EKONOMSKI HORIZONTI, 2011, 13, (1) str. 125-141

Stručni članak
336.717.11-053.6

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PREFERENCE-BASED SEGMENTATION OF YOUNG CLIENTS: IMPLEMENTATION ON THE MARKET OF BANK ACCOUNTS

Abstract: *The purpose of this paper is to explore diversity of the segment of young customers of bank accounts. To this end, the research among students of Cracow University of Economics was conducted. Firstly, the author used the conjoint analysis to examine respondents' preferences regarding individual aspects of bank account: number of charge-free ATM's and various bank charges. By using this technique, it was possible to calculate the relative importance of these features for each respondent. With the use of the obtained calculations and k-mean clustering, 4 homogeneous groups of students were identified. Each of these groups differs in bank preferences, as well in demographic features. These results lead to the conclusion that the segment of young customers of bank accounts is very complex and need very detailed analysis in order to perform successful marketing campaign.*

Keywords: *bank account, segmentation, conjoint analysis, preferences*

JEL Classification: G21

INTRODUCTION

In recent years there has been a significant increase in the number of banking institutions on the Polish market of financial services. As a result, one can observe strong competition between business entities in this sector. This situation is very beneficial for consumers, because banks do not only reduce the costs of individual services, but also gradually expand the range of new features. Depending on the needs and preferences, a consumer can choose between banks, which offer free of charge current account, high interest rates on savings accounts, a wide range of mobile services or enhanced customer loyalty programs.

From the perspective of a banking institution, it is impossible to conduct marketing activities in all the areas mentioned above, since it would be too expensive. Due to this fact, particular attention is paid to identifying factors that affect the consumer's decision regarding selection of bank account to the largest

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extent. Such knowledge enables banks to specify the areas in which it is reasonable to conduct marketing activities and where it is possible to make savings. One of the analytical techniques used to determine consumer preferences in relation to the various banking offers is conjoint analysis. Not only does it show the most important factors influencing the decisions of buyers, but also allows further study, which may facilitate the adaptation to the customers' needs. More about different uses of the conjoint analysis on the market of banking services may be read in the papers (Arias 1996; Laukkanen 2007; Oppewal, Vriens 2000).

The article is the continuation of the author's previous studies regarding students' preferences in choosing a bank account. So far, the author focused on the identification of the most important aspects of a bank account. To this end, the research among students of Cracow University of Economics was conducted. Firstly, the author used the conjoint analysis to examine respondents' preferences regarding individual aspects of bank account: number of charge-free ATM's and various bank charges. By using this technique, it was possible to calculate the relative importance of these attributes for each respondent and for the whole group of the examined students.

The results of the analysis gave the indication that the segment of young customers of bank accounts is much diversified, therefore it might be beneficial to identify existing subgroups. The aim of this paper is to determine how these subgroups differ in bank account's preferences. To this end, the results of conjoint analysis with regard to various respondents' features will be presented. Moreover, on the basis of k-mean clustering, the author will distinguish groups of students with homogeneous preferences.

1. CONJOINT ANALYSIS PROCEDURE

Assumptions of conjoint analysis had been published by R. D. Luce and J. W. Tukey in 1964 (Luce, Tukey 1964), but the first publication concerning its use in marketing research appeared several years later (Green, Rao 1971). Since then, the method gradually gained in popularity, which is confirmed by the number of commercial applications in several industry sectors (Wittink. Cattin 1989).

Conjoint analysis is based on the utility theory, therefore it is assumed that consumers' purchasing decisions are consistent with the criterion of the benefits maximization[1]. The products are treated as collections of attributes (features, characteristics), which have different influence on consumer preferences. On this basis, the regression model is built, where the dependent variable is the level of preference for the analyzed product and its features are the explanatory variables.

[1] One can read more about utility theory in (Varian 1990).

Estimated parameters, called partial utilities, indicate which attributes are the most important to the buyers.

In relation to the initial version, presented by R. D. Luce and J. W. Tukey, there were proposed many modifications and improvements (Acito, Jain 1980; Jaeger et al. 2000), but the overall research procedure has remained unchanged. The most important steps in the conjoint analysis are (Bąk, Walesiak 2000):

a) specification of the research problem,
b) the choice of relationships' model between variables,
c) the choice of preference model,
d) the choice of method for data presentation,
e) generating a set of profiles,
f) selecting the form of profiles presentation,
g) determining the scale measuring the dependent variable,
h) selection of methods for estimating model parameters,
i) interpretation of the results.

At the beginning, a researcher must define the research problem. In addition to defining the main purpose of the analysis, it is also necessary to indicate the subject of the study. In particular, define what kind of product or service will be evaluated and which attributes will be taken into account in the analysis. Moreover, the possible variants for all attributes have to be chosen[2].

In the next step, the researcher should make the assumptions about the relationships between different attributes. If it is assumed that among the distinguished features there are certain interactions, the additional combinations of the variables are added to the model (Akaah, Korgaonkar 1983).

The next step is to determine the relationships between the variants of the distinguished attributes. There are three basic models of relationships: a discrete, linear and square. In the first case, all variables are treated qualitatively, and therefore for each variables' level, the researcher obtains separate value of the partial utility. The linear model assumes a linear relationship between attribute levels and their utilities. For stimulants higher level of the variable will be perceived as more preferred, and for destimulants it is vice versa. Square model is used for variables that are nominants and determines how much the variable is worse than the most preferred.

The next step is to create all possible combinations of products from the selected levels of the variables. These combinations, called profiles, are presented to respondents for evaluation. The basic methods of the profiles presentation include: full profiles, pairs of attributes and a comparison of pairs. The description of these techniques can be found in (Churchill 2002). Regardless of the

[2] In the literature, variants are also called attribute levels (Bąk, Walesiak 2000).

presentation method, even if there is a small number of product features, the respondents would have to evaluate a lot of combinations. Therefore, appropriate statistical procedures are used to reduce the number of these combinations. One of the most commonly used method is the orthogonal arrays, included in the package PASW Statistics.

After this step, one specifies the form of individual profiles presentation. The most important methods are: verbal description, a graphic form, the three-dimensional model and the presentation of the actual product. The choice depends on the characteristics of the test subject, and especially from its physical attributes. In the case of services, generally a verbal description is only used.

The next and one of the most important steps is to select a scale measuring the dependent variable. It is possible to use all kinds of scales which include nominal, ordinal, interval and ratio scales (Walesiak 1996). The decision should be made based upon the number of options that will be evaluated by the examined group. In the case of the rank scale, it occurs that the respondents are able to identify only some of the best and most unprofitable versions. Other choices do not reflect their actual preferences. Therefore, the quantitative scales are used much more frequently (Wittink, Cattin 1989). In this case, the respondent gives the probability of the profile selection or determines the score relative to the best option.

Decisions made at each stage determine the estimation of model parameters. J. D. Carroll and P. E. Green showed a variety of methods of estimation, depending on how the profiles are presented and which measurement scale is used (Carroll, Green 1995). The most common approach used is the Least Squares method (Wittink, Cattin 1989), therefore in this article the authors will concentrate on this technique. The Least Squares method is used when the dependent variable is measured on the quantitative scale. In most cases, it corresponds to a probability of the profile selection. Way of defining variables dependents on the assumed relationship between the levels of these variables. In the case of linear relationship, the preference model for individual respondent is in the form (Bąk, Walesiak 2000 p. 48):

$$\hat{Y}_s = b_{0s} + \sum_{j=1}^{m} b_{js} Z_{js} \quad (1)$$

where:

b_{1s}, ..., b_{ms}-parameters of the regression equation (utility of each attribute)

b_{0s}-intercept

s-number of the respondent

Z_{1s}, ..., Z_{ms}-explanatory variables (attributes)

A form of the model of preferences for the entire study group is obtained by calculating the arithmetic mean of the parameters' values for each of the respondents.

Main advantage of conjoint analysis is also the possibility to establish the importance of certain aspects of a given product. It is determined with a use of a following formula (Hair, Anderson 1998 p. 608):

$$W_j^s = \frac{\max\limits_{l_j} \{U^s_{jl_j}\} - \min\limits_{l_j} \{U^s_{jl_j}\}}{\sum\limits_{j=1}^{m} \left(\max\limits_{l_j} \{U^s_{jl_j}\} - \min\limits_{l_j} \{U^s_{jl_j}\} \right)} \times 100\ \%\quad (2),$$

where:

$U^s_{jl_j}$ - partial utility for l-level j-th variable for respondent s,

W^s_j - importance of each variable for respondent s,

lj - number of level for variable Z_j

Similarly as in the case of the parameters, the importance of the attributes for the total sample is calculated as the arithmetic mean of the values for individual respondents.

The obtained model provides a basis for the further analysis. Depending on the purpose of the study, the results can be applied to determine the price and product concept, market segmentation, competitive analysis, advertising and selection of the distribution channel (Wittink, Cattin 1989). In the next sections of this article an example analysis will be provided.

2. CHARACTERISTICS OF THE RESEARCH SAMPLE

In order to determine the structure of preferences for particular aspects of a bank account, in April 2010 a survey among students of Cracow University of Economics was conducted. Out of 206 questionnaires received, 188 were completed correctly. Others were excluded from the analysis.

Respondents were characterized by the following features:

a) gender,
b) place of residence,
c) work status,
d) amount of money allowed to spend each month,

e) accommodation.

The table 1 presents the characteristics of the respondents, including the above-mentioned features.

Table 1 Characteristics of the respondents

Attribute	Category of the attribute	The percentage of category in the entire study group	Number of people who chose the category
Gender	Female	36,70%	69
	Male	62,77%	118
	No answer	0,53%	1
Place of residence	Over 200 000 residents	29,26%	55
	Between 199 000 and 50 000 residents	17,55%	33
	Between 49 000 and 10 000 residents	22,34%	42
	Less than 10 000 residents	30,85%	58
Work status	Unemployed	68,62%	129
	Casual work	25,00%	47
	Steady work	6,38%	12

Source: Own work

Table 1 Continuation

Attribute	Category of the attribute	The percentage of category in the entire study group	Number of people who chose the category
Amount of money allowed to spend each month	Over 2000 zł	1,60%	3
	Between 1999 and 1500 zł	4,79%	9
	Between 1499 and 1000 zł	23,94%	45
	Between 999 and 500 zł	43,62%	82
	Less than 500 zł	25,00%	47
	No answer	1,06%	2
Accommodation	Family house	17,55%	33
	Own flat	8,51%	16
	Rented flat	47,87%	90
	Digs	3,72%	7
	Dormitory	21,28%	40
	No answer	1,06%	2

Source: Own work

3. ANALYSIS OF PREFERENCES FOR BANK ACCOUNTS IN THE ENTIRE GROUP OF RESPONDENTS

The performed analysis was based on five diagnostic variables which had been selected from the results of preliminary studies. According to the information published on the banks' websites, each of these characteristics matched most frequently occurring levels in the offers. Featured variables and levels used in the analysis are shown in table 2.

The total number of the combinations of featured levels for diagnostic variables was equal to 288. Therefore, the assessment of all profiles is virtually impossible, but using the method of orthogonal arrays, the authors generated a subset of 19 profiles of bank accounts. Each of them, the respondents assessed on the quantitative scale, where the value of 100 meant the maximum utility of the profile of all presented. Other options were evaluated from 0 to 99 points. Each rating was supposed to show the difference between the given profile and the most useful one.

Table 2 Diagnostic variables and their levels used in the research

Diagnostic variable	Featured levels	Level coding
Monthly account maintenance fee	No charge 2 zł	1 2
Monthly fee for card usage	No charge Less than 2 zł Between 2 zł and 3.50 zł Between 3.51 zł and 5 zł	1 2 3 4
Number of charge free ATMs in Poland	Big cities only (less than 2000) Majority of places (between 2000 and 4000) Practically everywhere (more than 4000)	1 2 3
The penalty of withdrawing money from the ATM of another bank	No charge 5 zł 2% of the amount taken out (minimum fee 5 zł) 3% of the amount taken out (minimum fee 5 zł)	1 2 3 4
Online transfer fee	No charge 0.50 zł 1 zł	1 2 3

Source: Own work

Due to the scale of measurement used in the research, the approach of Least Squares method was used. It was assumed that all studied variables are linear, and thus higher levels of a variable are accompanied by an increase or decrease in preference. All the features except "number of charge free ATMs in Poland" was considered as destimulants. The estimation results of the regression

coefficients for each variable, and their relative importance as calculated by the formula (2), are shown in table 3.

Table 3 Regression coefficients and relative importance of each variable

Diagnostic variable	Estimated value of utility	Importance
Monthly account maintenance fee	-17.353	20,19%
Monthly fee for card usage	-7.754	26,20%
Number of charge free ATMs in Poland	1.183	12,26%
The penalty of withdrawing money from ATM of another bank	-6.689	23,87%
Online transfer fee	-7.279	17,48%

Source: Own work

The resulting coefficient values confirm that the "Number of charge free ATMs in Poland" is the only stimulant among the variables used in the model. Despite the results for all respondents, a detailed analysis points out that the 81 respondents replied against this assumption. This may suggest that the technique of measurement confused the respondents, therefore their statements may be inconsistent with real feelings. It is interesting that for all other variables, the number of irrational statements was more than four times lower.

Based on the calculated model it was also possible to determine which factors affected the students' preferences the most. Table 3 points out that both "Monthly fee for card usage" and "The penalty of withdrawing money from another's bank ATM" had the greatest impact on choosing the right account. These results do not confirm the hypotheses about the importance of free ATMs and the online transfer fee while choosing a bank account, obtained during the preliminary research. This may lead to the conclusion that the students take the account for a whole product, and therefore, do not realize the importance of individual factors. On the other hand, such results may be related to low reliability of measurement that was carried out.

4. RESULTS OF THE ANALYSIS WITH REGARD TO DIFFERENT FEATURES

In this part of the paper the results of conjoint analysis carried out in different subgroups will be presented. To this end, respondents were divided on the basis of the characteristics identified in the section 2. For each subgroup, utility function parameters were calculated in accordance with the methodology for the entire group of respondents. The obtained results are presented in the table 4[3].

Table 4 Results of conjoint analysis across different groups of respondents

Attribute	Category of the attribute	Partial utilities for:				
		Monthly account maintenance fee	Monthly fee for card usage	Number of charge free ATMs in Poland	The penalty of withdrawing money from the ATM of another bank	Online transfer fee
Gender	Female	-13,45	-3,66	6,56	-2,08	-2,68
	Male	-15,19	-6,79	0,77	-7,04	-7,47
Work status	Unemployed	-12,40	-3,55	6,13	-2,78	-3,29
	Casual work	-17,08	-7,21	0,64	-6,62	-7,61
	Steady work	-12,40	-3,55	6,13	-2,78	-3,29

Source: Own work

[3] In the table the minimum values were highlighted with italics and the maximum values with underline (with regard to specific attribute). The symbol "*" represents an irrational response of the respondents, which reflects in sign of the regression coefficient (partial utility) for the certain factor, in accordance to other group of respondents.

Table 4 Continuation

Attribute	Category of the attribute	Partial utilities for:				
		Monthly account maintenance fee	Monthly fee for card usage	Number of charge free ATMs in Poland	The penalty of withdrawing money from the ATM of another bank	Online transfer fee
Place of residence	Over 200 000 residents	-14,11	-6,18	2,23	-4,20	-4,50
	Between 199 000 and 50 000 residents	-15,54	-7,02	*1,86*	-7,43	-9,26
	Between 49 000 and 10 000 residents	-14,26	-5,00	4,13	-3,75	-5,14
	Less than 10 000 residents	*-13,26*	*-2,17*	8,50	*-1,76*	*-1,10*
Amount of money allowed to spend each month	Over 2000 zł	-12,38	-9,08	*0,87*	-7,78	-4,86
	Between 1999 and 1500 zł	-18,88	-6,30	-0,41*	-7,68	-8,42
	Between 1499 and 1000 zł	-17,66	-7,03	3,16	-5,82	-7,00
	Between 999 and 500 zł	-13,64	-4,09	6,16	*-2,46*	-4,33
	Less than 500 zł	*-10,71*	*-3,37*	4,70	-3,67	*-1,15*
Accommodation	Family house	*-7,75*	-2,29	6,82	-1,42	1,03*
	Own flat	-14,48	-7,90	-0,43*	-6,58	-8,27
	Rented flat	-17,71	-6,48	3,63	-5,44	-7,00
	Digs	-16,71	-9,39	4,43	-4,62	-8,86
	Dormitory	-11,47	*-1,19*	7,38	*-1,25*	*-1,04*
Entire group of respondents	-	-17,35	-7,75	1,18	-6,69	-7,28

Source: Own work

Taking into account the gender of the respondents, it can be noticed that there is a significant diversity of preferences between women and men. While the impact of monthly account maintenance fee is rather similar, in the case of the other factors, the preference function coefficients diverge radically. Men attach much more importance to the fee for card usage than women. At the same time, women consider number of free ATMs as very important. In this case, the value of regression coefficient is more than 7-times higher than for men. Estimations of preference parameters for other factors (the penalty of withdrawing money from ATM of another bank and online transfer fee) indicate that they are more important for men than for women. On this basis, it can be concluded that in the study group, women take the service of their bank account only for a way of locating and accessing money. Men, on the other hand, make use of bank accounts more comprehensively. Free access to the money is not as important as the ability to make payments - by credit card or online account.

Analyzing the place of permanent residence, one can notice a significant similarity between the preferences of residents of medium-sized cities (from 10 to 50 thousands inhabitants) and large cities (over 200 thousands inhabitants). For the other places much more diversity can be seen. Residents of the smallest towns (up to 10 thousand inhabitants) do not have high expectations in relation to bank accounts. They pay most attention to the number of free ATMs offered by the bank. Other factors are less important, as it is confirmed by relatively low values of the utility function parameters, with respect to the other questioned students. Bigger city residents (from 50 to 200 thousand inhabitants) are characterized by completely different preferences. In this case, the number of free ATMs has a marginal importance. Much more essential are other aspects of the bank account. It is worth noticing that the estimated parameters of the preference function for these factors are the highest among all groups of the residents.

The obtained results of conjoint analysis indicate also that preferences for a bank account are different depending on whether a student is working. Groups of the unemployed respondents pay attention mainly to the number of free ATMs. Other aspects are less important than for those, who are working. For comparison, the students with steady job prefer the accounts with low fees for the card usage and the account maintenance than other respondents. The group of casual workers often chose an account with low penalty for using ATMs of other banks and low online transfer fee.

Significant differences in preferences can be also seen in groups divided on the basis of the amount of money allowed to spend each month. People with limited financial resources (up to 500 zł) pay the least attention to the penalty of withdrawing money from another bank's ATMs, among all the groups. Students who had higher monthly amounts (between 1500 and 2000 zł) preferred the most account with low fees for a bank account maintenance and online transfers.

Respondents who declared the highest monthly disposable amount of money (above 2000 zł) chose mostly the account with low fees for the card usage and withdrawing funds from another bank's ATM. The number of free bank's ATMs was for this group unimportant. In the case of people with the amount in the range of 500 and 1000 zł, preferences were similar to the entire group of respondents.

Taking into account the analysis of student accommodation, it can be concluded that people that are living in dorms mostly prefer the accounts with a large number of free ATMs among all studied groups. Other factors are much less important compared to the rest of students. People living in digs are usually decided on the accounts with low fees for the card usage and online transfers. The respondents with their own apartment prefer primarily an account with low fees for using ATMs of other banks. Specific group are students that are living with their parents in the family houses. Because of the irrational statements concerning online transfer fees, which reflects the positive regression coefficient for this factor, the results will not be interpreted.

5. IDENTIFICATION OF THE SEGMENTS AMONG STUDIED GROUP

Comparing the results of conjoint analysis for individual respondents, one can identify some specific segments within the study group. To this aim, k-means clustering method will be used. This technique proposed by J. B. MacQueen (1967) is one of the most frequently used methods of a taxonomic grouping.

In k-means clustering the researcher assumes a priori the number of clusters which are existing in the entire group. In order to specify the correct number of clusters, the author used Ward's method, based on the Euclidean distance measure[4]. The basis for grouping were standardized regression coefficients, calculated for each respondent. Figure 1 shows the course of grouping.

[4] Detailed description of this method may be found in (Gatnar, Walesiak 2004).

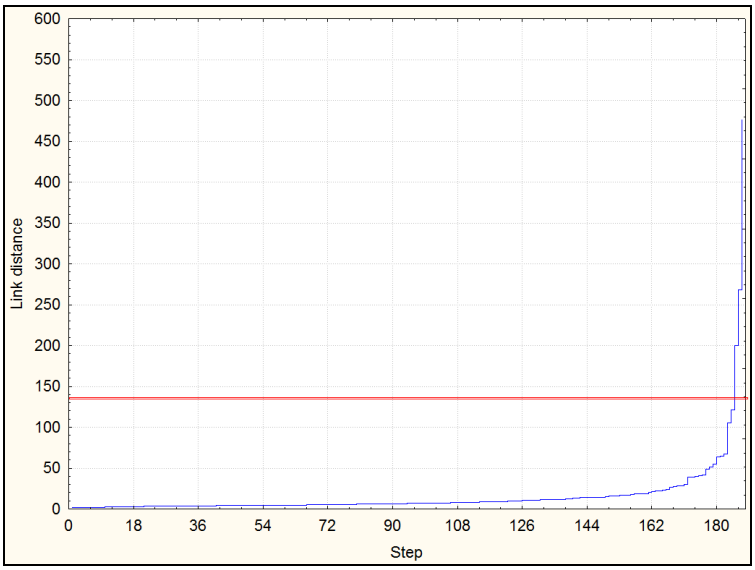

Figure 1 Course of grouping
Source: Own work

According to T. Panek (2009), the best dividing point is determined by the spot, where the chart shows a distinct flattening (longer vertical line). This situation can be observed for the link distance equal to 140. On this basis, the author distinguished 4 homogeneous segments in the study group (see Figure 2).

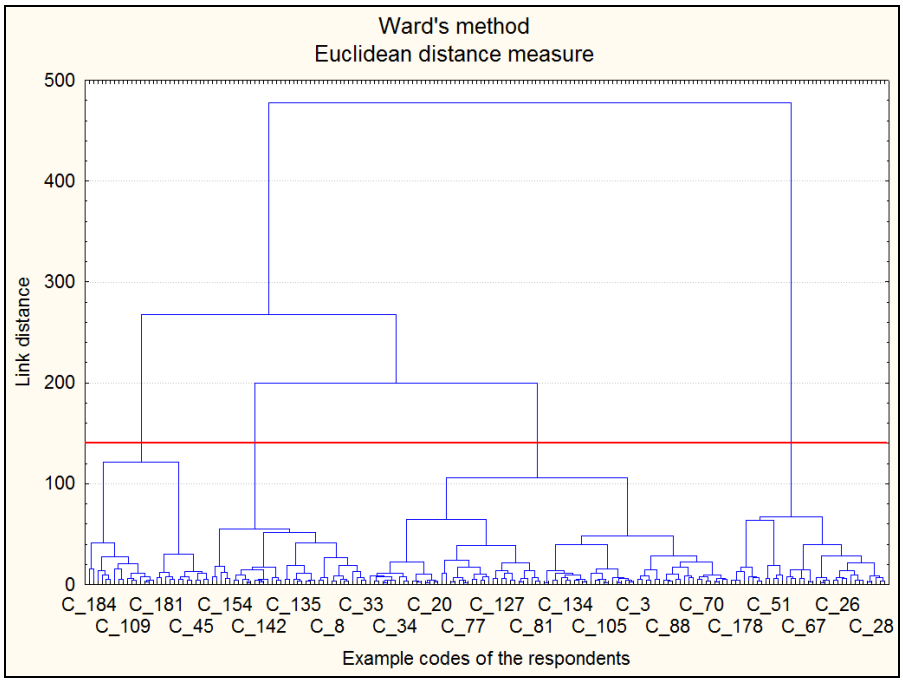

Figure 2 Dendrogram obtained with Ward's method
Source: Own work

In the next step, k-means clustering was performed. According to the results of the Ward's method, the author assumed the existence of four clusters in the studied group of students. For each cluster partial utilities of the bank accounts' attributes were calculated. Moreover, the clusters were specified with characteristics identified in section 2. Obtained results are shown in table 5.

Comparing the estimated models for all clusters some conclusions might be drawn. Students, who belong to the first cluster preferred accounts with low fees for maintenance and card usage. In the case of the second cluster, one can observed the significant impact of the number of free ATMs on declared preferences. The other factors appeared to be much less important than in other clusters. The opposite situation might be seen in the third cluster. The number of free ATMs has marginal importance in this group, while the other attributes strongly influence the declared preferences. Taking into consideration the fourth cluster, one can observed similar results to the entire group of respondents.

Table 5 Characteristics of the clusters[5]

Cluster number	Characteristics of the clusters
1	• Steady work • Monthly disposable amount of money between 1000 and 1499 zł • Digs or rented flat • $\tilde{Y} = -18{,}32X_1 - 8{,}03X_2 + 3{,}41X_3 - 5{,}36X_4 - 6{,}77X_5$
2	• Women • Unemployed • Monthly disposable amount of money below 500 zł • Dormitory or family house • Small towns (up to 10 000 inhabitants) • $\tilde{Y} = -11{,}51X_1 - 2{,}71X_2 + 6{,}68X_3 - 2{,}16X_4 - 1{,}37X_5$
3	• Men • Casual work • Monthly disposable amount of money over 1500 zł • Own flat • Bigger cities (between 50 000 and 199 000 inhabitants) • $\tilde{Y} = -15{,}59X_1 - 7{,}38X_2 + 0{,}55X_3 - 7{,}19X_4 - 7{,}65X_5$
4	• Medium sized cities (between 49 000 and 10 000 inhabitants) and big cities (over 200 000 inhabitants) • Monthly disposable amount of money between 500 and 999 zł • $\tilde{Y} = -14{,}02X_1 - 5{,}09X_2 + 4{,}17X_3 - 3{,}47X_4 - 4{,}66X_5$

Source: Own work

CONCLUSION

In the paper, the author presented the diversification of the bank accounts preferences, across various group of respondents. Despite the fact that the sample did not represent entire group of students, the obtained results may lead to the conclusion that the market of young customers is very complex. On this basis, designing the bank account with specified features to the entire group of students can be put into question.

In the subsequent studies, the author will concentrate on the identification of the most suitable bank accounts for the distinguished subgroups of students. To this end, the existing products on the market will be taken into account. In addition to that, the author will attempt to select the account, which best fulfills the expectation of all students' groups.

[5] Symbols: $\tilde{Y}$ - estimated partial utility of the profile, X_1- featured level of "Monthly account maintenance fee", X_2- featured level of "Monthly fee for card usage", X_3- featured level of "Number of charge free ATMs in Poland", X_4- featured level of "The penalty of withdrawing money from the ATM of another bank", X_5- featured level of "Online transfer fee"

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