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*Article*

# Segmentation of coffee consumers using sustainable values: cluster analysis on the Polish coffee market

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**Abstract:** In the face of the ongoing degradation of the natural environment and increasingly worrying climate change, societies and their governments should pay more and more attention to the issue of the development of sustainable consumption and pro-environmental consumer behaviour. It has been known for a long time that producers and retailers are the driving force behind adopting the idea of sustainable development. Unfortunately, many of them, when preparing the offer of their goods and services, still take into account only such consumer characteristics as their wealth, the purchasing frequency and volume. In consumer segmentation, the sustainable values that consumers follow when making their purchasing decisions are rarely taken into account. The purpose of the presented article is to try to fill the research gap in this area. The Polish coffee market, on which this type of research has not been conducted so far, was chosen as an example of segmentation taking into account the sustainable values of consumers. The article's main source of information is the results of primary research carried out using the CAWI (Computer-Assisted Web Interview) technique 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 results which were obtained from the research and statistical analysis. This made it possible to identify and describe six segments of coffee consumers, taking into account their demographic, social and economic characteristics as well as being guided by sustainable values in their purchases. 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 behavior, sustainable consumption, sustainable values, factor analysis, cluster analysis

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## 1. Introduction

W.R. Smith is considered to be the creator of the concept of market segmentation. He put forth the concept of market segmentation as opposed to the concept of product differentiation. He pointed out that "(...) as a starting point, segmentation adopts the development of the demand side of the market and means a rational and more precise adaptation of the product and marketing activities to the requirements of the consumer or user. In the economist's language, segmentation results in disaggregation and aims to the recognition of many demand lists where previously only one was recognised"[1] (p.5). After the publication of W.R. Smith's article, many publications appeared addressing the problems of market segmentation, its nature, types of applications, criteria, and, over time, also experiences from research and applications, and finally critical analyses (Table 1).

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**Table 1.** Review of the definition of the concept of market segmentation - chronological order

| No. | Authors | Understanding segmentation |
|---|---|---|
| 1 | J. Liguel, A. Cadet | Market segmentation means dividing the population into homogeneous groups of consumers, both in terms of their visible features and the mentality of consumption. |
| 2 | R. Kramer | Market segmentation is a market strategy that deals with dividing the entire market into segments and conducting consistent marketing in these segments. Any arbitrarily limited part of the entire market, which is characterised by a uniform structure of the motivation to purchase (consume) goods and services of a certain type, is defined as a segment. |
| 3 | Ph. Kotler | Market segmentation is a secondary division of the market into homogeneous buyer subgroups, where each subgroup can of course be selected as a market facility to be achieved through a separate composition of marketing elements (the so-called marketing mix). |
| 4 | H. Assael | The principle of segmentation is reasonable: a diversified allocation of marketing resources to meet diverse needs. |
| 5 | N. Goluskin | Market segmentation is identifying a group of consumers who have a homogeneous set of needs and then offering them a product that will satisfy those particular needs. |
| 6 | A. Samli | Market components, segments can be identified on the basis of different sets of criteria. A component or segment is each subgroup of the entire market that is worth cultivating. |
| 7 | M. McDonald, I. Dunbar | The process of market segmentation involves the division of clients or potential clients within a given market into groups, i.e. segments in which all clients have the same or similar requirements, satisfied with a specific marketing composition. |
| 8 | J. Altkorn | Market segmentation is the division of the market, on the basis of specific criteria, into relatively homogeneous partial markets (relatively homogeneous consumer groups) called segments, which determine the area of enterprise expansion and constitute a reference point for determining the target market and marketing strategy. |
| 9 | L. Garbarski | Market segmentation is the division of the market according to a given criterion into homogeneous consumer groups (market segments), which define the area of activity for the enterprise and constitute a reference point when formulating the plan of this activity. |

Data source: [2-10].

The definitions presented in Table 1 show that the concept of segmentation can be interpreted as a research process or as one of the company's basic strategies on the market. For the purpose of the article, in accordance with the definition by J. Altkorn and L. Garbarski, it has been assumed that segmentation on the coffee market is a research process whose purpose is to divide the market into homogeneous sets of consumers (so-called market segments) that define the area of the company's activity and constitute one of the stages in the process of formulating a marketing strategy. Formulating a marketing strategy on the coffee market requires the definition of the target market, i.e. selecting a group of potential buyers whose needs the coffee producing enterprise intends to satisfy.

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 [11].

This choice requires the use of an appropriate procedure that allows the division of the entire market into smaller areas, called market segments, which include buyers with similar needs, similar behavioural or motivational features, as well as assessment as to which of the identified segments has the highest market opportunities or potential threats [12].

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 [13],
- E.J. McCarthy's simplified segmentation procedure [13],
- J. Kramer's simple, practical six-step procedure [14],
- Segmentation procedure with an analytical and decision-making character [15],
- Five-stage procedure for determining segments in a given market developed by M. McDonald and I. Dunbar [9].

An overview and brief description of the segmentation procedures for ultimately selecting the target market are presented in Table 2.

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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 1.

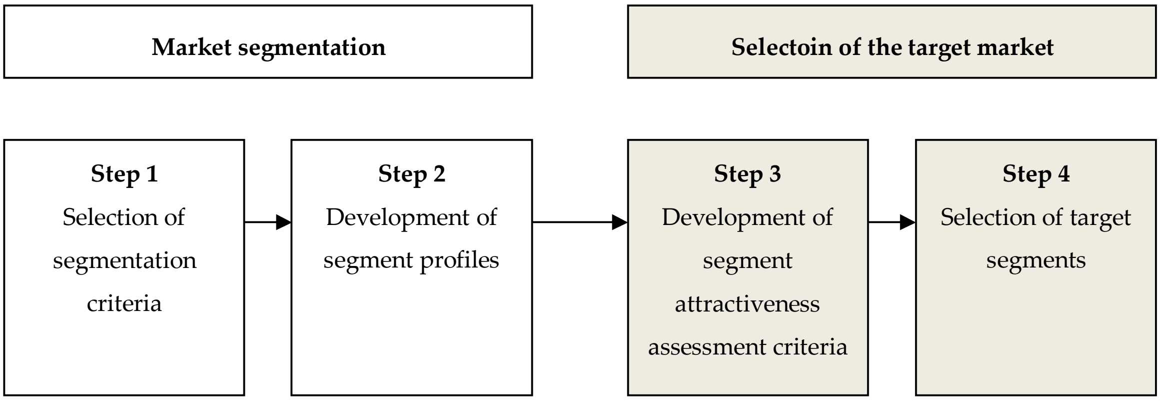


**Figure 1.** Selection of the target market in coffee manufacturing companies in Poland

Data source: Own study based on [16-18].

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.

**Table 2.** Review of market segmentation procedures

| No. | Type of procedure | Research stages |
|---|---|---|
| 1 | A priori procedure | • A priori selection of segmentation criteria<br>• Selection of a set of characteristics describing segments and the formulation of hypotheses about the relationship between these characteristics and segmentation criteria<br>• Design and selection of a test sample<br>• Gathering information in the course of empirical research<br>• The creation of segments by grouping consumers using selected segmentation criteria<br>• Sketching the profile of individual segments by analysing the collected information about consumers<br>• Estimating the size of each of the profiled segments, choosing the target market, designing or modifying a marketing strategy |
| 2 | E.J. McCarthy's procedure | • Broad definition of the segmented market<br>• Formulating a list of needs of potential buyers<br>• Defining segments by creating a combination of needs met in a given market<br>• Identification and removal of common features<br>• Naming the separable segments of the market<br>• In-depth description of individual segments<br>• Determination of the relative size of segments |
| 3 | J. Kramer's procedure | • Defining the company's area of activity on the market<br>• Defining the needs that the company can satisfy in a separate area of the market<br>• Initial identification of various market segments<br>• Identification of those needs that are repeated in each segment<br>• Naming the isolated market segments |
| 4 | Analytical/decision-making procedure | • Defining the product and market to be segmented<br>• Defining the needs and expectations of potential buyers of the product<br>• Review and initial selection of criteria for the division of buyers into segments<br>• Selection of market segmentation criteria<br>• Research and evaluation of potential market segments<br>• Choosing the target market, planning marketing activities depending on the adopted |

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| | | |
|---|---|---|
| | | variant of the market segmentation strategy |
| 5 | Procedure of M. McDonald and I. Dunbar | • Creating a market map (structure and decision makers)<br>• Analysis of customer behaviour and the transactions conducted (who is buying, what is being bought, who is buying what)<br>• Market segmentation (why things are bought, formulating segments, segment control)<br>• Assessment of the segments' attractiveness (attractiveness criteria, weighting of criteria, criteria parameters, segment assessment)<br>• Assessment of the company's competitiveness in individual segments |

Data source: [19-20].

Due to the fact that the coffee market is internally very diverse, not only in Poland, but also in the world, in order to distinguish its most important segments, it is necessary to apply many segmentation criteria [21-23]. In the source literature, market classification according to general and specific criteria, as well as according to objective and subjective criteria (Table 3), is the most common.

**Table 3.** Classification of market segmentation criteria

| **Criteria for market segmentation/consumer characteristics** | | | |
|---|---|---|---|
| Objective | | Subjective | |
| General | Specific | General | Specific |
| 1. Geographical factors (place of residence - city size class, rural area, region)<br>2. Demographic factors (gender, age, stage of family life cycle, family status)<br>3. Socio-economic factors (education, affiliation to social class, social mobility, character of professional activity)<br>4. Adaptation to the computerization of everyday life | 1. The method (model) of consumption (e.g. one's diet)<br>2. Attachment to specific trademarks, products, stores, forms of sale and purchase, brand loyalty<br>3. Consumption levels (high, medium, small) and purchasing frequency<br>4. Purchase related situations and subjective product categories<br>5. The role in the process of the assimilation and infiltration of information | 1. Characteristic personality traits<br>2. Lifestyle (specific areas of activity, interests, opinions)<br>3. Hierarchy of one's instrumental superior values<br>4. Susceptibility to the impact of marketing instruments | 1. Behaviour on the market<br>2. Manner of reacting to marketing strategies used by coffee producers<br>3. Attitudes towards products (expected benefits), values related to the product<br>4. Perception of product features<br>5. Preferences |

Data source: Own study based on [24-27] .

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) [28-29].

A list of the most commonly used criteria for the segmentation of coffee consumers both in Poland and in the world is presented in Table 4.

**Table 4.** Types and criteria for the segmentation of coffee consumers

| **Type of segmentation** | **Methods and criteria for dividing the market** |
|---|---|
| Psychographic | Division of the market into distinct groups of buyers because of their membership to a social group, lifestyle or personality traits. |
| Behavioural | Division of the market into groups of buyers due to their knowledge, attitude, preferences, market choices, etc. |
| Geographical | Division of the market into distinct geographical units such as nations, countries, regions, provinces, cities, districts, etc. |
| Demographic | Division of the market into groups of consumers according to demographic variables such as gender, age, family size, family life cycle, occupation, education, race or nationality. |
| Geodemographic | Research on relationships between geographical location and buyer demographics. |
| According to age and life cycle | Offering products or the use of methods of marketing influence in a way that takes into account the changing needs of consumers in different phases of their life cycle. |
| Economic | Division of the market into groups of buyers with different incomes, relatively high, medium or low, also indicating material conditions. |

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| | |
|---|---|
| According to purchasing opportunities | Division of the market due to the situations in which the intention to buy a product appears, its purchase takes place or the purchased product is being used. |
| According to benefits | Division of the market into groups of buyers due to the different benefits that they expect from the former product. This means identifying the major benefits that people expect from a given category of products, buyers looking for all of these benefits and leading brands that provide them. |
| According to the user's status: the intensity of use | Division of the market into groups of buyers: those who do not use the product, ex-users, potential users, new users and those regularly using the product. In some markets, segments of customers can be distinguished based on high, medium and low intensity of product use. Those using the product intensively are usually a small percentage of the market, but they have a large share in the total value of purchases. |
| According to the degree of loyalty | Division of the market into groups of buyers fully loyal (always buying the same brand), loyal to a certain extent (faithful to two, or three product brands, or preferring a certain brand, but from time to time buying another) and disloyal (when buying products they choose a different brand every time or choose one which is offered in promotion) to their products, then focusing on profitable, loyal consumers. |
| According to purchasing readiness | Division of the market into groups of buyers at different stages of readiness to purchase a particular product into those unaware of the existence of the given product, those conscious and interested in the product, those wanting to have it and those who intend to buy it. The relative abundance of each of these groups has a significant impact on building loyalty programs. The stages through which the usual consumer moves when making the purchase are: awareness, knowledge, liking, preference, conviction and purchase. |
| According to the attitude towards the product | Division of the market into groups of buyers who are enthusiastic, positive, indifferent, negative or hostile towards a given product. Attitude to the product can be an effective variable of market segmentation when marketing programmes can confirm the belief of people having a positive attitude towards a product and try to convince those who are indifferent. Little time to devote to attemptts a changing the customer's negative or hostile attitude to the product. |

Data source: Own study based on [16, 30-34] .

In the presented list (Table 4) covering the analysis of 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.

For the needs of the research conducted, the following hypothesis was put forward: 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.

To verify the truth of the hypothesis put forward, primary research was carried out with the participation of 800 Polish 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

For the purpose of this article, direct research was carried out (Table 5). The research was completed in July 2018. The research conducted was quantitative. The research focused on Polish coffee consumers. The aim of the research was to identify the attitudes and behaviours of respondents on the coffee market in Poland, including the study of the respondents' attitudes towards sustainable values.

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**Table 5.** Basic information on the quantitative research conducted

| Specification | Description |
|---|---|
| Research method | Interview |
| Research technique | CAWI (Computer Assisted Web Interview) |
| Research tool | Standardised interview questionnaire |
| Sample selection | Targeted (inhabitants of Poland, people declaring that they drink coffee at least once or several times a week, gender breakdown consistent with the ratio in the general population of Poland's inhabitants) |
| Sample size | Total of 800 people (50 respondents from each province in Poland) |
| Spatial extent of research | Poland (all 16 provinces) |
| Research date | 13-27 July 2018 |

Data source: Collected by this research.

The study was conducted using the interview method, via the CAWI technique (Computer-Assisted Web Interview). The research took advantage of the electronic platform of the Ariadna National Research Panel [35]. The electronic questionnaire was available at the following Internet address: https://panelariadna.pl/survey/page.php?code=YToxOntzOjc6InBhZ2VfaWQiO3M6NToiY2xvc2UiO30=. The research tool consisted of 15 substantive questions and 9 demographics questions. The substantive questions were formulated in the form of open, closed and semi-closed questions and Likert scales. In addition, dichotomous and filtering questions were used. The substantive questions were strictly subordinated to the research objectives. The demographics questions made it possible to characterise the sample in regard to the demographic, economic and psychographic characteristics of the respondents. 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) [36]. 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 [37] , 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.

Targeted sampling was used in the research. The survey sample constituted people who declared that they drank coffee at least once a week. The size of the research sample was 800 people, 50 people from each province in Poland. This assumption was met - a total of 800 correctly and fully filled out questionnaires were received (about 160 questionnaires obtained from respondents from each of the five age groups: 16-24, 25-34, 35-44, 45-54 and 55-64). The size of the sample was chosen as this size is optimal from the point of view of both the research objectives, the research costs and the researcher's workload. At the same time, it should be remembered that the size of the sample does not depend on the size of the population, but on the degree of its homogeneity. The more homogeneous population (in terms of selected features), the smaller the sample can be (Table 6).

**Table 6.** 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 |

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| | | | |
|---|---|---|---|
| | 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.

The research 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 ine the consumed ground coffee (39.4%) or instant coffee (34.1%) once or twice a day (65.1%) - Table 6.

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 [38] (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.

CA methods, also known as classification methods or grouping methods, are among the basic methods of statistical multi-dimensional analysis used in segmentation [39-41]. They make it possible to find and assess isolated clusters, create classifications and mine data [42] (p.179). The description of their numerous applications in marketing research has been presented by Walesiak et al. [43] (pp. 344-347).

Various systematics of cluster analysis methods can be found in the source literature; one of the most commonly adopted systematics is the division into four groups [43-46]:

- Hierarchical methods (agglomeration and deglomeration).
- Partitioning methods (area and density methods, when the number of isolated clusters is unknown and methods optimising the initial division of a set of objects when the number of separated clusters is known).
- Graphic presentation methods.
- Hybrid methods (combining the aforementioned classic methods with neural networks).

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

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described in the literature [39] (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 [45] (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 (Figure 2).

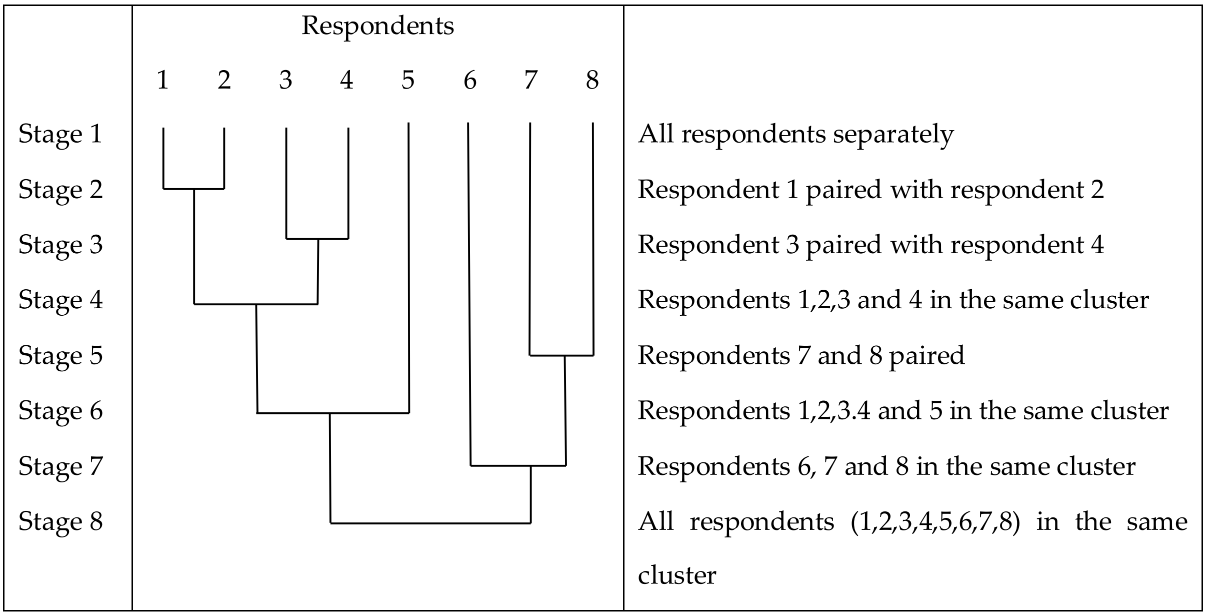


**Figure 2.** Cluster analysis process

Data source: Own study based on [49] (p.241).

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 [39, 44]. For the purpose of segmentation in marketing research, Ward's method [47] is quite often used (p. 75). This is determined by the method of combining objects into clusters. In Ward's method, such objects are comnined which cause the smallest increase of the variance in the cluster, and thus ensure the highest homogeneity of the cluster [48]. 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 [39]. Unfortunately, like any method, Ward's method has its methodological drawbacks and limitations. In order to obtain more accurate results, the use of other classification methods in the same study, e.g. division methods, non-hierarchical methods is therefore recommended [42]. 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

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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 [50-54]. 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.

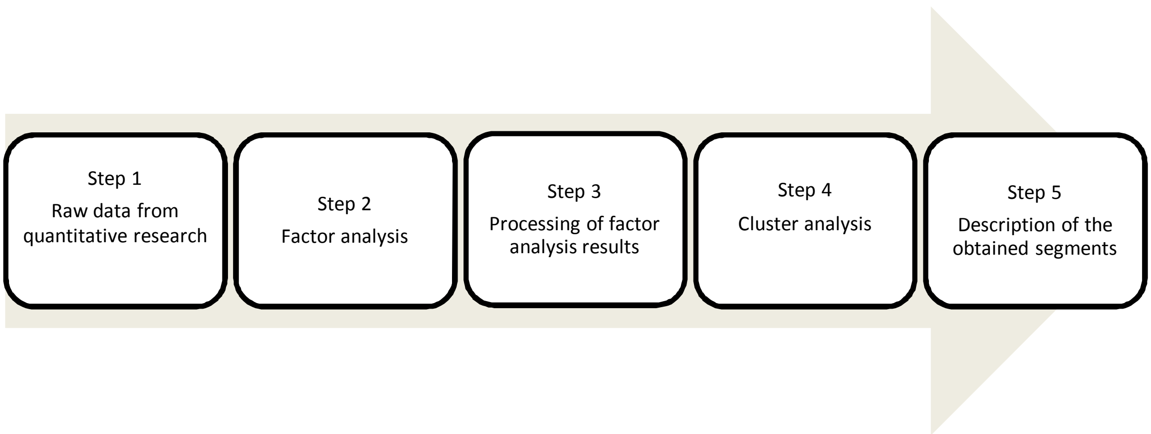


**Figure 3.** The process of consumer segmentation
Data source: Collected by this research.

After collecting data from CAWI quantitative interviews, 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 7). The obtained factors 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.

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**Table 7.** 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 [55] (p.148). 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 8).

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**Table 8.** 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 |
| | 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 9 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 9.** 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 | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| 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 | | | |
| 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 10.

**Table 10.** 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.

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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 11.

**Table 11.** 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. Cross tables, along with statistical significances, form a detailed structural analysis of data, allowing for an in-depth analysis of results and drawing conclusions that can be used to build a new or reconstruct existing brand strategies according to consumer perception. The detailed description of the segments, due to its non-established character, as well as the subjective names that may be subject to polemics, are presented in the next section of the paper.

## 4. Discussion

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

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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, 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+ catagory 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

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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 12.

**Table 12.** 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 |

Data source: Collected by this research.

## 5. Conclusions

The basic research carried out for the purposes of the article 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.

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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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