Article

Segmentation of coffee consumers using sustainable values: cluster analysis

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Abstract: The driving force behind adopting the idea of sustainable development are producers and retailers. Unfortunately, when preparing their product range for consumers, many of them still only pay attention to the size of the customers' earnings, how often they shop and how much they buy when shopping. In consumer segmentation, sustainable values that consumers apply when making their purchasing decisions are rarely taken into account. The aim of this article is to show that values such as environmental protection, the ethical behaviour of producers, fair trade or maximising the utility function of consumption are so important in the purchasing process in the coffee market that they can be used as segmentation variables. The Polish coffee market was selected to carry out segmentation taking into account the consumers' sustainable values. The main source of the article is the results of a standardized online survey conducted on a nationwide sample of 800 coffee consumers in July 2018. Multi-dimensional analyses such as extrapolative factor analysis (EFA) and cluster analysis (CA) were used to describe the obtained results. As a result, six segments of coffee consumers were identified and described: "responsible, aspiring to be connoisseurs", "loyal coffee enthusiasts", "pragmatic users", "coffee laypersons", "sophisticated connoisseurs", "consumerists, connoisseurs, but not at any price". Among the identified segments, the sustainable consumption values most often mentioned refer to "responsible, aspiring to be connoisseurs", and the least often - "consumerists, connoisseurs, but not at any price". The conclusions presented in the last part of the article may be used by manufacturing and trade enterprises, operating on the coffee market, in order to respond to the identified needs and expectations of consumers and by governmental and social organisations so as to determine the directions of pro-ecological education of consumers.

Keywords: market segmentation, coffee market, consumer behaviour, sustainable consumption, sustainable values, factor analysis, cluster analysis

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1. Introduction

The classic understanding of the coffee market reduces its definition to the sum of the trading relationships between sellers offering coffee beans, coffee products, and the buyers - representing the demand for these products. It includes both the subjective (who participates in the trading process) and the objective aspect (what is the object of trade) [1]. With regard to the coffee market, the subjects are the growers - suppliers of coffee beans, dealers, producers of roasted coffee beans (coffee roasters), coffee processors and coffee distributors (wholesalers, retailers, service providers) - the supply side of the market, as well as the buyers of coffee (coffee consumers) - the demand side. The objects of the coffee market are the green coffee beans, roasted coffee beans, as well as various

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products based on these grains (e.g. coffee beans, ground coffee, instant coffee, cappuccino) and hybrid products offered by businesses serving coffee in the form of a ready-to-drink beverages [2].

In the 21st century, coffee has become the second most important product of international trade - after oil and, according to H.R. Neumann of Neumann Kaffe Group, the world demand for coffee will increase from 152 million bags in 2015 to 200 million bags by 2030 [3]. The largest supplier of coffee beans in the world is South America (71.4 million 60kg bags of coffee in 2017) and, more precisely, Brazil, with an annual production volume of about 55 million bags in 2017. While the supremacy of Brazil, with its huge plantations covering a total of about 2 million hectares of the country's area, remains unwavering, the situation is more fluid in further positions. According to the geographical breakdown, the following should be included as the world's largest coffee producers in 2017, besides Brazil: Vietnam (25.5 million), Colombia (14.6 million), Indonesia (11.5 million), Honduras (7.5 million) and Ethiopia (7.3 million). In further positions, the following countries have ranked respectively in recent years: India (5.2 million), Uganda (5.0 million), Peru (4.2 million) and Mexico (3.8 million) [4].

The largest portion of global coffee production (approx. 159 million bags) goes to the European market (approx. 52 million bags), followed by the emerging Asia and Oceania markets (approx. 35 million bags) and the North American market (approx. 30 million bags) [5]. According to the International Coffee Organization in London, the aggregate demand for coffee beans in the world during the 2017/2018 cultivation season will amount to 158,953,000 bags of coffee, exceeding the production of coffee beans by 23,000 bags. Table 1 presents the supply and demand for coffee beans in the world and their changes in 2016-2017.

Table 1. Supply and demand for coffee in the world (in thousands of coffee bags x 60kg).

	2014	2015	2016	2017	Change 2016-2017 [in %]
SUPPLY SIDE OF THE GLOBAL COFFEE MARKET					
Coffee production (total)	149077	152108	157694	158930	0.8
Arabica	86281	88433	102174	98843	-3.3
Robusta	62796	63675	55520	60087	8.2
Africa	15964	16338	17123	17929	4.7
Asia and Oceania	45974	49566	44968	47642	5.9
Mexico and Central America	17189	17238	20466	21924	7.1
South America	69951	68966	75137	71435	-4.9
DEMAND SIDE OF THE GLOBAL COFFEE MARKET					
Coffee consumption (total)	151727	155756	157382	158953	1.0
Countries exporting coffee (total)	47198	48253	48514	48998	1.0
Countries importing coffee (total)	104527	107503	108868	109954	1.0
Africa	10705	11031	11309	11404	0.8
Asia and Oceania	32550	33605	34425	35300	2.5
Mexico and Central America	5238	5315	5239	5266	0.5
Europe	50914	51626	51693	51924	0.4
North America	27359	28931	29380	29658	0.9
South America	24960	25248	25335	25400	0.3
BALANCE OF THE GLOBAL COFFEE MARKET					
Difference (Production - Consumption)	**-2648**	**-3648**	**312**	**-23**	**-**

Source: own study based on [4].

Additionally, the 2018 report from Mintel Group Ltd. [4-5] shows that the global coffee market is still growing with the growth trend being particularly visible in Asia, where the residents traditionally drink tea, but are slowly changing their habits and are starting to consume more and more coffee. The culture of drinking coffee is also developing in the countries of Latin America, North Africa and the Middle East, which in turn translates into more sales. In mature European markets (including Poland), the growth is already much smaller. In North America, the market development is mainly driven by the increase in the consumption of coffee in pods and ready-for-consumption chilled coffee.

In Poland, coffee is fourth in the ranking of food categories in terms of annual turnover and the value of the coffee market is still growing [6]. Total coffee sales in Poland in 2017 amounted to nearly USD 1 billion, an increase of approx. 3.7% in comparison to 2016. The average annual consumption of coffee per capita in Poland is about 2.85 kg. For comparison, in Finland it amounts to as much as

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12 kg, in Sweden - 11 kg, in Denmark, the Netherlands, Norway - 9 kg [7] Selected information on the sale of coffee in Poland and its prices is provided in Table 2 and Figure 1.

Table 2. Coffee sales in Poland in 2015-2017.

	2015	**2016**	**2017**	**Annual growth rate in % (2015/2016)**	**Annual growth rate in % (2016/2017)**
Coffee sales in USD millions	875.9	886.5	920.8	1.2	3.7
Coffee sales in tons	82097.3	83616.2	82406.5	1.8	-1.5
Coffee sales in thousands of units	451727.3	438981.9	422494.9	-2.9	-3.9

Source: own study based on [6].

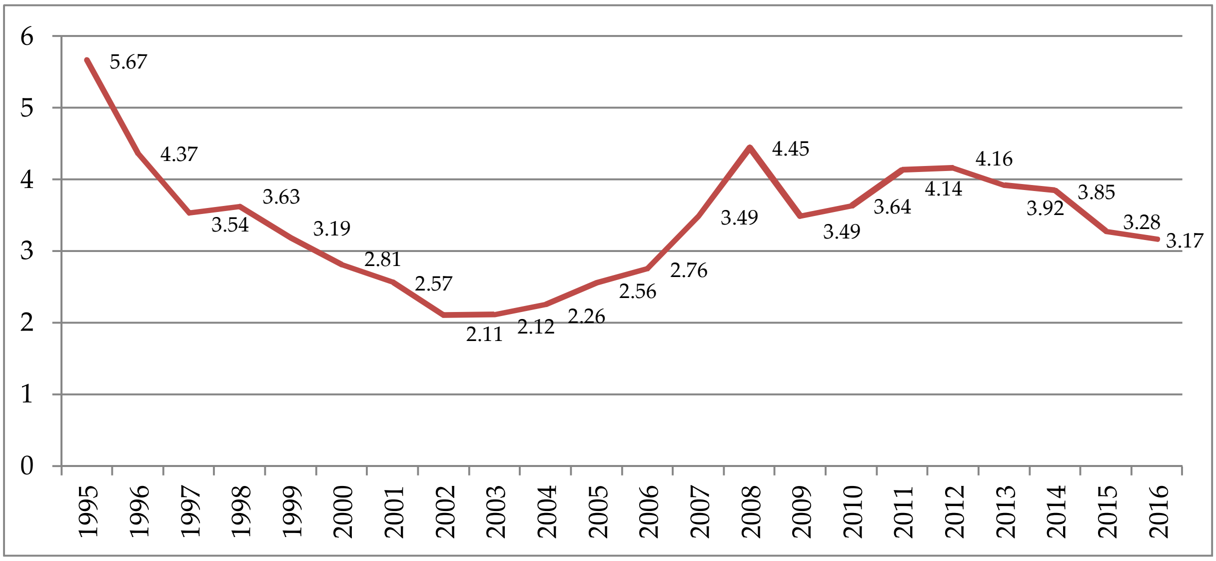

Figure 1. Retail coffee prices in Poland in 1995-2016 [in USD per lb]
Source: Own study based on [4].

The data presented in Table 2 and Figure 1 show that, despite the decreasing number of coffee packages sold and the drop in its prices, the coffee market in Poland (coffee sales) is growing steadily. This is mainly related to changes in consumer behaviour and their preferences on the market of coffee products in Poland. Poles are increasingly replacing cheaper coffee with more expensive ground coffee or grain coffee [8].

Consumer groups, whose needs and expectations are unsatisfied or not satisfied sufficiently, may become the area of activity of coffee producers in Poland. Determining whether these groups can become a viable market and decisions to focus activity on a specific market segment is referred to as the selection of target market segments [9].

This choice requires the use of an appropriate procedure that allows the entire market to be divided into smaller areas - segments, which include consumers guided by the same values, with similar needs, similar characteristics of behaviour or motivation. The application of the appropriate procedure also allows which of the isolated segments is distinguished by the highest market opportunities or potential risks to be assessed [10].

Due to the varied objectives of segmentation research, both in source literature and in practice, various market segmentation procedures have been proposed, but the most common are the procedures such as:

- Traditional *a priori* segmentation procedure [11],
- E.J. McCarthy's simplified segmentation procedure [11],
- J. Kramer's simple, practical six-step procedure [12],
- Segmentation procedure with an analytical and decision-making character [13],

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- Five-stage procedure for determining segments in a given market developed by M. McDonald and I. Dunbar [14].

In the segmentation of the coffee market, which is a market characterised by a very large, heterogeneous group of recipients, it seems the most appropriate to use the analytical and decision-making procedure. The procedure is derived from E.J. McCarthy's simplified segmentation and is based on the four main steps presented in Figure 2.

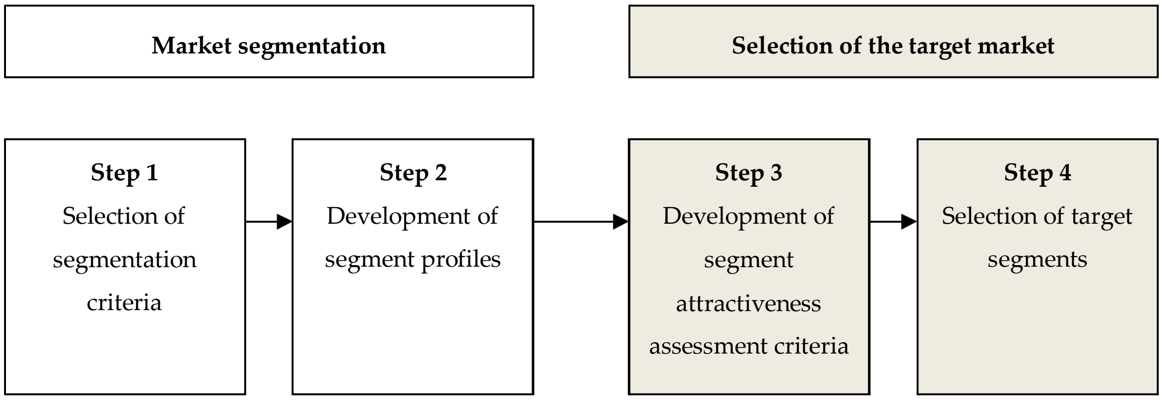

Figure 2. Selection of the target market in coffee manufacturing companies in Poland

Data source: Own study based on [15-17].

As presented in Figure 1, the selection of segmentation criteria is made after defining the product and the market to be segmented and determining the needs and expectations of potential buyers. The next step of the procedure is to examine and evaluate potential market segments, which requires the preparation of the so-called segment profiles. This step is about the development of qualitative and quantitative characteristics in order to assess the attractiveness (profitability) for the enterprise of future target (operational) segments. The choice of target segments and the planning of marketing activities depending on the adopted variant of the market segmentation strategy is the last step of the procedure.

Due to the fact that the coffee market is internally very diverse, in order to distinguish its most important segments, it is necessary to apply many segmentation criteria [18-20]. In the source literature, market classification according to general and specific criteria, as well as according to objective and subjective criteria [18-21], is the most common. The general criteria include those that apply to every consumer, a coffee consumer in this case, regardless of the market situation, and specific criteria refer to a specific market situation affecting consumer behaviour as a subject of demand. Objective criteria include those criteria that can be measured in an indisputable way (e.g. age, gender), while subjective criteria have to be arrived at on the basis of research results (e.g. lifestyle, coffee brand preferences, attitude towards sustainable consumption) [22-23].

In the source literature it is difficult to find segmentation criteria referring to sustainable development or to sustainable consumption. Thus, there are no studies that take sustainable values in the segmentation criteria on the coffee market into account. Therefore, this article is an attempt to fill the research gap in this field and to find the answer to the question whether sustainable values may constitute segmental variables in the coffee market and is there a segment of coffee consumers who are guided by sustainable values in their choices?

The authors therefore put forward the following hypothesis: Sustainable values, such as environmental protection, the ethical behaviour of producers, fair trade and maximising the usefulness of consumption can be used as segmentation criteria in the coffee market. The relation to these values differentiates consumer groups, distinguishing a segment for which not only a better quality of their life is important, but also the protection of the Earth's ecosystem and concern for the ability to meet the needs of future generations. Knowledge about the availability, measurability and size of this segment may contribute to the wider implementation of a balanced product offer by producers and sellers operating in the coffee market.

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To verify the truth of the hypothesis put forward, primary research was carried out with the participation coffee consumers. The research methodology, as well as the results and conclusions are presented in the subsequent parts of the article.

2. Materials and Methods

In order to confirm or reject the hypothesis, a standardised online survey was designed and conducted. The research conducted was quantitative. The research was completed in July 2018.

The research tool was a standardised survey posted on the website of the Ariadna Nationwide Research Panel, in which over 100,000 people from all over Poland are registered [24]. The questions in the survey were formulated in the form of open, closed and semi-closed questions and Likert scales. The reliability of the scales used in the study was confirmed by Cronbach's alpha test. The test values obtained for all applied scales were in the range from 0.7 to 0.9. The quality of this research is guaranteed by the Interviewers' Quality Control Programme Certificate (PKJPA) of the Polish Association of Public Opinion and Marketing Research Firms (OFBOR) [25]. OFBOR adopts recommendations included in the International Code on Market, Opinion and Social Research and Data Analytics by the International Chamber of Commerce (ICC) and the European Society for Opinion and Marketing Research (ESOMAR) as binding for its members [26] , and at the same time on their basis prepares its own sets of rules of professional conduct intended for the Polish market and controls their observance. Ariadna operates in accordance with the Personal Data Protection Act and guidelines of the Inspector General for Personal Data Protection [27].

The research focused on Polish coffee consumers. In Poland, coffee is the most often consumed drink, immediately after mineral water. Coffee consumption is declared by 80% of adult Poles. This represents a population of over 25 million consumers. In the conducted research, targeted sampling was used. Respondents were people registered in Ariadna, who met the conditions for selection to the sample and responded to the researchers' invitation: adults, consuming coffee at least once a week. These consumers were sent a link to the survey via email with a request to complete it.

The size of the test sample was set at 800. This size sample provided results with a measurement error of no more than 3%, with a confidence level of 0.95. This assumption was met - a total of 800 correctly and fully filled out questionnaires were received (Table 3).

Table 3. Characteristics of the research sample (N=800)

Specification		Absolute number	Percentage of the tested sample
Sex	Female	413	51.6
	Male	387	48.4
Age	16-24	160	20.0
	25-34	161	20.1
	35-44	159	19.9
	45-54	161	20.1
	55-64	159	19.9
Place of residence	Rural areas	186	23.3
	Town with up to 20,000 residents	108	13.5
	Town with 20,000-49,000 residents	100	12.5
	Town with 50,000-99,000 residents	106	13.3
	Town with 100,000-199,000 residents	94	11.8
	Town with 200,000-500,000 residents	107	13.4
	Town with over 500,000 residents	99	12.4
Education	Primary/lower secondary	25	3.1
	Vocational	92	11.5
	Secondary	366	45.8
	Higher	317	39.6
Monthly net income per person	200 euro or less	99	12.4
	From 201 euro to 300 euro	157	19.6
	From 301 euro to 500 euro	245	30.6
	From 501 euro to 700 euro	138	17.3
	From 701 euro to 950 euro	94	11.8
	Above 950 euro	67	8.4

Frequency of drinking coffee	3 times per day and more often	190	23.8
	1-2 times per day	521	65.1
	Once or several times a week	89	11.1
Most common type of coffee drunk	Coffee beans (whole beans)	127	15.9
	Ground	315	39.4
	Instant	273	34.1
	Coffee mixes (2in1, 3in1)	16	2.0
	Instant cappuccino	19	2.4
	Coffee in capsules (for espresso machine)	15	1.9
	Coffee in sachets/pads (for espresso machine)	13	1.6
	Instant wheat coffee / chicory	22	2.8

Data source: Collected by this research.

Gender breakdown consistent with the ratio in the general population of Poland's inhabitants was assumed in the research. As a result it involved 413 women and 387 men, which accounted for 51.6% and 48.4% of the sample, respectively. These were most often people living in towns of various sizes (76.7%) with secondary (45.8%) or higher education (39.6%). The monthly net income per person in the respondents' households usually ranged from 301 to 500 euro (30.6% of the respondents provided such answers). Most people in the consumed ground coffee (39.4%) or instant coffee (34.1%) once or twice a day (65.1%) - Table 3.

Multi-dimensional analyses were carried out in order to identify the main consumer segments on the coffee market in Poland: factor analysis and cluster analysis. Factor analysis was aimed at reducing the originally occurring number of variables and creating a new set of variables with the least possible loss of information contained in them. For this purpose, it was decided to use exploratory factor analysis (EFA), which allows a large number of studied variables to be reduced to a much smaller number of factors (principal components). The isolated principal components have a different substantive interpretation and retain a significant part of the information contained in the primary variables [28] (p.194).

In turn, the objective of cluster analysis (CA) was the final determination of consumer segments on the coffee market in Poland, including the indication of segments of consumers guided by sustainable values in their choices.

Among the cluster analysis methods used in the process of market segmentation, hierarchical methods are most often used. In the course of the grouping procedure, several stages widely described in the literature [29] (pp. 204-206) can be distinguished. The starting point is the situation in which each object represents one, independent group, class - in other words, a single element cluster. There are as many clusters as there are objects. After each classification step, the number of classes decreases by one, whereby the number of classes is reduced by combining two existing ones. There are n-1 classification steps. The procedure ends when all objects are in a single group [30] (p. 413). The grouping process is usually represented using a binary tree - a dendrogram, which illustrates the hierarchical structure of the set of objects according to the decreasing similarity between them.

Due to the differences in the method of determining the similarity between objects combined into classes (clusters) and determining the distance between classes of objects in a multi-dimensional space, several grouping variants (algorithms) of agglomeration methods are distinguished in cluster analysis, which is reflected in their names: the nearest neighbour method, the farthest neighbour method, the centre of gravity method, the median method, the group mean method and Ward's method [29, 31]. For the purpose of segmentation in marketing research, Ward's method [32] is quite often used (p. 75). This is determined by the method of combining objects into clusters. In Ward's method, such objects are combined which cause the smallest increase of the variance in the cluster, and thus ensure the highest homogeneity of the cluster [33]. In this method, the Euclidean squared distance is most often used as a measure of similarity between objects. This solution has a very valuable trait - when calculating the distance between objects, large differences in the values of the variables describing these objects are taken into account more strongly than in the situation of a small variation of variables [29]. Unfortunately, like any method, Ward's method has its methodological drawbacks and limitations. In order to obtain more accurate results, the use of other

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classification methods in the same study, e.g. division methods, non-hierarchical methods is therefore recommended [34]. This was also carried out in the research, first using one of the hierarchical agglomeration methods - Ward's method applied with the Euclidean squared distance, and then the non-hierarchical k-means method.

3. Results

In the research conducted, the segmental analysis was based on behavioural criteria describing the respondents' attitudes and behaviours related to purchasing opportunities, benefits sought after, brand attachment or usage intensity, etc. The research took into account the attitude of the respondents to sustainable values, currently strongly promoted by the protagonists of consumerism and apologists of sustainable consumption. Sustainable values were included in six statements out of thirty, which were assessed by the study participants. The participants responded to the statements using a five-point Likert scale, where a score of 1 meant "I strongly disagree" and a score of 5 meant "I strongly agree". Statements containing sustainable values corresponded with the model of sustainable consumption in the ecological, economic and social dimension [35-38]. They were presented as follows:

- I can pay more for coffee, which is a BIO product or is Fair Trade certified.
- When buying coffee, I always check who is the producer.
- I want to know how the coffee I drink was made.
- It is important for me that the packaging in which coffee is sold is as environmentally friendly as possible.
- If the coffee has practical packaging, I can pay more for it.
- Large packages are better because they are more economical.

To elaborate the data obtained in the research, the aforementioned multi-dimensional analyses were used, the basic feature of which is the possibility of analysing many (more than two) variables at the same time. This makes it possible to create a uniform image of the consumer, going beyond many separate and often incomparable profiles that can be obtained based on standard statistical methods. When segmenting the market, EFA is usually performed first, where factors are initially unknown and are isolated by analysing the values of random variables. In this study, this type of factor analysis was also used. Segmentation analysis was carried out in the 5 steps shown in Figure 3.

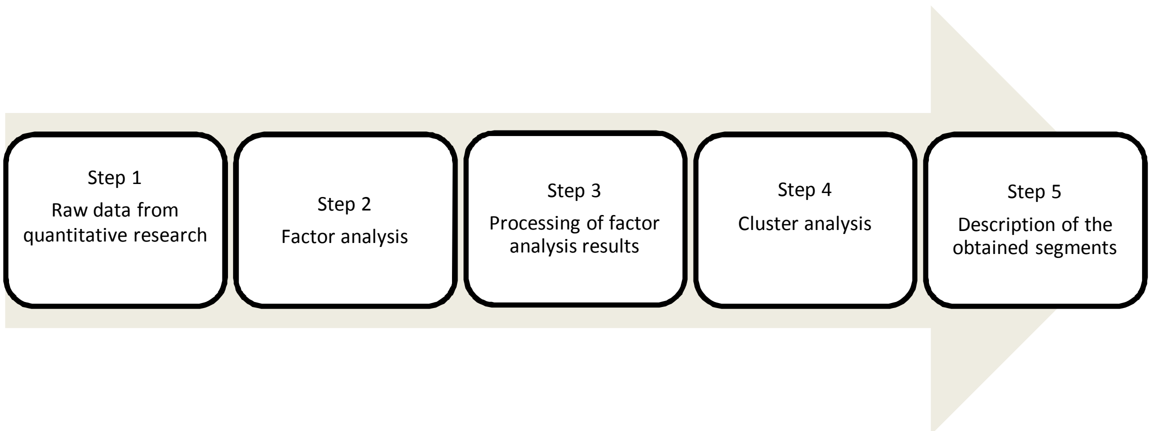

Figure 3. The process of consumer segmentation
Data source: Collected by this research.

After collecting data from surveys, EFA was carried out using the principal components method. Its purpose was aimed at reducing the originally occurring number of variables and creating a new set of these variables with the least possible loss of information contained in them. The analysis was based on 30 statements - attitudes towards coffee consumption. Five explanatory factors were obtained, totalling 54.6% of the variance of total variables (Table 4). The obtained factors

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were subjected to Varimax rotation. It does not change the results of the analysis itself, but through the distribution of variance, it significantly affects the ease of the interpretation of the factors.

Table 4. Total explained variance and eigenvalues

Component	Initial eigenvalues			Sum of load squares after isolation			Sum of load squares after rotation		
	Total	% of variants	Cumulative %	Total	% of variants	Cumulative %	Total	% of variants	Cumulative %
1	8.803	29.342	29.342	8.803	29.342	29.342	7.683	25.610	25.610
2	2.858	9.526	38.868	2.858	9.526	38.868	2.894	9.647	35.257
3	2.259	7.532	46.400	2.259	7.532	46.400	2.882	9.606	44.864
4	1.226	4.086	50.486	1.226	4.086	50.486	1.535	5.116	49.979
5	1.220	4.065	54.551	1.220	4.065	54.551	1.372	4.572	54.551
6	.987	3.290	57.841						
7	.963	3.209	61.050						
8	.827	2.757	63.807						
9	.771	2.568	66.375						
10	.729	2.430	68.805						
11	.680	2.267	71.072						
12	.643	2.143	73.215						
13	.623	2.077	75.292						
14	.608	2.027	77.319						
15	.591	1.971	79.289						
16	.569	1.895	81.185						
17	.551	1.836	83.021						
18	.499	1.665	84.686						
19	.486	1.620	86.306						
20	.466	1.554	87.860						
21	.459	1.528	89.388						
22	.442	1.474	90.863						
23	.425	1.416	92.279						
24	.392	1.306	93.585						
25	.382	1.274	94.859						
26	.341	1.138	95.997						
27	.328	1.093	97.090						
28	.310	1.034	98.124						
29	.288	.961	99.085						
30	.275	.915	100.000						

Data source: Collected by this research.

An important indicator of the quality of factor analysis is the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy. Its purpose is to check to what extent the sample meets the requirements of the factor analysis, i.e. to answer the question whether the sample is adequate for the assumptions of the factor analysis. The measure compares partial correlations with two-coefficient correlation coefficients. KMO assumes values in the range of 0-1, with low results indicating that the reduction of variables will be small. It is assumed that the result of KMO ≥ 0.5 gives a satisfactory reduction of variables. In the analysis carried out, the KMO measure is 0.919, which means that the variable reduction model is at a very good level (Table 5).

Table 5. Obtained KMO values and Bartlett's sphericity test values

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.919
Bartlett's Test of Sphericity	Approx. Chi-Square	9683.195

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	df	435
	Sig.	.000

Data source: Collected by this research.

Bartlett's sphericity test (Table 8) was calculated for the same purpose as the KMO measure. This test examines whether there are any significant correlations between variables, verifying that the correlation matrix is a unit matrix. In the case of a significant test result, this hypothesis is rejected and it is assumed that there are correlations between variables, meaning that there are hidden factors. In the case of this study, the sphericity test is <0.05 and therefore statistically significant.

Table 6 presents the results of the factor analysis, including the names that the new variables received. Those factor loads which are important for individual factors have been presented.

Table 6. The obtained matrix of rotational components

Specification	New variables				
	Not any random coffee, but from a responsible producer	There's no difference - coffee is coffee	Quality at a reasonable price	Coffee, a lot of coffee	Trying new things
1. I want to know how the coffee I drink was made.	.742				
2. I can pay more for coffee, which is a BIO product or is Fair Trade certified.	.711				
3. If the coffee has attractive packaging, I can pay more for it.	.709				
4. I am able to spend a lot of time searching for a place where I can buy my favourite coffee.	.695				
5. If the coffee has practical packaging, I can pay more for it.	.687				
6. I am willing to pay more for freshly roasted / produced coffee.	.684				
7. Among my family and friends, I am an expert on the subject of coffee.	.675				
8. When buying coffee, I always check who the producer is.	.657				
9. I like limited edition coffee (available for sale only for a limited time).	.654				
10. Before I buy coffee, I check the opinions on the internet.	.636				
11. I prefer coffee that is roasted / produced in Poland.	.608				
12. I enjoy not only drinking coffee, but also the ritual of its preparation.	.607				
13. More expensive coffee always tastes better than cheaper coffee.	.560				
14. I am a demanding person - I only like a few coffees types.	.521				
15. Small packages are better, because only then the coffee is fresh enough - we will use it up before it becomes stale.	.514				
16. What counts for me is not only the taste of coffee, but also how it looks and in what it is served.	.513				
17. It is important for me that the packaging in which coffee is sold is as environmentally friendly as possible.	.510				
18. The best coffees are in coffee bars / cafés.	.425				
19. I do not care what coffee I drink - coffee is coffee.		.814			

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20. I usually buy the cheapest coffee available in the store.		.807			
21. I try to buy coffee which is on offer (at a reduced price).		.615			
22. If my favourite coffee is not available, I just buy a different one.		.587			
23. More expensive coffee does not necessarily mean better quality.			.651		
24. Coffee should be convenient and fast to prepare.			.634		
25. Producers should provide consumers with practical knowledge about the proper preparation of coffee.			.616		
26. I am more willing to choose coffee that has been on the market for a long time, has been tried and tested.			.518		
27. It's hard for me to imagine life without coffee.				.661	
28. Large packages are better because they are more economical.			.474	.483	
29. I'm attached to my favourite coffee and I'm reluctant to change it.			.401		-.620
30. I like to try new coffees when they appear on the market.					.525

Data source: Collected by this research.

As a result of factor analysis, each respondent was assigned results consistent with the new variables obtained by factor analysis.

The next step was to conduct cluster analysis, the aim of which was to define the segments and the analysis itself took place in two stages. The first stage was to perform hierarchical clustering analysis using Ward's method, the second stage - using the non-hierarchical method. The use of both methods results from methodological limitations. Non-hierarchical analysis is less sensitive to observations deviating from the norm and incorrect variables, which enables better results to be obtained. However, the target number of segments need to be specified (which is not pre-determined). To obtain this information, it is first necessary to use a hierarchical clustering analysis. Analysis of the agglomeration coefficient and the dendrogram, obtained using a layered analysis via Ward's method, led to the selection of 6 segments. After conducting a non-hierarchical analysis, their centroids were finally determined, as shown in Table 7.

Table 7. Final cluster centres

Specification	Cluster / Segment					
	I	II	III	IV	V	VI
Not any random coffee, but from a responsible producer	1.22992	.01227	-.04732	-.46716	.49747	-1.22403
There's no difference - coffee is coffee	1.29610	-.73632	.30398	-.18234	-.93130	.53307
Quality at a reasonable price	.30222	.11011	-1.18744	.79579	.18571	.40705
Coffee, a lot of coffee	.20172	.78105	-.34943	-1.11779	-.02616	.87190
Trying new things	-.12462	-1.06431	-.06789	-.32330	.99031	.78082

Data source: Collected by this research.

Next, names were given to the isolated segments which, in the opinion of the authors, best reflect the behavioural features and the attitude towards the sustainable values of the consumers assigned to the segments. The size of the segments is shown in Table 8.

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Table 8. Size of the segments obtained

Cluster / Segment	Name	Number of observations	Percentage of observations
I	Responsible, aspiring to be connoisseurs	106.00	13.25
II	Loyal coffee enthusiasts	136.00	17.00
III	Pragmatic users	186.00	23.25
IV	Coffee laypersons	134.00	16.75
V	Sophisticated connoisseurs	134.00	16.75
VI	Consumerists, connoisseurs, but not at any price	104.00	13.00
	Valid	800.00	100.00
	Losses	0.00	0.00

Data source: Collected by this research.

Finally, a description of the segments was made in a broader context, which also included the socio-economic and demographic characteristics of the respondents and their preferences in the coffee market. The description of segments was based on cross tables, which were created as a result of using the IBM SPSS Statistics 24 program.

The first isolated group (segment I) includes people whose attitudes and opinions are most in line with the guidelines for sustainable development and sustainable consumption from among all respondents. For more than 80% of consumers in this group, it is important (the answers "I strongly agree" and "I mostly agree") that the packaging in which coffee is sold is as environmentally friendly as possible and to know how the coffee they drink was produced. Also, over 80% of respondents in this segment agree to pay more for coffee, the packaging of which can be re-used in the household or which is large, economical, which means less packaging. Over 75% of respondents who find themselves in this segment are willing to pay more for coffee, which is a BIO type product or has a Fair Trade certificate, and when buying coffee, always check who the producer is. It is difficult for these people to imagine life without coffee. They are of the opinion that the best coffee is served in coffee bars and cafés. Although they are attached to their favourite brand of coffee, if it is not on the store shelf, they decide to buy another one, so as not to have to give up their favourite drink. They are happy to choose coffee that is roasted / produced in Poland. They are willing to pay more for freshly roasted coffee. They drink ground coffee (38.7%) almost as often as instant coffee (35.8%). These are their most preferred types of coffee. This segment is characterised by an equal share of women and men. Almost half of the people who make up this segment are young people under 35, most often living in towns with less than 100,000 inhabitants, who come from households in which the net monthly income per person is below 500 euro. Therefore, these consumers could be described as "**responsible, aspiring to be connoisseurs** ", constituting 13.3% of the sample.

Consumers classified in the second group (segment II) declare attachment to their favourite coffee and the reluctance to change it most often among all the participants of the survey. Like consumers in the first group, it is difficult for them to imagine life without coffee. The respondents forming this market segment consider themselves demanding - they only like a few coffee brands, as well as coffee experts – more expensive coffee does not necessarily mean better quality. Coffee beans are the most popular among all the segments (25.0%). When it comes to the attitude to sustainable values, positive attitudes ("I definitely agree" and "I mostly agree") can be identified in less than half of the respondents in this group. The segment is dominated by women (56.6%), people aged 45 and more (56.6%) whose monthly net income per person in their households is in the range of 201-500 euro. The respondents forming segment II could therefore be described as "**loyal coffee enthusiasts**". In the sample, they constitute 17.0% of respondents.

The next, third group of respondents, was characterised by attachment to their favourite brand of coffee and a reluctance to change. They are people who like to drink coffee and it is difficult for them to imagine life without coffee. The segment is dominated by men (55.4%). Almost half of the respondents in this group are people aged under 35, mainly aged 16-24 (28.5%). This segment,

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among all those isolated, is characterised by the highest share of rural residents (30.1%). Almost half of the respondents in this group receive a monthly net income in the range of 201-500 euro per person. When buying coffee, they usually choose ground coffee (39.8%) or instant coffee (35.5%). People forming this segment can be described as "**pragmatic users**" of coffee. They form the most numerous segment - 23.3% of all respondents. Among all the respondents, people in this segment are characterised by the highest indifference towards sustainable values. The responses "I neither agree nor disagree" accounted for as much as 63 to 70% of the responses to statements regarding aspects of sustainable development and sustainable consumption.

Segment IV consists of people who can be described as "**coffee laypersons**". They constitute 16.8% of all the surveyed coffee consumers. Their market behaviour is characterised by attachment to their favourite coffee and an unwillingness to replace it with another brand. Lack of knowledge about the coffee market translates into the purchase of coffee brands that have been on the market for years. In their opinion, coffee products should be convenient and quick to prepare, and producers should provide consumers with practical knowledge about proper coffee preparation. They agree with the opinion that more expensive coffee does not necessarily mean better quality. As far as their attitude towards sustainable values is concerned, more than half of the respondents in this segment "strongly agree" or "agree" only with the statements "It is important for me that the packaging in which coffee is sold is the most environmentally friendly" (63.4%) and "Large packaging is better because it is more economical" (56.7%). In the "coffee layperson" segment, there are slightly more women than men (51.5%), and more people in the 45+ category than those of a younger age. Nearly two thirds of the respondents in this segment are residents of smaller towns (less than 100,000 inhabitants) and villages. Nearly 40% of the respondents in this group of consumers live in households where the monthly net income per person is in the range of 301-500 euro. Consumers in this segment usually buy instant coffee (41.0%).

Consumers classified to the fifth group (segment V) are people who more often than others replied that what counts for them is not only the taste of coffee, but also how it looks and how it is served. It's not just drinking coffee that makes them happy, but also the ritual of preparing it. They can also surely be included in the group of pioneers. They like to try new products whenever they appear on the market. They cannot imagine life without coffee and are willing to pay more for good, freshly roasted coffee. This segment is dominated by women (56.7%), people under 55, inhabitants of larger cities (over 100,000 inhabitants) and relatively well-to-do people. Nearly 1/3 of the respondents in this segment declared a monthly net income of 701 euro and more per person in their households. "**Sophisticated connoisseurs**", which is how this segment can be described, are characterised by a high consumption of coffee, bought in bean form (23.1%), second in this respect, and only slightly, to loyal coffee enthusiasts. In the analysed sample, they constitute 16.8% of all respondents. Their attitudes and opinions are the most in line with sustainable values, immediately after the consumers classified in the first segment.

The sixth and last segment of coffee consumers are people who are least guided by the values of sustainable consumption. Over 70% of the respondents in this group admit that they do not see any justification to pay more for coffee which is a BIO product or has a Fair Trade certificate. About 60% do not agree to pay more for coffee in a practical packaging, which can be used later. A similar percentage is not interested in either who produces the coffee they buy or how it is produced. It is important for every sixth respondent in this group that the packaging in which coffee is sold is environmentally friendly. People in this segment mainly buy coffee currently on sale (offered at a reduced price), choosing large packages that they think are more economical. In their opinion, more expensive coffee does not necessarily mean that the coffee is of good quality, and if the store does not have their favourite brand - they simply buy another one. Regarding the type of coffee purchased, it is usually ground coffee (40.4%) or instant coffee (37.5%). This segment has slightly more men than women (52.9%), nearly 1/3 are people aged 35-44, urban residents (79.0%), most often with a monthly net income of 201-500 euro per person in a household. In the studied sample they constituted the smallest group, 13%. They can be described as "**consumerists, connoisseurs, but not at any price.**"

The synthetic approach to sustainable values in the identified segments of coffee consumers is presented in Table 9.

Table 9. Attitude towards sustainable values in identified segments (N=800, in%)

Specification	Evaluations	Coffee consumer segments					
		I	II	III	IV	V	VI
I can pay more for coffee, which is a BIO type product or is Fair Trade certified.	negative	3.8	38.2	20.9	46.3	15.7	**70.2**
	neutral	18.9	39.0	**69.4**	29.1	37.3	25.0
	positive	**77.4**	22.8	9.7	24.6	47.0	4.8
When buying coffee, I always check who is the producer.	negative	4.7	24.3	21.5	44.0	20.9	**58.7**
	neutral	17.0	34.6	**64.5**	33.6	29.1	25.0
	positive	**78.3**	41.1	14.0	22.4	50.0	16.3
I want to know how the coffee I drink was made.	negative	0.9	28.0	21.5	29.8	9.0	**62.5**
	neutral	17.0	39.0	**62.9**	46.3	38.1	31.7
	positive	**82.1**	33.0	15.6	23.9	52.9	5.8
It is important for me that the packaging in which coffee is sold is as environmentally friendly as possible.	negative	2.8	14.0	20.4	9.0	12.0	**36.6**
	neutral	15.1	38.2	**65.1**	27.6	29.9	46.2
	positive	**82.1**	47.8	14.5	63.4	58.2	17.2
If the coffee has practical packaging, I can pay more for it.	negative	2.8	34.6	20.9	38.8	21.7	62.5
	neutral	16.1	36.8	**69.4**	38.8	41.8	26.0
	positive	**81.1**	28.7	9.7	22.4	36.6	11.5
Large packages are better because they are more economical.	negative	0.9	2.2	13.4	13.4	**26.9**	4.8
	neutral	9.4	16.9	**65.1**	29.9	26.1	6.8
	positive	**89.7**	80.9	21.5	56.7	47.0	88.4

* on a five-point Likert scale, where a score of 1 meant "I strongly disagree" and a score of 5 meant "I strongly agree". Negative opinions denote a total of indications from 1 to 2, neutral – 3, and positive indications from 4 to 5.

Data source: Collected by this research.

4. Discussion and Conclusion

The obtained results clearly indicate that coffee producers operating on the Polish market should seriously consider the possibility of preparing a separate offer for those who attach great importance to the protection of the natural environment. The research has indicated that over 13% of coffee consumers in Poland can be qualified to 1st segment - "responsible, aspiring to be connoisseurs". Thus, their attitudes and opinions are consistent with the guidelines of sustainable development and sustainable consumption. However, it turns out that not all coffee producers in Poland are fully aware of this. Looking through the missions and offers of 23 coffee producers in Poland, it can be noted that only a few of them, such as: Tchibo, Nestlé, Strauss Group and Sati undertake large-scale activities in Poland that fit into the concept of sustainable development as well as social and ecological responsibility. In their strategic documents, these producers commit themselves to the ethical conduct of business, both in regard to the environment, growers, local communities, consumers and their own employees. They offer the highest quality coffee, paying special attention to its taste and aroma, but at the same time advocate the protection of the environment and better living conditions for farmers cultivating coffee. On its official website, Tchibo emphasises its commitment to sustainable development and ecological responsibility: *Tchibo – on the way towards a 100% sustainable business* [39]. This slogan reveals the drive to run a fully sustainable business, respecting communities and natural resources. This goal has also been an integral part of this corporation's strategy since 2006 [40]. What is very important, these statements are not just empty phrases. Coffee makers such as Tchibo or Nestlé endeavour to offer coffee coming exclusively from the so-called sustainable sources. That is, from such plantations where cultivation methods comply with ecological and social standards. To achieve this, they cooperate with all the known standardisation organisations in the world, such as: Rainforest Alliance, Fairtrade, UTZ Certified, Lean&Green, BIO, as well as organisations offering the Green Office or Green Shop Certificate in Poland (Table 10).

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Table 10. Certificates confirming coffee production in Poland based on sustainable development values

No.	Type of certificate	Description	Certification mark
1	Rainforest Alliance	Rainforest Alliance is a globally recognised NGO that supports the sustainable improvement of human and environmental conditions in countries where coffee is grown.	
2	Fairtrade	Products with the Fairtrade mark guarantee that the living and working conditions of coffee growers and employees are improved thanks to Fairtrade prices and bonuses.	
3	UTZ Certified	The certificate guarantees that coffee growers are trained in improving the quality of their processes while respecting people and the natural environment.	
4	BIO	The BIO mark may be placed only on products that are grown and certified in accordance with the EU's restrictive regulations on organic farming.	
5	Lean&Green	Products with the Lean&Green mark guarantee that the coffee maker makes every effort to reduce CO_2 emissions during all transport.	
6	Green Office Certificate	The Green Office Certificate distinguishes coffee producers who want to improve and take new initiatives to protect the environment and strengthen their pro-ecological image.	
7	Green Shop Certificate	This certificate is the first environmental standard in Poland dedicated to companies with retail outlets, as well as those selling online. The guidelines have been developed on the basis of international standards in the field of corporate social responsibility ISO26000 and the Global Reporting Initiative's rules for reporting on sustainable development.	

Data source: Own study based on [39-42].

Having these certificates is becoming a very important element of the marketing strategy of coffee producers in Poland (in the area of the product, promotion, price, distribution and personnel). The research carried out by the authors shows that for over 80% of coffee consumers in the 1st segment it is important to know how the coffee they drink has been made and where it comes from. Nestlé, being aware of this, emphasises in its promotional materials that more than 40% of the coffee beans processed in their roasting plants come from plantations certified by the Rainforest Alliance [41]. It is equally important that the packaging in which coffee is sold is as environmentally friendly as possible - over 80% of coffee consumers included in the 1st segment is willing to pay a higher price for coffee with ecological packaging. To meet these expectations, the Nestlé Group (owner of the Nespresso brand - coffee capsules), offers the opportunity to recycle used packaging to its Polish customers. Nestlé, through the Nespresso Club, provides free bags for recycling used capsules. All the customers have to do is to mark the delivery option with recycling when ordering the product. Then the courier, when delivering the order, will collect the used packaging and leave a recycling bag for the next used capsules [42]. In addition, all Nespresso Club Members who use this recycling method receive a voucher guaranteeing a 10% discount on products (vegetables, herbs, fruits) from the Quan Fa Organic Farm, which uses leftover coffee from used capsules as a natural fertilizer for growing vegetables [42].

The research also shows that over 75% of the respondents classified to the 1st segment are willing to pay more for coffee, which is a BIO type product or has a Fair Trade certificate. A coffee maker like Tchibo is aware of this. In Tchibo's most recent "*Sustainability Report 2015*", the producer emphasises that [40]:

- Over 40% of Tchibo coffees in 2015 originated from sustainable crops;
- Nearly 30,000 coffee growers took part in training courses in Central and South America, East Africa and Asia as part of the Tchibo Joint Forces!® programme;
- Since 2009, Tchibo uses only coffee from sustainable crops when preparing coffee in its own coffee bars;

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- Since 2012, the Tchibo Privat Kaffee coffee and Tchibo Cafissimo coffee capsules use only certified coffee beans;
- Up until 2015, in the Huehuetenango and Chiquimula regions of Guatemala, more than 2,000 children were looked after in twelve day-care centres.

The presented activities carried out by the largest coffee producers in Poland may provide valuable advice for other Polish producers who are interested in preparing an attractive offer for the 1st segment identified and described on the basis of the research carried out. To prepare such an offer, in the authors' opinion, activities should focus on four key areas:

- Support for growers - in the 21st century, in order to respond to the challenges facing the coffee market, producers should teach small growers how to operate in a more effective way, how to use sustainable crop methods and thus increase their productivity over a longer period of time;
- Cooperation with standardisation organisations such as: Rainforest Alliance, Fairtrade, UTZ Certified or other national or global organisations behind the organic BIO mark;
- Environmental protection to achieve the best quality coffee. Coffee is a valuable resource. Fertile soil, clean water and suitable climatic conditions are key to its quality and quantity. Knowledge about environmentally friendly cultivation methods is often limited. Coffee producers in Poland should engage in initiatives such as Coffee & Climate, which deals with climate change and the best possible adaptation of farmers cultivating coffee and their methods to the local effects of these changes;
- Educational projects in coffee-growing countries. Growers and their families are often exposed to difficult social conditions. Therefore, coffee producers in Poland should engage in the rights of children more often, for example in projects such as *Save the Children* - a campaign consisting in organising practical and vocational educational activities, to prepare students in Tanzania, for example, to start a professional activity related to growing coffee.

The research and the statistical analysis of its results allow the hypothesis which was set in the introduction to be accepted. The sustainable values included in the study, such as environmental protection, the ethical behaviour of producers, fair trade or maximising the usability of consumption can, and should, be used as segmentation criteria in the coffee market in Poland. What has been proven is that the attitude of the respondents to these values statistically significantly differentiates the consumer groups, distinguishing a segment to which not only a better quality of their life is important, but which is also concerned for the natural environment and the ability to meet the needs of future generations. What is more, the implementation of the segmentation procedure also allowed the identification of the coffee consumer segment for which being guided by sustainable values in the consumption process is of little importance. It is worth emphasising that segments of coffee consumers guided by sustainable values ("responsible") and those who disagree with them ("consumerists") constitute two extreme clusters of the least similar individuals. This demonstrates more clearly the importance of sustainable values as variables differentiating consumer behaviour in the coffee market.

The authors of the article are aware that, although the conducted research was of a national nature, it cannot be considered as fully representative. According to the authors, the presented results may, however, provide interesting conclusions about demographic, economic, psychographic or behavioural characteristics of Polish coffee consumers, while providing input to the discussion on the importance of sustainable consumption and sustainable development in consumer decisions and choices in the coffee market.

An important research task would be to confirm the results obtained in these studies using a representative sample of consumers selected randomly. It would also be important and interesting to conduct further research on the impact of sustainable values on consumer behaviour in other markets for goods and services.

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