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POSITIONING OF BRAND CONCERNING DURABLE GOODS AND OTHER VARIABLES USED IN ROMANIAN CONSUMERS ACQUISITION PROCESS

This paper focuses on Romanian market of durable goods and endowment of households with these durable goods, and shows the results of a sampling based research for a sample of 300 urban households, emphasizing that, in the acquisition process of durable goods, variables as product brand, price, name of shop, warranty, quality-price ratio, design, technical performances of product and other variables group differently in line with the important sociodemographic characteristics of Romanian consumers, for instance: income, level of education, age or occupational status. In order to emphasize these features two statistical methods have been applied: the principal component analysis (PCA) and the cluster analysis. Romanian consumer is sensitive to other market variables than the European Union, American, African, Russian or Asian consumer. We consider the results of this research as being important for all the players at the durable goods market: producers, dealers, advertising companies etc.

Keywords: *brand of durable goods; principal component analysis (PCA); cluster analysis; acquisition process; Romanian consumer; representativeness urban sampling.*

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ПОЗИЦІЮВАННЯ БРЕНДУ ДЛЯ ТОВАРІВ ТРИВАЛОГО КОРИСТУВАННЯ ТА ІНШІ ЗМІННІ, ЩО ВИКОРИСТОВУЮТЬСЯ В ПРОЦЕСІ ПРИДБАННЯ РУМУНСЬКИМ СПОЖИВАЧЕМ

У статті проаналізовано румунський ринок товарів тривалого користування і забезпеченості домогосподарств товарами тривалого користування, також показано результати дослідження по вибірці з 300 міських домогосподарств, підкреслюючи, що в процесі придбання товарів тривалого користування такі змінні, як бренд продукту, ціна, назва магазина, гарантія, співвідношення ціна-якість, дизайн, технічні характеристики продукту та інші змінні групуються по-різному відповідно до важливих соціально-демографічних характеристик румунських споживачів: доходів, рівня освіти, віку і професійного статусу. Для того щоб підкреслити ці особливості, застосовано два статистичні методи: аналіз головних компонент (PCA) і кластерний аналіз. Румунський споживач чутливий до інших змінних, ніж споживач Європейського Союзу, Америки, Африки, Росії або азіатських країн. Результати цього дослідження важливі для всіх гравців на ринку товарів тривалого користування: виробників, ділерів, рекламних компаній і так далі.

Ключові слова: *бренд товарів тривалого користування; аналіз головних компонентів (PCA); кластерний аналіз; процес придбання; румунський споживач; репрезентативна міська вибірка.*

Рис. 11. Табл. 4. Літ. 24.

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ПОЗИЦИОНИРОВАНИЕ БРЕНДА ДЛЯ ТОВАРОВ ДЛИТЕЛЬНОГО ПОЛЬЗОВАНИЯ И ДРУГИЕ ПЕРЕМЕННЫЕ, ИСПОЛЬЗУЕМЫЕ В ПРОЦЕССЕ ПРИОБРЕТЕНИЯ РУМЫНСКИМ ПОТРЕБИТЕЛЕМ

В статье проведен анализ румынского рынка товаров длительного пользования и обеспеченности домохозяйств товарами длительного пользования, а также показаны результаты исследования по выборке из 300 городских домохозяйств. Подчеркнуто, что в процессе приобретения товаров длительного пользования такие переменные, как бренд продукта, цена, название магазина, гарантия, соотношение цена-качество, дизайн, технические характеристики продукта и другие переменные группируются по-разному в соответствии с важными социально-демографическими характеристиками румынских потребителей: доходом, уровнем образования, возрастом и профессиональным статусом занятости. Для того чтобы подчеркнуть эти особенности, применены два статистических метода: анализ главных компонент (PCA) и кластерный анализ. Румынский потребитель чувствителен к другим переменным, чем потребитель Европейского Союза, Америки, Африки, России или азиатских стран. Результаты этого исследования важны для всех игроков на рынке товаров длительного пользования: производителей, дилеров, рекламных компаний и т.д.

Ключевые слова: *бренд товаров длительного пользования, анализ главных компонентов (PCA), кластерный анализ, процесс приобретения, румынский потребитель, репрезентативная городская выборка.*

Introduction and brief literature review. In the foreign literature the first research with regard to this market is dated 1979, when Kasulis, Lusch and Stafford were anticipating that for a number of reasons durable goods will be the fastest segment of consumer market in the 80s. This acquisition is considered by the authors as being discretionary, but they consider that period was characterized by the existence of a quite subjective distribution of income for each household to purchase durable goods. This economic detail also characterized Romania in 2006-2008, the period of "credit with identity card only" in the banks of Romania. The author also suggests to study this issue in different geographical areas in the future (as it is one of variables that influences this purchase – see the case of Romania in Gabor et al., 2011c) and also take into consideration variables such as social class of consumers (this aspect was considered in this research, reflected by variables such as net monthly income obtained in a household and household head, level of education and occupational status of a household head).

Modeling of relation between value, usefulness and holding of durable goods was studied and approached by Corfman, Lehmann and Narayanan (1991). The consumption patterns showed the connection between combination of preferences, price information and budget restrictions for household buying decisions, but these patterns are not consistent for basic utilities of durable goods, too, and as processing methods of data collected by sampling, factor analysis and cluster analysis.

The issue of purchasing durable goods on credit was approached by Hira (1993) that analyzed this tendency in the '20s. If we carry out an analogy with the Romanian market in the surveyed period, what was considered luxury durable goods in the '20s, in Romania, as regards category of these goods, necessity goods were "placed" or pur-

chased on credit (considered in the European Union as being part of the "basic" endowment of a household), for instance: double glazing, refrigerator, air conditioner etc.

In the durable goods industry there is still a global feature namely: a country where a product is designed is not the same with a country it is produced in, aspects related to the impact of country of design and the country of manufacture over perceptions of durable good consumers was studied in 2006 by Hamzaoui and Merunka. The durable goods market was approached as regards the selection of working life in case of differentiated products by Goering (2007), that built up a model that considered the impact of these products over the selection of monopolists at the durable goods market related to product durability.

An aspect that considers an important demographic variable was studied by Podoshen (2008) concerning the brand loyalty, the word of mouth and the effect of an unpleasant experience compared to the use of a brand as regards durable goods within Afro-American consumers compared to those non-Afro-Americans, singularized on cars.

Prince (2009) through his research responds to another problem of the durable goods market, he tries answering the question how do consumers choose the quality level and time of replacing the commodity for the vertically differentiated durable goods, these aspects being analyzed both theoretically and practically by means of structural equation patterns for durable goods demand. Fon Sim Ong et al. (2010) used a convenience sampling of primary data for the conjoint analysis application in order to analyze the decisions taken by consumers in Malaysia in selecting durable goods, air conditioning systems, respectively. They collected information about differences perceived by consumers related to: brand name, producing country, price, quality, technological progress, and warranty over product development. The results of research emphasized the importance provided by the consumers of intrinsic qualities and the need to provide a special attention to the price-quality relation.

Albaum and Wiley (2010) used a descriptive sampling, related to the perception of the extended warranty that producers provide to an independent service supplier when buying a PC by mail, phone order or online. Seitz et al. (2010) researched the importance of brand equity over the purchase of durable goods, singularized on air conditioning systems. Therefore, the research results emphasized that, for this durable brand is a proof of product quality but it is not a characteristic criteria in selecting a product.

The results were published for the durable goods market in Romania but were strictly related to endowment of households with a computer, home Internet access and mobile phone services (in urban environment) and as regards the knowledge based society, by S. Nicolae (2010).

Liberali et al. in 2011 published the results of their research regarding the effect of sensitivity (senzitation) to price and habituation over the purchase of durable goods, emphasizing that product performances represent the key of consumer motivation to purchase discretionary goods for replacing a durable good, a consumer considering only those goods that provide additional performances compared to that they already have.

Previous research related to the durable goods market in Romania – the results have been published by the author – revealed the following aspects:

- to purchase durable goods, consumers in Romania use the following criteria and information sources (Gabor et al., 2009a): price, promotions, brand of a product, the smallest influence having the provided aftersales service;

- applying the method concerning the factor analysis of correspondences related to information sources used by Romanian consumers in purchasing durable goods according to their age (Gabor and Isaic-Maniu, 2011b) resulted that young people below 24 use Internet advertisements and dislike posters displayed on transport, that are preferred by those who are over 65, and who are still influenced by radio advertisements and those published in paper press. The age category of 50-64 use friends' advice and warranty provided to product, the age category ranged between 25 and 49 prefer the same brand that we have used as well, TV advertisements, billboards and promotional leaflets;

- by applying the Student test we concluded there are significant differences statistically as regards endowment with durable goods across counties, development regions and nationally (Gabor et al., 2011a);

- applying the discriminant analysis method (Gabor and Isaic-Maniu, 2011b) in order to see which sociodemographic variable discriminates Romanian consumers' preference best, for foreign brands, Romanian brands or "no-names" and using as continuous variables age, last school graduated and net monthly income earned by a household head, it resulted that the sociodemographic characteristics that best discriminate this preference are income and studies of a household head.

Methodology: PCA and cluster analysis – thehoretical considerations and features for marketing data. Within this research, as information related to attributes has been collected by means of the Stapel scale, data being metric, using of PCA was possible, thus reaching the main requirement of applying the method. In order to decide the number of main components kept in the study several criteria of the above mentioned have been used cumulatively, the Kaiser criterium respectively – supra-unitary proper values – and the Evrard criterium or the screeplot of proper values. The rotation type used has been Varimax rotation with Kaiser normalization.

3 main components resulted after applying PCA represented the basis of applying another data analysis statistical method, the cluster analysis respectively, in order to detail and study thoroughly the results of research by applying PCA. Thus resulted – according to the sociodemographic characteristics of household leaders (age, level of education, monthly net income and occupational status) – the main clusters, types of households that use attributes grouped on each of 3 principal components in acquiring durable goods.

Also known in the special literature as the group analysis, numerical taxonomy or classification analysis or typological analysis (Gabor, 2009b), the cluster analysis aims at classification of a heterogeneous aggregate (either made of objects, individuals or cases) in relatively homogenous groups, according to a series of variables and their interdependence relations (Malhotra, 2004, p. 539), statistical principle that is based being that of minimization of variation between statistical units (intraclass lag) for their reunion in classes and maximization of variation between classes (interclass lag). The cluster analysis is based on the distances between individuals (Giannelloni and Vernette, 2001, p. 395) that can represent people, brands, products, regions etc.,

input data being presented as a picture of distances, frequencies or logical description (Guigou, 1977, pp. 70-71), selection of calculation methods being one of the stages related to carrying out the typological analysis, the method being adapted to the type of data comprised in the study (metric, ordinal or nominal). As a working method, it aims at the similitude ratios between objects, and is used when there is not an a priori hypothesis.

Sample description. In the sample formation, and consequently to ensure its representativeness, we start from national distribution of households according to two criteria, namely: the distribution of urban households based on occupation status and level of education of a household head, the sample used in our research illustrated in Table 1.

To increase the representativeness of the sample, we consider as appropriate to apply a scheme of combined sampling, respectively the quota sampling, and stratified sampling, using two layers as follows:

- the first layer consists of the household head occupation: employed persons, including the following categories: manager, employed person with higher education, employed person with high-school education, unqualified laborer, freelancers, respectively employers and self-employed, farmers, unemployed, retired.

- the second layer consisting of the level of training of household head: primary level (no school, elementary school, secondary school), secondary level (vocational school, high-school, technical/craftsmen school), higher education level (college/university, postgraduate studies).

Table 1. **Distribution of households in a sample**

Occupational status / Level of education	Employees	Freelancers	Agriculture workers	Unemployed persons	Retired
Primary	1	1	1	0	22
Secondary	109	11	2	12	90
Higher	42	1	0	0	8
TOTAL	300 households				

For information gathering stage we used a questionnaire administered by trained operators, namely trained students who have practical experience in this field, questionnaire containing a broad range of scales both classical and specific to marketing data and, implicitly, identification of the sociodemographic variables of the household head characteristics.

Presentation of the research results. Applying PCA a better visualization of grouping variables is targeted and, in line with this group, identification of some typologies of households respectively identification of attribute groups to which are sensitive households in the sample. Horizontal processing of the sampling data show us only the hierarchy of these attributes not how they group, therefore how they act together over the buying decision, aspect that we want to identify applying PCA. Data related to the total variance explained by the extracted components is in Table 2.

Table 2. **Explained total variance and eigen values for initial variables**

Extracted principal components	Initial eigen values (λ)			Rotation sums of squared loadings		
	Total	Percentage of variance	Cumulative percentage	Total	Percentage of variance	Cumulative percentage
1	2.913	26.481	26.481	2.079	18.898	18.898
2	1.667	15.156	41.637	1.931	17.553	36.451
3	1.356	12.327	53.964	1.926	17.512	**53.964**
....	...	...	...			
11	.358	3.259	100.000			

In case of PCA, we select 3 principal components but they explain a higher share of information, 54% of initial information, respectively. In Table 3 (col. 1-3) the grouping of initial variables on 3 principal components can be noticed.

We notice that 3 components are described as follows:

- The first principal component (PC1) is generally made of the variables related to "notoriety": name of shop, brand, product design and personnel competence;

- The second principal component (PC2) includes variables related to economic side and safety of a purchased product, respectively: price, provided discounts, post-sale service and provided warranty and this component will be called "economic and safety";

- The third component (PC3) includes aspects related to product reliability: quality, quality/price ratio and their technical performances and it will be called "reliability".

Table 3. **Rotated component matrix and matrix of component scores**

Initial variables	Rotated component matrix			Matrix of component scores		
	PC1	PC2	PC3	PC1	PC2	PC3
0	1	2	3	4	5	6
Name of shop	.720	.122	-9.105E-02	.391	.038	-.177
Brand	.712	-.221	.242	.355	-.189	.060
Product design	.629	-2.258E-02	.390	.277	-.092	.138
Personnel competence	.514	.399	3.536E-03	.252	.192	-.121
Price	-.151	.715	8.091E-02	-.132	.395	-.011
Provided discounts	-1.727E-02	.713	.125	-.068	.382	-,004
Post-sale service	.408	.610	-4.998E-02	.191	.321	-.161
Provided warranty	.287	.406	.283	.088	.177	.078
Product quality	3.170E-02	5.703E-02	.827	-.112	-.064	.479
Quality/price ratio	-8.584E-02	.383	.681	-.170	.139	.373
Technical performances of product	.338	-1.772E-02	.674	.079	-.105	.351

Reviewing information in Table 3 (col. 4-6) we notice that:

- Initial variables that make the PC1 are negatively correlated with PC2 and as a result the conclusion is that brand with a special design is not correlated with an economy product, or "accessible" to consumers. The other two variables that correlate negatively with the third component are name of a shop and personnel competence, this aspect leading to the conclusion that quality products do not always sell in well-known shops and quality of products is not related to selling personnel competence;

- Variables that make PC2 are correlated negatively, either with PC1 – "notoriety" – these variables being the price and provided discounts and therefore consumers' perception is that shops and well-known brands seldom use these promotional "incentives"; these variables are in conjunction with the post-sale service variable that together correlate negatively with PC3, "reliability", conclusion being that, consumers consider that "acceptable" discounts and prices are applied for unreliable products;

- And 3 attributes that make PC3 correlate negatively with the other two are: quality and quality/price ratio with PC1. Therefore we may conclude that respondents face the so-called "cognitive dissonance" in the consumer behavior, respectively they made acquisitions at famous shops that were strongly promoting products and were disappointed by various aspects of the purchased products; the other negative correlation group being provided by the quality and technical performances of product with PC2, this aspect leading to the conclusion that a product with an "acceptable" price is not always a quality product and in any case one with high technical performances.

Also, for a better visualization of localization of 300 households in relation to the factorial axes, their representation in bidimensional space was used grouping 3 principal components two by two, 3 figures being illustrated in Figs. 2-4 for grouping households according to occupational status of a household leader and Figs. 5-7 for grouping households according to the latest school graduated by a household leader.

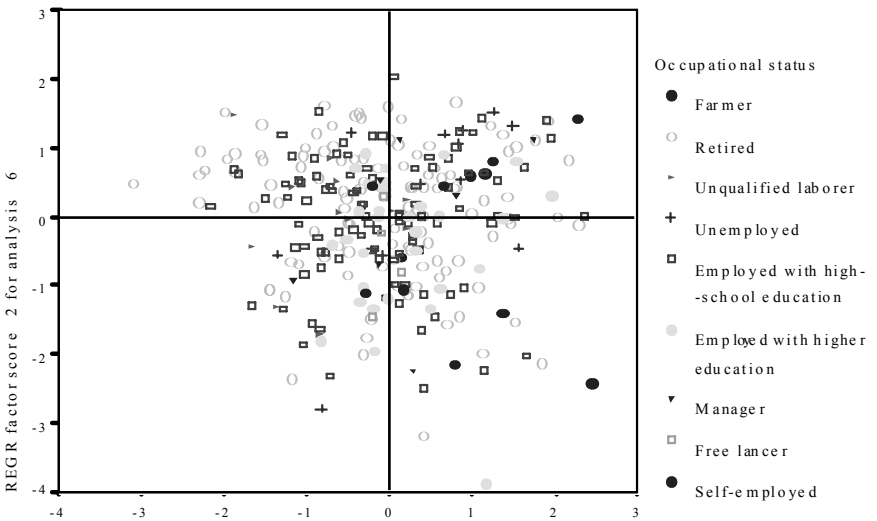

Fig. 2. **Representation of households according to occupational status of household leader on PC 1 and PC 2**

From the above figure we may notice that the PC 1 household leaders are freelancers, self-employed, managers or higher education employees, i.e. consumers with an income higher than average consumers, with higher education, who are not sensitive to price, brand, name of shop – elements related to "notoriety". Other categories of consumers are grouped almost equally spaced than the origin of axes.

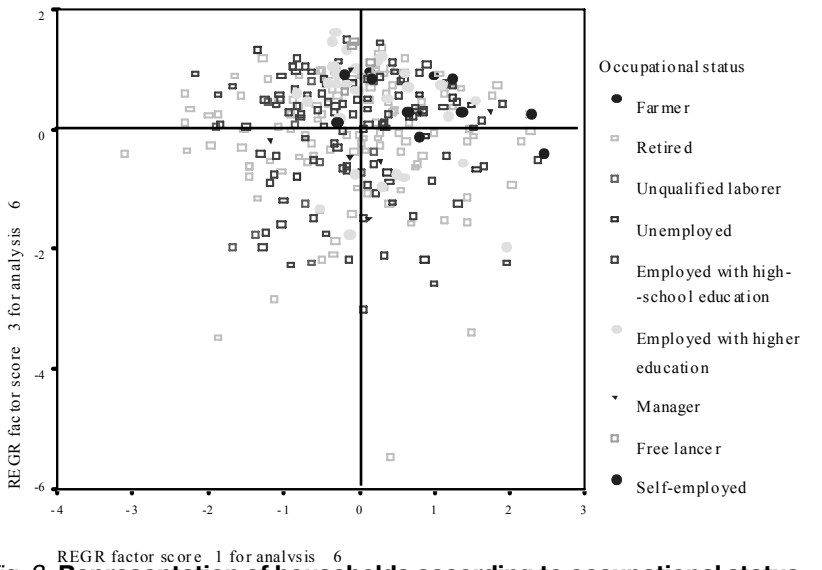

Fig. 3. **Representation of households according to occupational status of household leader on PC1 and PC3**

According to the job of a household leader, Fig. 3 locates many households in the negative plane of PC3 emphasizing an important aspect, namely those households that are grouped around the factorial axis are located in the positive plane of PC3; therefore it correlates with the aspects related to product reliability. In the negative plane of PC3 household leaders are found who have the following qualifications: unqualified employed, retired and high-school education employees.

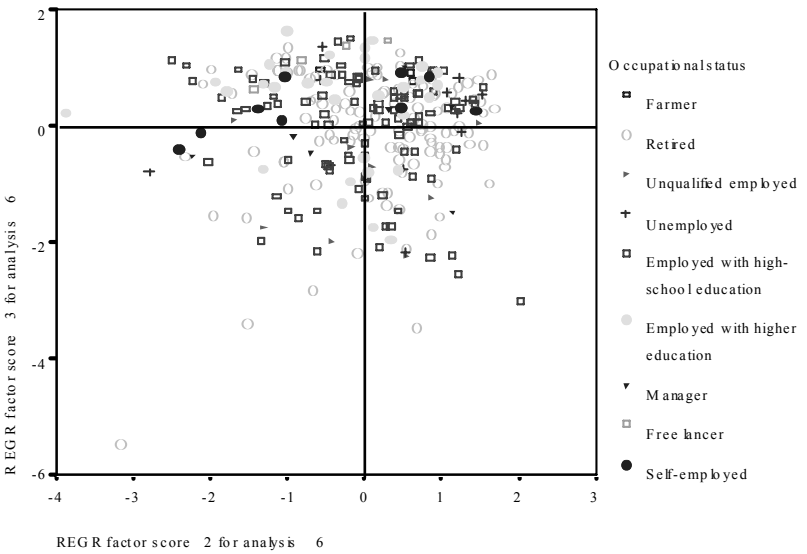

Fig. 4. **Representation of households according to job of household leader on PC2 and PC3**

Representation of households in the plane of factorial axes consisting of PC2 and PC3 (Fig. 4) emphasize even better the polarization of households in the positive plane of PC3, therefore all the households whose household leader is an owner or a freelancer are in the positive plane of PC2, therefore are sensitive to the aspects related to price or product reliability. Their opposite are the households whose household leaders are managers.

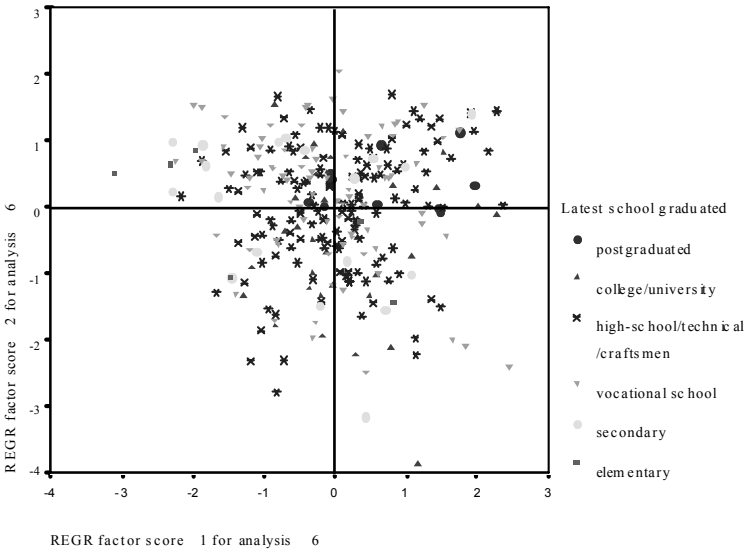

Fig. 5. **Representation of households according to level of education of household leader on PC1 and PC2**

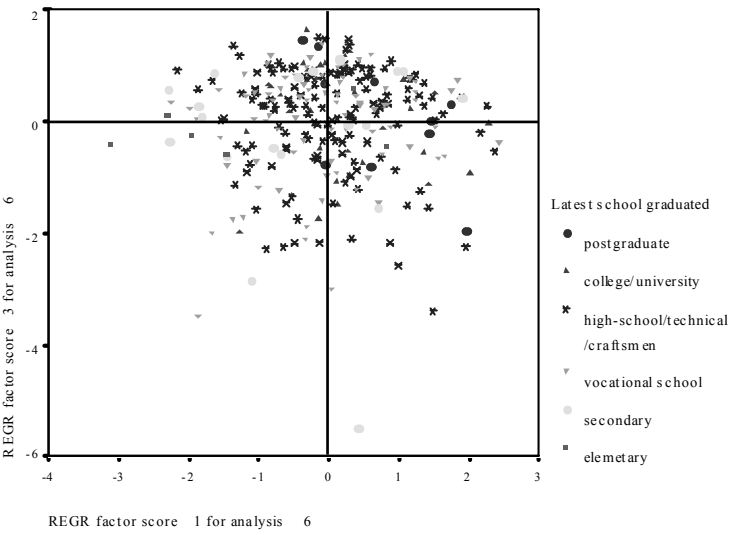

Fig. 6. **Representation of households according to level of education of household leader on PC1 and PC3**

We detail interpretation and analyze the projection of households in the plane of PC1 and PC2 according to the latest school graduated by a household leader (Fig. 5), emphasizing the fact that all the households whose household leaders have postgraduate studies is located in the positive plane of PC1, all other having an equally-spaced distribution in relation to the origin.

Grouping of households on PC1 and PC3 (Fig. 6) locate all the households whose household leaders have postgraduate studies in the positive plane of PC3. In Fig. 8, 300 households are illustrated in the bidimensional plane made by the PC2 and PC3.

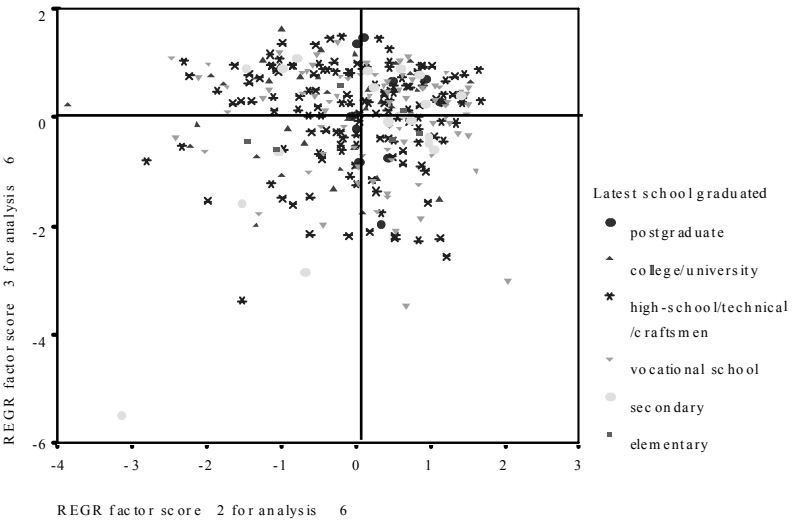

Fig. 7. **Representation of households according to level of education of household leader on PC2 and PC3**

We applied further another statistical method, the cluster analysis, based on the data and the detailed figures mentioned above. We can conclude that 3 clusters of households are noticed, see Table 4.

Table 4. Final clusters and their coordinates

	Number of households in each cluster	Cluster		
		1	2	3
Notoriety	2	-.12069	.95273	.45457
Economic and safety	238	.36013	-2.34459	-1.37324
Reliability	59	-.01709	-4.42372	.21889

It is noticed that the first cluster is attached to the "economic and safety" component and is represented by most households, 238 households (in a proportion of 80%), cluster 3 is attached to "reliability" and is represented by 59 households (20% of total number of households) and cluster 2 is represented the least – only by 2 households. Description of 3 clusters by means of sociodemographic variables is shown in Figs. 8-11.

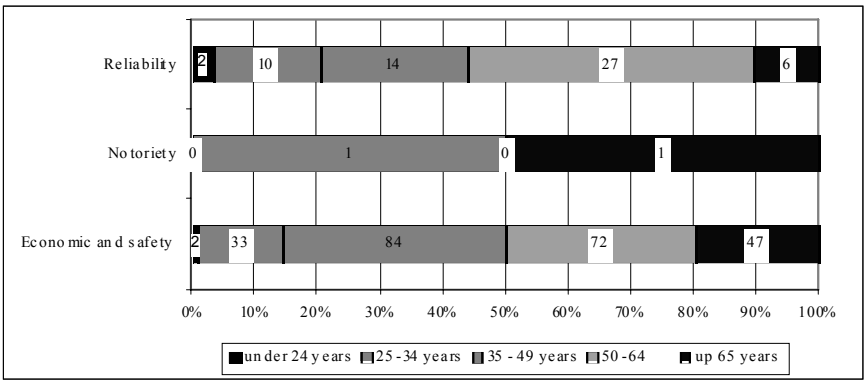

Fig. 8. **Grouping of households according to age of household leader on components**

The first characterization of grouping 300 households according to the age of household leader – Fig. 8 – consists of the following characteristics:

The highest share of young people, under 24 years, that take into account aspects related to reliability and not notoriety, aspect explainable by the fact that these people are in the first stage of endowing their household with durable goods and therefore, making a long-term investment, this is the main aspect taken into account in purchasing goods; this issue is also valid for the share represented by household leaders with age between 25 and 34, with the mention that this share is divided almost equally on PC3 as well, "economic and safety" is explained by the fact that households have children, therefore additional costs, and are sensitive to aspects related to price, discounts, promotional periods. The age share between 35 and 49 characterizes component 3 prevailingly, "economic and safety", but some of them share with older consumers aspects related to notoriety.

For the last two groups it is noticed that households whose household leader is up to 64 are sensitive to aspects related to product "reliability" and those who are over 65 are sensitive to aspects related to economic side of purchasing a durable good.

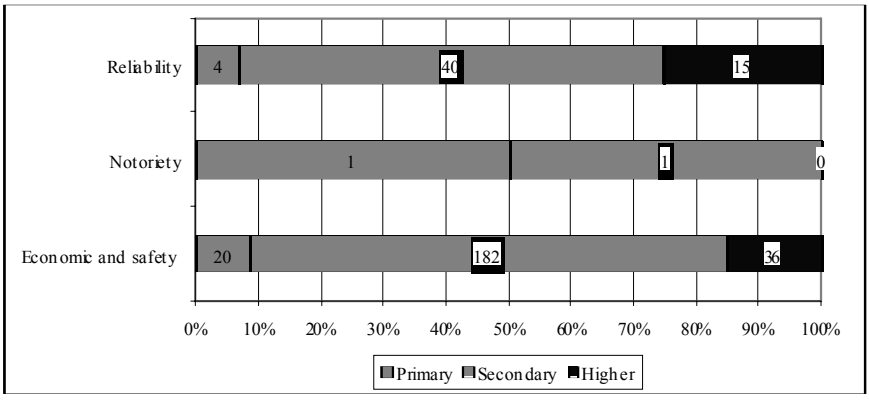

Fig. 9. **Grouping of households according to level of education of a household leader on components**

Fig. 9 illustrates that on PC3, "reliability" a higher share of higher education household leaders have been grouped than those grouped on PC2, "economic and safety", a category of high-school education household leaders being distributed almost symmetrically on all the components.

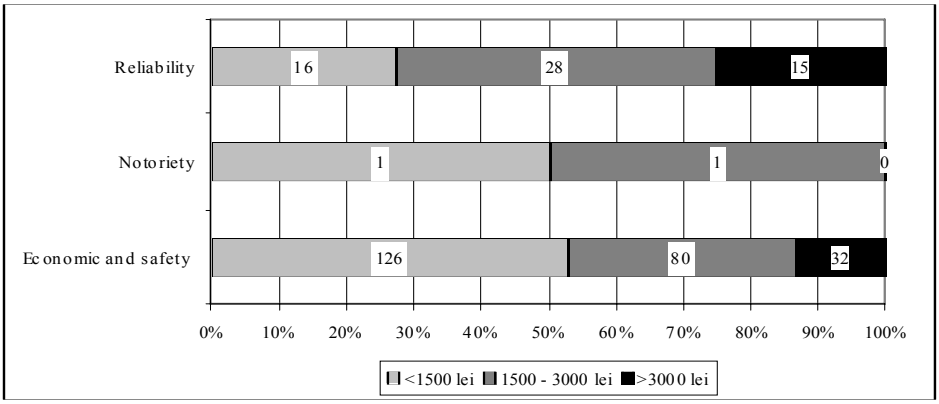

Fig. 10. **Grouping of households according to average monthly net wage of a household leader on components**

According to the average monthly net income achieved by a householder leader, locate on "reliability" component household leaders with the highest income in the sample, over 3000 lei (700 euros), on "economic and safety" component grouping most household leaders with a monthly income below 1500 lei (350 euros), those with a monthly income between 1500 lei and 3000 lei dividing PC2 and PC3 almost symmetrically.

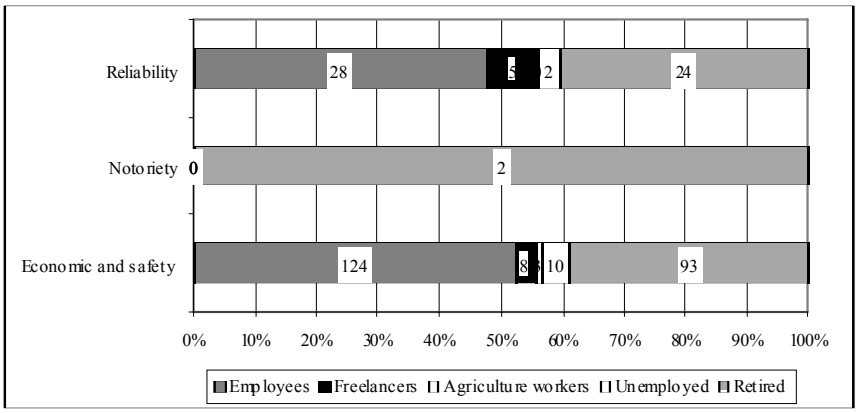

Fig. 11. **Grouping of households according to the job of a household leader on components**

Graph representation according to the job of household leader – Fig. 11 – strengthens the aforesaid, namely, that all categories of jobs distribute approximately equally on 3 extracted principal components.

Conclusions and discusions. Applying the data analysis descriptive method, PCA, helped to study thoroughly and in detail the results emphasized by horizontal and vertical analysis of attributes taken into account by households when purchasing durable goods.

Characterization of 3 principal components in line with typologies of households that group around them is provided by the following aspects resulted in the cluster analysis:

- component "households that purchase goods according to aspects concerning "economy and safety" – i.e. price, discounts, post-sale service and provided warranty – is typical to age categories 35-49 in a proportion of 28% and 50-64 in proportion of 24%, secondary studies (in proportion of 61%), with a monthly net income per household below 1500 lei (350 euros) for 42% of households and to a lower proportion of those with an income ranged between 1500-3000 lei (700 euros), in a proportion of 27%, respectively and being either an employee or a retired person.

- component "households that purchase goods according to "notoriety", though being typical to only 2 households, is characterized by: age either between 34-49, either over 65 years, primary or secondary level or education, income ranged between 1500-3000 lei, either lower than 1500 lei, retired person.

- component "households that purchase goods according to "product reliability" is typical to households whose household leader is between 50-64, secondary level of education, monthly income per household ranged between 1500-3000 lei, occupation is either an employee, or a retired person.

The cluster analysis applied to the PCA results brovides a better intrinsic interpretation of these results and implicitly a segmentation of Romanian household's representation across cities nationally according to sociodemographic characteristics of a household leader: monthly net income, age, level of education and occupational status.

By applying two statistical data analysis methods to marketing variables used within research, criteria considered when Romanian consumers purchase durable goods, we have emphasized other features of this market. These two statistical methods helped us to position the brand of durable goods together with other variables involved in Romanians' decision-making purchasing process.

If we relate to the fact that in the top 100 brands in the world (carried out by INTERBRAND), most brands come from the electronics (with a downward trend, however, from 18 brands in 2001 to 14 brands in 2011) as well as automotive (from 8 brands in 2001 to 12 brands in 2011) and Internet services (4 brands in 2011), it results that brands related to durable goods have 30% of total top 100 brands in the world being a strong communication tool of the companies in this field with many implications: social (extent of endowment as regards households mirrors consumers' social status), intercultural, economic (both micro- and macro level) etc.

Also, though PC1 – "notoriety" explains 25% of total variance as regards 11 decision criteria it only groups two households showing that Romanian consumers are not senzitive to variables related to brand of durable goods, name of shop or design of a product (variables used in making PC1) but are strongly influenced by their price. This aspect can be explained in that Romanian consumers' buying power is low, over 30% of Romanian households have credits to banks in order to purchase – in install-

ments – durable goods. Furthermore, in the press-release in June 2011, GfK company recommends to brands that, when it is decided to be in line with certain values of consumers, it is important to select a set of values and find out more information about consumers, what their sociodemographic characteristics are, at what life stage they are and what their lifestyle is respectively, referring to the fact that Romanian value system is dominated by two orientations: toward achievement and toward tradition.

Acknowledgments: *This paper is the result of the project "Transnational Network for Integrated Management of Postdoctoral Research in Communicating Sciences. Institutional building (postdoctoral school) and fellowships program (CommScie)" – POSDRU/89/1.5/S/63663, financed under the Sectoral Operational Programme Human Resources Development 2007-2013.*

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Стаття надійшла до редакції 30.12.2011.