised in the models: security, prudence and the will to protect oneself in case of future shortages. Therefore, the assumptions were corroborated, according to which in a time of crisis and uncertainty (a pandemic is such a time), psychological factors and assumptions of behavioural theories gain prominence. These determinants have confirmed that consumers care about their health and health safety when shopping.

One can expect that when the social distancing restrictions are lifted, many households will continue to do their shopping online, many companies will find a way to reduce costs and will switch to "working from home" mode, etc. Therefore, it may be the case that when the pandemic subsides, these new shopping forms and habits will remain and households will see them as convenient and safe.

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