Study on the influence of advertising attractiveness on the purchase decisions of women and men

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Abstract. This article attempts to document differences in purchase decisions of men and women. Earlier research has found that they, due to their different upbringing and socialization along with various other social, biological and psychological factors, depict different types of consumer behaviour. The purpose of this study is to investigate the influence of advertising attractiveness on male and female purchase decisions. The aim of the paper is to present the authorial research procedure which proposes the usage of the theory of rough set to determine the rules of the consumers' behaviour. Implications and directions for future research are provided on the basis of the results.

INTRODUCTION

Knowledge of the issues concerning the purchasers' behaviour in the market is an extremely important, and even essential, element in the creation of the modern enterprise marketing strategy. The ability to predict the consumers' response and to identify determinants of their decision-making processes, and the knowledge of to what extent the consumers are brand sensitive (and other forms of marketing impact

of the manufacturer on the market) largely determine the entrepreneur's success (Wiśniewska, 2005). The consumer's choice is a result of a complex play of cultural, social, personal and psychological factors (Table 1). The complexity of the system of these factors perfectly illustrates the model of the consumer's behaviour called the black-box model (Figure 1). Putting the majority of the types of factors in the table 1, it shows the relations between external stimuli, consumer's traits, the decision-making process and the consumer's response expressed through his or her choices.

Table 1

Types of Factors Affecting Consumer Buying Behaviour

Researcher	Major factors
Zikmond and Amico (1993)	social factors, environmental factors, individual factors
McCarthy and Perreault (1993)	physical factors, social factors
Narayyana and Raol (1993)	physical factors, social factors, culture factors
Keegan (1995)	social factors, culture factors, economic factors, geography factors
Setlow (1996)	personal factors, marketing mix, environmental factors
Stanton (1997)	social factors, physical factors, attitudinal factors
Lancaster and Reynold (1998)	physical factors, social factors, culture factors
Kotler and Armstrong (2007)	physical factors, social factors, culture factors, personal factors
Straughan and Roberts (1999)	demographic factors, lifestyle
Pride and Ferrell (2000)	social factors, physical factors, attitudinal factors
Kardes, Cline and Cronley (2011)	personal factors, attitudinal factors, cognitive factors, physical factors, culture factors, social factors
Rudnicki (2012)	psychological factors, personal-demographic factors, socio-cultural factors, economic factors

Source: own elaboration based on Stávková et al., 2008; Suleiman, 2000; Obaidat, 1995; Kardes et al., 2011; Rudnicki, 2012.
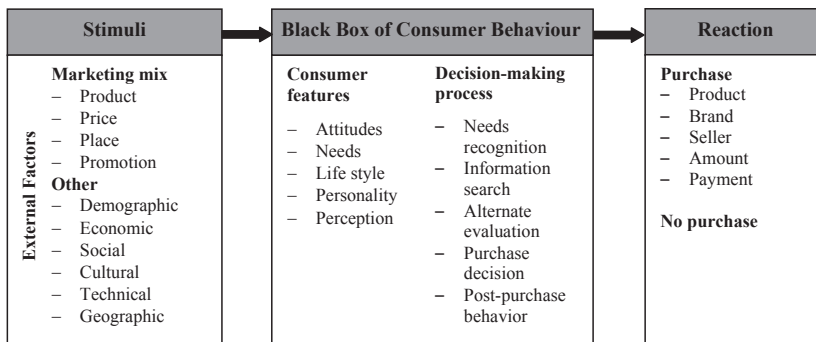

Figure 1. The Black Model of Consumer Behaviour
Source: own elaboration based on Keegan et al., 1992; Kotler et al., 2002.

One of the most crucial factors influencing the consumer's choice, according to the black-box model, is the marketing mix, which includes the promotion. The key element of the promotional activities is advertising, defined as "any paid form of non-personal presentation and promotion of ideas, goods and services by an identified sponsor" (see Kotler, 1994, p.574; Ayanwale et al., 2005; Bovee et al., 1995). The major aim of advertising is to create positive attitude towards the advertisement and the brand until a consumer purchases that product and through this positive attitude create emotional response in the mind of a consumer (Goldsmith and Lafferty, 2002). Advertising is the element that directly influences marketing processes, and above all, motifs, attitudes and behaviours of purchasers (Altkorn, 1998, p. 6-10). As a promotional strategy, advertising serves as a major tool increasing product awareness in the mind of a potential consumer to make an eventual purchase decision (Latif and Abideen, 2011, cited by: Abideen and Saleem, 2011).

The issue of making the purchase decision under the influence of the advertisement has been repeatedly discussed in literature. A number of publications provide the results of the study on the advertising efficiency, but none of them includes the differences resulting from the consumers' gender (e.g. Niazi, 2012; Fu1 and Chen, 2012; Abideen and Saleem, 2011; Ayanwale et al., 2005). Of course, this does not mean that the issue of differences in making decisions by women and men is omitted. Several works prove it, for example those by María L. Sanz de Acedo Lizárraga, María T. Sanz de Acedo Baquedano and María Cardelle-Elawar (2007). Similar studies were made in Malaysia by S. Mokhlisi and H. S. Salleh (2009). Another studies also prove that the purchase decisions may be gender dependent (e.g. Bakshi, 2012; Rudell and College, 1993; Bae and Lee, 2011).

However, so far the results of the studies on the influence of the advertising on the decisions made by women and men have seldom been published. The aim of this article is to make up for this deficit. Here are presented the results of the study on the influence of advertising attractiveness on the purchase decisions of women and men in the market of electrical devices. Empirical data crucial for the study to be made were gathered via questionnaire survey. The aim of the article is to present the authorial research procedure which proposes the usage of the rough set theory to determine the rules of the consumers' behaviour.

PURCHASE DECISION MAKING OF WOMEN AND MEN

As it was mentioned in the introduction, the process of decision making is one of the most complex mechanisms of the human thinking, as various factors and courses of action intervene in it with different results. Orasanu and Connolly (1993) define it as a series of cognitive operations performed consciously, which include the elements from the environment in a specific time and place. Narayan and Corcoran-Perry (1997) consider decision making as the interaction between a problem that needs to be solved and a person who wishes to solve it within a specific environment. In the classic theory of decisions, decision making means a group of logically connected mental operations or calculations, leading to the solution of a decision problem through the choice of one out of all possible variants of behaviour.

As with other psychological phenomena, sex and age are among the variables that affect decision making, or rather, that allow one to establish individual differences. The fact is that decisions are affected by beliefs about the characteristics that differentiate the genders, although those beliefs may be based on questionable criteria. Despite the fact that society is progressing towards social and labour equality between men and women, it is necessary to continue to examine from a psychological perspective whether there are sex differences in the importance that people allocate to factors that determine the decision process. Till now, the results of research are somewhat ambiguous because, although some significant differences have been identified, most of them are minimal (Crow et al., 1991; Hatala and Case, 2000; Hawkins and Power,

1999; Venkatesh, Morris, & Ackerman, 2000; cited by: Sanz de Acedo Lizárraga et al., 2007). It seems that women are more affected by the environment; they look for more information, and dedicate more time to the decision process (Gill et al., 1987; cited by: Sanz de Acedo Lizárraga et al., 2007). Men, on the contrary, are more dominant, assertive, objective, and realistic (Wood, 1990; cited by: Sanz de AcedoLizárraga et al., 2007). However, these differences have been interpreted as the result of the incidence of sex-related social norms and stereotypes that are transmitted in the form of values, traditions, and behavioural expectations. Together with some other educational factors, these probably foment and maintain some of the differences associated with certain aspects of decisions (Bussey and Bandura, 1999; cited by: Sanz de AcedoLizárraga et al., 2007). Therefore, although utill now the findings have been somewhat limited, it is relevant to continue to investigate these differences and determine how they are formed.

Understanding the consumers' purchase decision-making process allows marketers to gain more knowledge about their consumers. Moreover, it can be a foundation for them to create more suitable marketing strategies for their target consumers. If marketers understand this process of their consumers, they will know how their consumers search for information before buying, which criteria can encourage them to purchase, and what factors influence their purchase decision-making. (Solomon et al., 2010; cited by: Bakshi, 2012). Studies suggest that customers generally go through a five-stage decision-making process whenever they make a purchase. This is summarised in figure 2. The model implies that customers pass through all of the stages in every purchase.
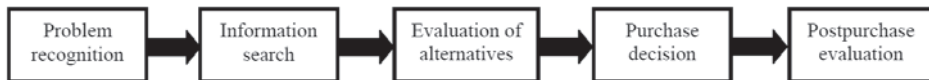

Figure 2. Consumer Buying Decision Process
Source: Furaiji F., Łatuszyńska M., Wawrzyniak A., 2012, p. 80.

Consumption has always been gendered. Most of the products made these days have a specific gender type, some have masculine features and some have feminine features ascribed to them. Products' genders are created and sustained by marketers. Different researches suggest that shopping is a more exciting activity for women than for men. Female consumers feel more independent when they do shopping in accordance with men. Another evidence that men and women present differentiation is that women consider shopping as a social need whereas male consumers pay importance to main function of a product instead of a secondary function. Gender plays an important role in the consumer behaviour because the differences between menand women about expectation, want, need, life-style etc. reflect to their consumption behaviour (Bakshi S., 2012, p. 5). Men and women due to their different upbringing and socialization along with various other social, biological and psychological factors depict different types of behaviour in various situations.

Men and women traditionally approach the purchase decisions very differently. The dissimilarity results from men and women wanting different things being an effect of a buying decision. Women look for satisfying long term needs and wants while men are short-sighted and look for satisfying immediate or short term needs and wants (Baker, 2012). Traditionally, the purchase decision is to move from customer's awareness to interest in purchasing and finally narrowing of options (Kraft and Weber, 2012).

As per a research by Davis and Rigaux (1974) women were found to be dominant during the problem recognition and information search stage for "traditional" female products like home furnishing, appliances, cereals etc. whereas their husbands were found to be more dominant in the information search stage for male

dominated products like cars, TV sets, etc. Gender was identified as a factor influencing information search and other meaningful consumer behaviour constructs. Several broad advertising implications follow the observed gender differences. The specialized hemispheric processing by males suggests that they might benefit from nonverbal reinforcement (e.g. pictures, music etc.) of the verbal product information contained in an advertisement. On the other hand, the more integrated and symmetrical processing by females suggests that verbally descriptive messages might be more useful for such an audience. The rather strongly held gender identities suggest that appropriately targeted gendered advertisements might be quite effective, especially in cultures where there is a strong gender role prescription (Putrevu 2001).

Male and female consumers evaluate messages in advertisements differently. The selectivity model by Joan Meyers-Levy suggests that men and women should exhibit different searching patterns. Men will tend to go to the most salient cue while women will tend to comprehend all information available (Haas, 1979; Meyers-Levy and Maheswaran,1991), females are more subjective, intuitive, comprehensive, and relational processing while men are more logical, analytical, selective and item-specific processing. Males' selectivity and item-specificity predict that they may search less comprehensively than females and focus on certain information sources and topics. When it comes to decision making, women use other people's opinions to help make their own decision while men use other people's decisions to help them form their own opinion.

Additionally, previous researches have shown that though gender plays a vital role there are differential gender roles across products. As it was mentioned above, Davis and Rigaux (1974) did research on the study of family decision-making roles. They found out that the roles and relative influence of men and women differed basing on a decision-making stage and product type. Further, Belch and Willis (2002) argued that the purchase decisions related to the household items such as cars, TV sets and financial services are moving from being primarily male dominated to joint decisions. This may be due to the rising education level and increasing in the number of working women. Studies show that the household decision-making areas that were once dominated by one gender were also becoming more influenced by the opposite gender (Bakshi, 2012).

In conclusion, prior studies provide convicting evidence that the consumers' decision-making styles varies by genders. However, none of these studies have focused on male and female consumers in Iraq. The authors believe that male and female consumers in Iraq may also have certain distinctive characteristics in terms of their decision orientation towards shopping and buying that could be of equal interest to both researchers and marketing practitioners. This study fills this gap by studying the differences in decision-making styles based on gender in the Iraqi context.

THE METHODS USED AND THE PROPOSED RESEARCH PROCEDURE

One of the basic groups of methods allowing study on the analysis of the consumers' behaviour are surveys. Literature and practice distinguish three elementary kinds of surveys: secondary survey based on secondary sources, and survey research and experimental survey both based on primary sources (a wide overview of the methods of gathering data from secondary and primary sources is included in the works of: Kaczmarczyk, 2003; Kędzior et al., 2005; Pfaff, 2010). The methods of surveys vary in the level of anonymity and control. The review of literature made by the authors shows that the most common method of gathering data in the customers' behaviour studies is questionnaire study (Burns, 2000; Lancaster, 2005; Kaczmarczyk, 2003). This is the reason why the authors decided to choose this method.

Unfortunately, the data from questionnaires cannot provide direct information that could be used in the process of the analysis of the consumers' behaviour. In such a situation, usually a statistical analysis of raw

empirical data is made and on the basis of it, it is possible to state whether there is any relation between the variables and how strict this relation is. The regression and correlation analysis is one of the most important and commonly used statistical techniques. It is a tool that precisely determines the relations between variables. However, it is essential to pay attention to the fact, that numerical stating of existing relations does not always mean the existence of cause and effect relation between variables (e.g. repeatedly mentioned in the literature on the subject studies of the apparent correlation between the number of occupied stork nests and the number of births in the given area). Co-occurrence of two phenomena can also be a result of being directly influenced by yet another, third phenomenon.

As it shows, the usually used static analysis does not allow full study of cause and effect relationship, which is essential in searching for the rules of behaviour. This is why there is a need to find another methods which would fill the gap. One of such methods is a rough set theory. The rough set theory may be an appropriate tool to process the survey data about the decision rules and types of behaviour of various consumers (Vindigni et al., 2002; Cui, 2009).

The rough set theory was proposed by Zdzisław Pawlak in the beginning of 1980s' (Pawlak, 1982). Since then, it has been developed for many years by the author and other researchers, being the basis of different methods and information tools which enable, among other things, induction of decision rules or reduction of data. The theory of rough set has gained huge popularity and is currently used in: data exploration and knowledge discovery, complex classification tasks, and computer systems of decision support. Areas to which the theory has been applied are, among others: medicine, pharmacology, finances and marketing (above all including the market research), production management, signal and image processing, speech recognition, linguistics, artificial intelligence, chemistry, sociology. The usage is accompanied by the systems and modules. A detailed study of both theoretical background and the list of the usage of the rough set theory can be found in (Komorowski et al., 1999).

Popularity of this method was caused by many factors. Above all, the rough set theory together with algorithms that use it allow to analyse large data sets and this enables reduction of a set of features describing objects to the necessary minimum (so called attributes set reduct), deleting inconsistent data, if there are such, and generating the, so called, minimal rules, which means simulating the behaviour of an expert in a given area, who would usually be able to present his or her knowledge as such rules (using if ... and ... then... structure). Advantages of the theory of rough set are as follow: it does not demand data assumptions (for example probability or fuzziness), it includes fast algorithms for data analysis, it simplifies the process of results interpretation, and it is characterized by considerable mathematical simplicity (Pawlak, 2004).

Because of the above features, this theory may also be applied to marketing research. The last few years resulted in many scientific publications about the usage of the rough set theory in the analysis of consumers' behaviour, for example: Cui (2009), Hyuang (2010), Liou and Tzeng (2010), Ogino et al. (2010), Shibata (2010), Furaiji and Wąsikowska (2012). Preference studies are currently the major area of interest for the researchers in economy and management. These are the basic category of research in modelling the consumers' behaviour in the marker, taking into account the rationality of decision-making.

In order to analyse the data using the rough set method, the data gathered by a researches during, for example, the survey must be recorded in the form of so called primary decision table (see figure 3). A decision table is an ordered five $T=(U, Q, D, V, f)$, where D is a set of characteristics (attributes) of decision-making, U is a set of objects (examples) and is called the universe, Q is a set of characteristics (conditional attributes), $V=U_q \in Q$ and V_q is a set of all possible values of attributes, and f: $U \times Q \rightarrow V$ is a function of information (Rutkowski, 2005). Representing data in a table has two basic features: universality, which means that is allows gathering and restoring various data, and efficiency, which means that is allows to easily analyse such data in a computer. Data gathered in the primary decision table are analysed according to such steps:

a) discretisation (encoding) data,

b) studying the importance of particularconditional attributes,

c) reduction of space of conditional attributes (detecting redundant attributes),

d) construction of the rules base,

e) rejection of conflicting rules,

f) simplification of remaining rules (combining similar rules),

g) assessment of quality and accuracy of the received rules,

h) record of the rules in the linguistic form (decoded).

The record of the received rules in the decoded form makes them easy to understand for a decision-maker, who, on the basis of those rules, is to make a decision concerning, for example, the marketing strategy of a company. The rough set method can successfully be applied to practise as an effective analysis tool.
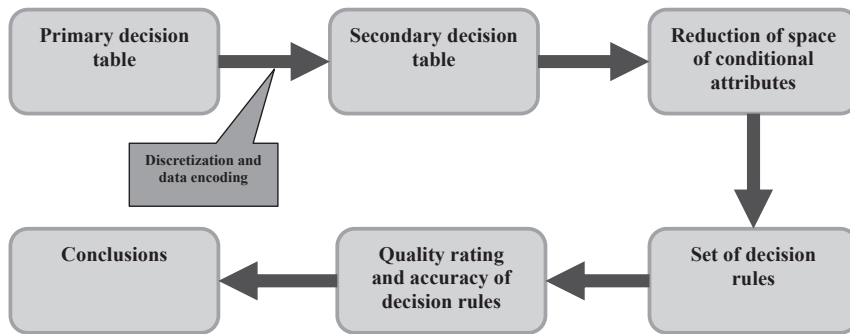

Figure 3. Steps of rough sets modelling
Source: own elaboration based on Wawrzyniak A., 2010.

For the purpose of carrying out the study on the influence of advertising attractiveness on the purchase decisions of women and men, the authorial research procedure has been developed. This procedure proposes usage of the rough set theory in setting the rules of consumers' behaviour. The procedure consists of the following steps:

1. Analysis of historical data concerning the consumers' behaviour in purchasing electrical devices (surveys and static analysis),

2. Construction of the base of consumers' behaviour rules with the usage of the rough set theory,

3. Formulation of conclusions on the basis of the analysis of the rules base.

THE RESULTS

The article presents the method of applying the rough set theory to the analysis of women's and men's preferences in purchasing electrical devices for their households and the influence of advertising on the decisions concerning the purchase of those devices. The empirical data, crucial for the study, were gathered through surveys. The survey, conducted in December 2011 in Basra (city in the southern Iraq), resulted in 174 correctly filled questionnaires (out of 200 sent ones). The poll included 5 questions concerning age, sex, education, income and the number of people in the family of each respondent and 44 questions concerning

the purchasing preferences connected to buying home appliances. The last question concerned the issue of advertising attractiveness being the significant factor in purchases made by a respondent (Likert scale: A1 – totally disagree and disagree, A2 – fairly, A3 – agree and totally agree) and whether it is a decisive attribute. The gathered data were collected in the form of a primary information table (Table 2).

Table2

A fragment of the primary information table

	Sex	Age	…	Question 1	Question 2	…	Question 43	Decision attribute
p1	female	18-24	…	fairly	totally disagree	…	totally agree	fairly
p2	female	45-54	…	totally agree	totally disagree	…	totally agree	disagree
p3	female	18-24	…	totally agree	disagree	…	agree	totally agree
p4	female	18-24	…	totally agree	totally agree	…	totally agree	agree
p5	female	18-24	…	totally agree	agree	…	agree	fairly
.	.	.	.	.	.	.	.	.
p170	male	25-34	…	totally agree	agree	…	totally agree	totallyagree
p171	male	45-54	…	totally agree	disagree	…	agree	agree
p172	male	35-44	…	agree	agree	…	fairly	fairly
p173	male	35-44	…	totally agree	totally agree	…	agree	disagree
p174	male	35-44	…	totally agree	totally agree	…	agree	disagree

Source: own elaboration

In the next step, in accordance with the theory of rough set, the data collected in the primary information table went through the process of discretisation and encoding, as a result of which the secondary information table was made (Table 3).

Table 3

A fragment of the secondary information table

	Sex	Age	…	q1	q2	…	q43	d
p1	F	v1	…	A2	A1	…	A3	A2
p2	F	v4	…	A3	A1	…	A3	A1
p3	F	v1	…	A3	A1	…	A3	A3
p4	F	v1	…	A3	A3	…	A3	A3
p5	F	v1	…	A3	A3	…	A3	A2
.	.	.	.	.	.	.	.	.
p170	M	v2	…	A3	A3	…	A3	A3
p171	M	v4	…	A3	A1	…	A3	A3
p172	M	v3	…	A3	A3	…	A2	A2
p173	M	v3	…	A3	A3	…	A3	A1
p174	M	v3	…	A3	A3	…	A3	A1

Source: own elaboration

Such pre-prepared data was analysed by the method of rough sets, using the program DAT (Data Analysis Toolbox) operating in MATLAB R2010a. First, an analysis of the data on the buying preferences and the influence of advertising attractiveness on the purchase decisions of women were made, and then of men. In both cases, the introductory analysis was made according to the following steps:

defining elementary sets (sets of examples including the same values of conditional attributes),

defining decisive concepts (sets of examples including the same value of decision)

an attempt to reduce the sets of conditional attributes in both a relative and absolute way.

As a result of the survey, two reducts were obtained. The first reduct is a set of conditional attributes which have the biggest influence on the purchase decisions of women. The second reduct includes those attributes which have the biggest influence on the purchase decisions of men. Both reducts are presented in table 4 together with the significances of particular conditional attributes.

The next step was to approximate the set, meaning determining the lower and upper approximations, boundary, and the positive and negative regions of the set (detailed explanation of this notions and suitable formulas may be found in the works of (Piegat, 2005/2006; Rutkowski, 2005; Mrózek and Płonka, 1999; Wąsikowska 2007).

Table 4

Significance of conditional attributes included in the reducts

Reduct 1	
Attribute	Significance
q36 – I prefer to purchase expensive electrical appliances	0.414
Age	0.329
Income	0.314
q6 – I prefer brands that offer a variety of models and appliances	0.157
Reduct 2	
Attribute	Significance
Income	0.231
Age	0.221
q6 – I prefer brands that offer a variety of models and appliances	0.125
q24 – I prefer to purchase the electrical appliances in response to opinion leaders	0.125
q27 – I prefer to purchase electrical appliance that have specific color and shape	0.106

Source: own elaboration

On the basis of the results, the factor of approximation quality gamma, was calculated. It informs about what percentage of the analysed examples and conditional attributes allow determining certain rules. Approximation quality of the set F is expressed by the following formula:

$$\gamma_{\tilde{Q}}(F) = \frac{card(Pos_{\tilde{Q}}(F))}{card(U)}$$

,

where the numerator includes the number of examples in the positive region of the set, and the denominator includes the number of examples in the whole universe of the set. In this case the value of gamma was 0.97, which means that on the basis of 97% of the examples gathered in the table, we can obtain results, which

are in 100% certain. As a result of the further analyses two decision tables were made, containing: 64 rules describing the purchasing preferences of women and 99 rules describing the purchasing preferences of men. In the next step thesimilar rules were simplified and the rules applicable to the biggest number of cases were chosen (Table 5).

Table 5

The attributes and the chosen rules of a decision algorithm

Conditional attributes:
Sex: female, male
Age: v1 = [18-24], v2 = [25-34], v3 = [35-44], v4 = [45-54], v5 = [55 and more]
Income: v1 = [below 500 euro), v2 = [500-1100 euro), v3 = [1100-1600euro), v4 = [1600-2000), v5 = more than 2000 euro
Education: v1=didn't get education, v2=primary, v3=medium, v4=secondary, v5=higher
Decision attribute:
A1 = totally disagree or disagree, A2 = fairly, A3 = totally agree or agree
Rules for women:
If sex = F and age >= v1 and education = 3and income <= v3 thend = A1 If sex = F and age=v1 and income=v2 and q6=A2 or A3 and q36=A1 then d = A2 If sex = F and age >= v3 and education >= 4 and income >= v3 then d = A3
Rules for men:
If sex = M and age=v5 and income=v5 and q24=A1 and q27 = A3 then d = A1 If sex = M and age=v2 and q27 = A3 then d = A3

Source: own elaboration

The thoughts presented in the article allow to formulate a conclusion that in Iraq advertising attractiveness has a significant influence on the decisions concerning the choice and purchase of electrical home appliances made by women aged over 45, with at least secondary education and high or very high income. Such people willingly buy appliances that are advertised.

Another conclusion is that for women aged over 35, who ended their education in the middle school and have an income below 1600 euro advertising attractiveness does not matter in the purchase decisions concerning the purchase of electrical appliances.

A similar situation occurs in the case of young women (aged from 18 to 24). Although this group of women prefers expensive home appliances, due to their low income they do not buy them and as a result do not pay any attention to the advertisements of such products (attractiveness of this adverts has no significance for them, they are indifferent to them).

In the case of men, aged over 45, having income above 2000 euro, their purchase decisions in purchase of electrical appliances are influences not only by advertising attractiveness but also by recommendations and suggestions of opinion leaders. Whereas for men aged from 24 to 35, apart from advertising attractiveness, it is also significant to have a possibility to buy a particular appliance in a concrete colour or shape.

CONCLUSION

This research contributes to the understanding of the consumer's buying behaviour in the electrical appliances market.The research problem was to study the influence of advertising attractiveness on the pur-

chase decisions of women and men. But for properly organised surveys, it was possible to gather appropriate data, which was applied to generation of the rules of consumers' behaviour using the theory of rough set.

Research shows that even in the same group of customers, differences abound that make marketing to men and women another factor to consider. These differences require that the company define their target marketas men, women or both. They must define the market in order to better understand how to communicateeffectively with them. The companies need to focus on how the markets differ between men and women. It is vital that a company considers how each gender will perceive theirmarketing message. These perceptions determine if the potential customer will even consider the product in apurchase decision (Kraft and Weber, 2012).

FUTHER RESEARCH

The analysis, described in the article, helped authors to identify several promising directions for future research. The primary goal of this future research will be to develop methodological bases for the consumer's behavior analysis using Multi-Agent Based Simulation (MABS) and simulation tests using the developed methodology. As a result of the research, they plan to develop a computer simulation model that will allow to investigate male and female consumer behavior. The simulation model of the electric appliances market will be elaborated with a multi-agent approach.

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