

Factors influencing consumer behaviour

Faktory ovlivňující chování spotřebitele

J. STÁVKOVÁ, L. STEJSKAL, Z. TOUFAROVÁ

Faculty of Business and Economics, Mendel University of Agriculture and Forestry, Brno, Czech Republic

Abstract: The main aim of the article is to understand the influence of factors biasing purchase decisions connected with measurement of consumers' involvement. Consumption expenditures are purposefully subdivided according to the classification made by the Statistical Office of the European Communities. The performed survey showed that the most important factors biasing purchases of all commodity groups are products' characteristics and the perceived quality. Together with these goes the factor price, nevertheless for example for the commodity group health price did not appear in the scale of the perceived importance at all. Factor necessity of need proved to be significant for decision making about the purchase of all commodities with the exception of alcoholic drinks and tobacco and recreation. Former experience compared to that is not crucial for clothing and footwear and housing equipment and contents. For alcoholic drinks and tobacco, there has notably approved also the factor brand. These analyses enable disclosure of rules of consumer decision making and thereby definition which factors for individual commodities should be targeted by the help of the marketing doyens or where the gradual changes should be achieved.

Key words: consumer behaviour, purchase decision making, commodity groups, interference factors

Abstrakt: Článek se zabývá spotřebitelským chováním z pohledu subjektu provádějícího jednotlivá nákupní rozhodnutí, tedy spotřebitele, případně jeho domácnosti. Spotřební výdaje jsou účelově členěny podle klasifikace vytvořené statistickým úřadem Evropské unie pro zajištění transparentnosti mezinárodních srovnání. Navazuje vymezení faktorů ovlivňujících spotřebitelská nákupní rozhodnutí u jednotlivých komoditních skupin. Hlavním cílem příspěvku je sledování vlivu těchto faktorů podle míry angažovanosti spotřebitele. Z šetření vyplynulo, že nejdůležitějšími faktory pro všechny skupiny komodit jsou vlastnosti a kvalita produktu. Společně s tím je významným faktorem cena, ale například pro skupinu komodit zdraví, léky a vitaminy se cena ve stupnici vnímané důležitosti vůbec neobjevila. Faktor nezbytnosti potřeby se projevil jako relevantní pro rozhodování u všech komodit s výjimkou alkoholických nápojů a tabáku, rekreace a kultury. Dřívější zkušenost oproti tomu není rozhodující u odívání, obuvi i bytového vybavení a zařízení. U jedné komodity – alkoholické nápoje a tabák – se jako významná projevila i značka. Analýza umožnila odhalit pravidla rozhodování a tím definovat, které faktory pro jednotlivé komodity pomocí marketingových manažerů posilovat nebo jak postupným působením dosáhnout změny.

Klíčová slova: spotřební chování, nákupní rozhodnutí, skupiny komodit, ovlivňující faktory

Consumer behaviour research enables better understanding and forecasting not only of the subject of purchases but also of purchasing motives and purchasing frequency (Schiffman, Kanuk 2004). One of the present fundamental presumptions for the consumer behaviour research is the fact, that people often buy products not because of their main function but for their subjectively perceived value. It does not mean

that products' basic function is not important, but that the today's role of product exceeds its service limits (Salomon 2004). Even more often consumers do not rate products according to their cores (it means the main the main utility provided) but above all according to so-called real product (it means the particular products' qualities) and the extended product, which represents the set of intangible factors bringing the

Supported by the Ministry of Education, Youth and Sports of the Czech Republic (Grant No. MSM 6215648904).

demanding perceived advantage to consumer – image, consultancy, after-sale service and other (Foret, Procházka 2007).

Trommsdorff (2002) however warns of that there are no activities more important for the consumer behaviour research, connected with consumption, than the personal characteristics. According to him the term “consumer” (Konsument) is being used instead of a more accurate one “target customer”, and also the term “consumer behaviour” (Konsumentenverhalten). This conception causes problems afterwards because it must comprehend more personal roles – decision maker, buyer and consumer.

Except the conventional conception of consumption being the only instrument of the basic needs’ satisfaction, Solomon (2004) identifies another four different types of consumers’ activities:

- consumption as an experience (emotive or aesthetic reaction to product consumption),
- consumption as an instrument of integration (usage and consumption of the product integrates us somehow to the society),
- consumption as a classification scale (choice of products influences the way how we are perceived by our environment and how we are ranged in the society),
- consumption as a game.

There are a lot of factors influencing consumer by decision-making process. The literature classifies and structures these factors in various ways. For example division into inner and outer factors (Koudelka 1997), distinguishing three basic categories: *personal, psychological and social factors* (Brown 2006), to which Kotler (2001) adds the *cultural factors* as the independent category. The next group of factors can be labelled as *situational factors*, it means factors forming the environment of the concrete decision-making situation. Because the subject of the analysed inquiry are factors belonging to groups of personal, psychological and situation factors, in the hereafter text the attention is devoted only to them.

As a **personal factors**, there are referred the ones unique for each consumer. Above all data like age, sex, place of domicile, occupational and economic conditions, personality and self – consciousness can be found here (Horská, Sparke 2007)

Psychological factors include motivation, perception, skills and knowledge, positions, personality, style of life (Brown 2006).

Perception means the adaption of reality. The process of selection, processing and interpretation of input data from the environment to make them purposeful (Brown 2006).

Personality is created by inner characteristics and by behaviour. This makes a person unique. Personal characteristics influence the way how people behave. It is, however, difficult to find a reliable connection between the individual personality and the behaviour type.

Consumers’ *skills and knowledge* are connected to learning and predestinate changes of behaviour. Therefore to cause changes of consumer behaviour concerning the concrete product, it is necessary to give the adequate information. Learning process can come through a simple association between the impulse and the reaction to it, or through the complicated set of rational activities.

Motive means the inner driving force that orients human/consumers’ activities towards meeting the needs or achievement of the definite aim. In every decision-making process several motives play a role, not only one. In case of need of measuring or analyzing, there is one questionable thing that motives often work only on the subconscious level (Brown 2006).

Knowledge and positive or negative feelings influence humans’ perception and consequently decision making and behaviour. People learn their bearings through experience and interaction with other people. The eventual changes of positions are conditioned by consumers’ personality and his style of life. Consumer generally refuses information that is in conflict with his positions, eventually he modifies them to reach correspondence.

Situational factors can notably influence purchase decision. Social environment, physical environment of the purchase place, time influences and the previous states fall into this group. (Berkowitz et al. 1992; Vysekalová 2004; Nagyová 2001a).

Consumers’ decision includes the product (brand) selection from the set of possibilities.

Understanding consumers’ decision making includes clarifying answers to these questions:

Which products (brands) are considered at the selection?

What information is being used to compare the products (brands) with one another?

How are these information used?

Selection based on stimulation means selection whereat we can directly compare products, because they are being kept at one’s disposal. Selection based on memory means selection whereat we do not have the possibility to directly compare products.

Sometimes purchasing public prefers a simple decision making process instead of the complex solution. Decisions are then made only on the basis of a few criteria. Instead of comparing more characteristics, consumer e.g. decides after price criteria (he comes

out from the presumption that a higher price means also higher quality).

There is quite a number of other heuristics, except the above mentioned relation price – quality. Strategies based on positions are called the compensatory strategies, which means that good attributes may compensate worse ones. They suppose that the product/brand associated with mostly favourable positions will be chosen. The application of heuristics based on positions requires a fractional effort.

If consumers have not created an attitude towards certain products or brands and are not motivated or able to create their positions, they derive benefits from the decision-making strategy based on the attributes of products or brands. These heuristic strategies are not compensatory because a high score of one attribute cannot compensate a low score on other characteristics. It means that every attribute is compared separately and compromises among the single attributes stay out in consideration.

Lexicography heuristics includes the selection of the best brand/product on the basis of its most important attribute.

Lexicography multilevel heuristics issues from a similar principle but at the juxtaposition, however, it is taking score in the definite dull interval as a draw and survey on other characteristics.

Connecting heuristics includes setting of the minimal acceptable level for each attribute and the choice of first option that meets these minimal levels in all characteristics. Other options then already are not considered.

The influence over the approach to solving of the given situation and purchase decisions is exerted also by the variables like involvement and responsibility. Involvement depends on personal significance or the importance given to the decision, the responsibility reflects need to explain or vindicate our decisions before other people. Both these variables escalate motivation to make a good decision, even if it requested bigger effort and more time. Therefore at the low level of involvement we use rather the easier selection heuristics.

The content of this paper is in understanding of the influence of the surveyed factors coming out of measurement of consumers' involvement (purchase behaviour types: routine or habit based, limited, extensive or impulsive), for individual kinds of commodities. This will contribute to a better knowledge of consumer behaviour and the elaboration of differentiated marketing strategies.

The results published in the paper are part of research objective, id. code: 62156 48904 "The Czech Republic in the process of integration and globalization

and the evolution of agrarian and service sectors in the new conditions of the European integrated market", thematic area 03 "The evolution of trade relationships regarding changes in a life style and purchasing behaviour and changes of business environment in the process of integration and globalization" that is conducted with a financial support of the Ministry of Education, Youth and Sports.

MATERIAL AND METHODS

Sources for the analysis of factors biasing the consumer at purchase decision-making process were gained through a marketing survey. The instrument used to collect the primary data was the electronic questioning system RELA (Souček, Pavlíček 2005). This system proved itself to be very efficient especially on the ground that the data were immediately available after the end of survey. This means that no additional data processing or conversions were necessary.

When constructing the questionnaire, all intentions of marketing research were considered. The crucial part of the questionnaires' preparations was the pre-research that acknowledged the correctness of construction and intelligibility for a broad spectrum of informants. The questionnaire survey proceeded, on December 2007 in various areas of Czech Republic, when there were gathered 731 survey results. However, after removing of the invalid data there remained 609 correctly completed questionnaires acceptable to use for analyses. For selection of informants there were not used any restrictive criteria that could concentrate focus only on certain segment.

The aim of survey was to obtain information about the influence by the above mentioned factors at the purchase decision making on consumers concerning various commodity groups. The surveyed factors were: habit and tradition, necessity of need, former experience, recommendation of relatives and friends, recommendation of specialists, product characteristics and parameters, quality, brand, price, discount action, inspiration by an advertisement, endeavour to try out novelties, fashion trend and design of products. Measurement of the interference by mentioned factors at purchase decision making was recorded on 10 point scale where 1 meant no interference and 10 maximum interference. Measure of influence by the mentioned factors encompassed these commodity groups:

- food and non-alcoholic drinks
- alcoholic drinks and tobacco
- clothing and footwear

- health, pharmaceuticals and vitamins
- transport
- post services and telecommunications
- recreation and culture
- education
- boarding and accommodation
- other goods and services

The commodity group “food and non-alcoholic drinks” was analysed from the point of view of the interference by the surveyed factors also in the preceding years 2006 and 2005. This enabled the authors to find out whether the influence by factors changes in time. The survey in year 2005 covered 1074 informants and in 2006 there were 726 informants (Stávková et al. 2007.)

Data evaluation was made by the help of the statistical software STATISTICA Cz 8. The used technique was data classification by the interference measurement.

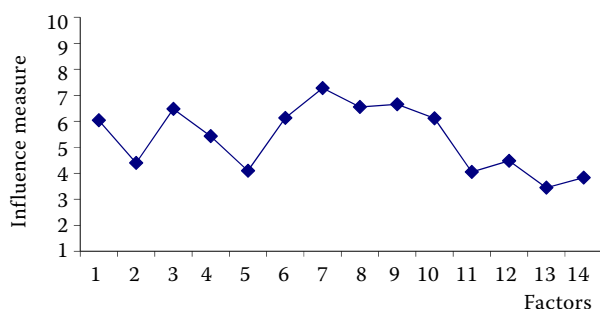


Figure 1. Measure of interference by factors at purchasing food and non-alcoholic drinks

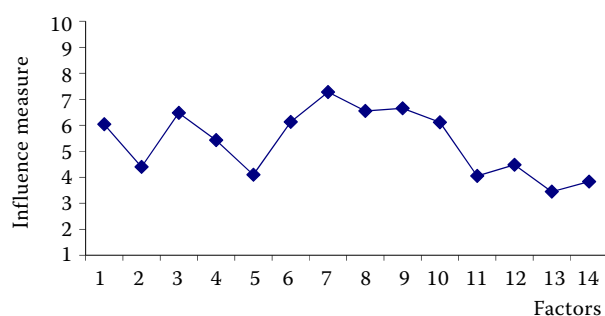


Figure 3. Measure of interference by factors at purchasing alcoholic drinks and tobacco

Explanation for Figures 1–12

Factors: 1 = tradition and habit; 2 = necessity of need; 3 = former experience; 4 = recommendation of friends and relatives; 5 = recommendation of specialists; 6 = products' characteristics and parameters; 7 = quality; 8 = brand; 9 = price; 10 = discount action; 11 = inspiration by an advertisement; 12 = endeavour to try out novelties; 13 = fashion trends; 14 = design of product

RESULTS AND DISCUSSION

The surveyed set of 609 informants consisted of 362 men and 247 women. The prevailing age category was 40–49 years (45%) and 50–59 years (32%). Prevailing social group were employees (60%), then self-employers (25%) and pensioners (10.5%). Other social groups were insignificant. The education level of informants is especially secondary, i.e. apprentice training centres, secondary schools and grammar school (55%) followed by universities (40%).

Food and non-alcoholic drinks

Commodity that fills basic needs to survive represents important expenditure item in households' budget. It represents 13.1% of average expenditures averaged on one households' member (Eurostat 2005).

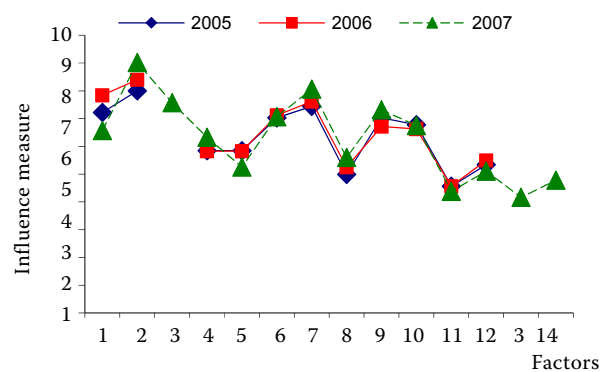


Figure 2. Comparison of interference by single factors at purchasing food and non-alcoholic drinks in years 2005, 2006 and 2007

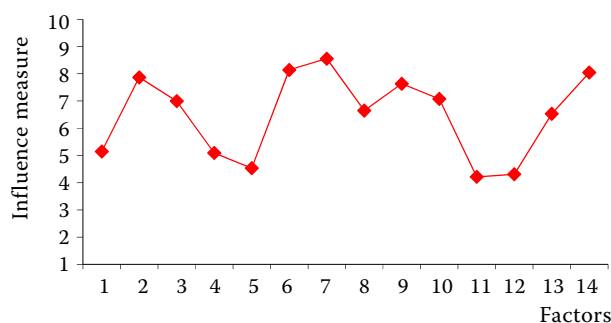


Figure 4. Measure of interference by factors at purchasing dress and footwear

The most important factors at purchase decision making have been identified the necessity of need (9.02), quality (8.06), former experience (7.57), price (7.32) and products' characteristics and parameters (7.07). Decision making then proceeds in accordance with model of routine – habit purchase, whereat change of a decision can be caused above all by change of characteristics and change of products' quality (Nagyová 2001b). Price influences customers' decision making as fourth in order of importance (Figure 1).

Figure 2 shows the records of surveys in years 2005, 2006 and 2007. It is evident that the consumers' views and factors determining their purchases of food and non-alcoholic drinks do not change during the last years.

Decision making at food purchase acknowledges the complexity of factors determining the purchase: consumers' characteristics and external products' characteristics. After the usage of product (typical for food), also the internal characteristics and quality of the product play role.

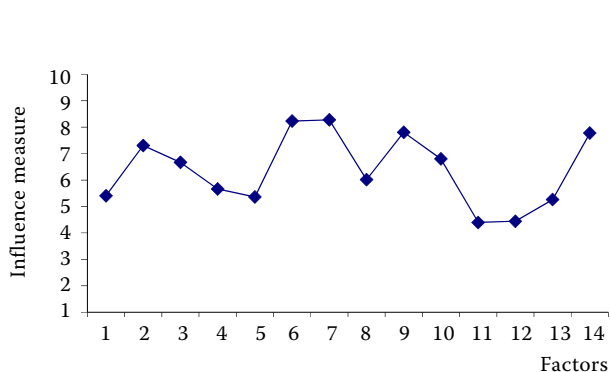


Figure 5. Measure of interference by factors at purchase of housing equipment and contents

For explanation see page 279

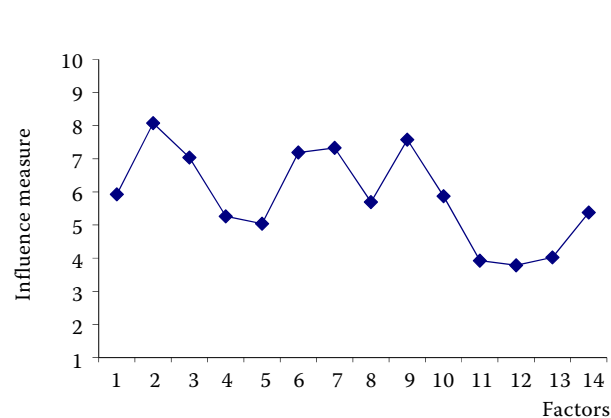


Figure 7. Measure of interference by factors at decision making about expenditures on transport

For explanation see page 279

Alcoholic drinks and tobacco

Alcoholic drinks and tobacco are lined rather to the non-essential goods. They are not among the significant expenditure entries and represents only 3.8% of expenses per one households' member (Eurostat 2005). The most significant factors at decision making about purchase of these commodities are quality (7.28), price (6.65), brand (6.55), former experience (6.48) and products' characteristics and parameters. The special attention has to be paid to the group of informants addicted to these products (Figure 3).

Clothing and footwear

Clothing and footwear are counted to normal goods, they constitute 6.1% of the expenses per one households' member (Eurostat 2005). Purchase decision making is mostly influenced by quality of product

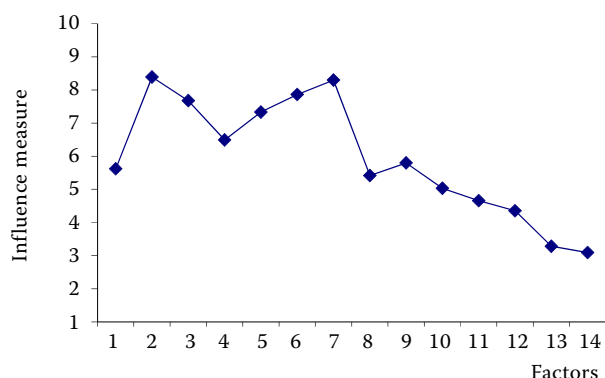


Figure 6. Measure of interference by factors at decision making about health, medicines and vitamins

For explanation see page 279

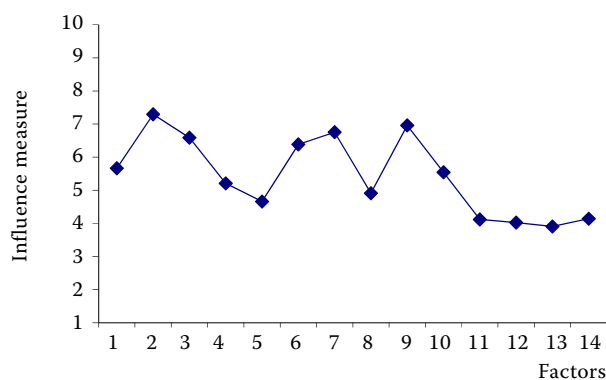


Figure 8. Measure of interference by factors at decision making about expenditures on postage and telecommunication services

For explanation see page 279

(8.55), products' characteristics and parameters (8.14), design of product (8.05), necessity of need (7.87) and price (7.63) (Figure 4).

For this commodity group, there are typical so-called limited purchases which are characteristic by the fact, that the consumer does not know the purchased product, but issues only from a common experience. At the purchase there is supposed a higher level of consumers' involvement and a high measure of interference (by quality, characteristics, design, or price). Chance for the incidence of situation factors.

Housing equipment, contents

Housing equipment and contents represent 6.6% of the expenses per one households member (Eurostat 2005). At the purchase decision-making, the consumer is mostly influenced by quality (8.28) and products' characteristics or parameters (8.23), then price (7.80), design of product (7.78) and necessity of need (7.30).

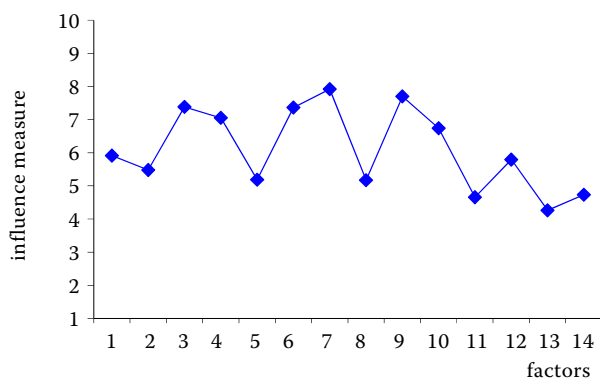


Figure 9. Measure of interference by factors at decision making about expenditures on recreation and culture

For explanation see page 279

It is a commodity with prevailing extensive purchase behaviour with a high involvement of buyers and a high level of the need of information about a product (Figure 5).

Health, pharmaceuticals, vitamins

Health, pharmaceuticals and vitamins constitute 3.5% of the expenses per one households member (Eurostat 2005). This expenditure item, however, gains on importance. Expenses grow on a yearly base, which is proved by the records of the Czech Statistical Office (ČSÚ 2008). The consumer is at decision making about this commodity group mostly influenced by the necessity of the need, i.e. health reasons (8.39), quality of products (8.30), products' characteristics and parameters (7.87), former experience (7.68) and recommendation of specialists- doctors (7.33). The purchase is not limited by price (Figure 6).

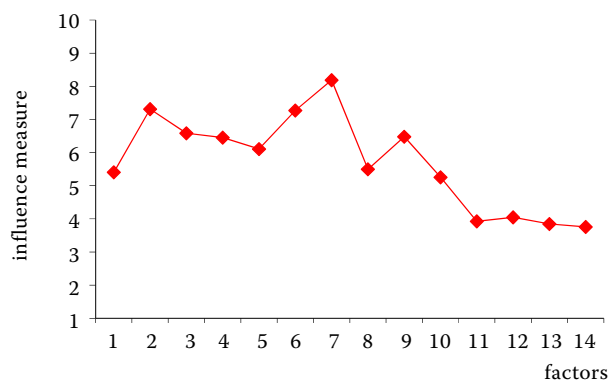


Figure 10. Measure of interference by factors at decision -making about expenditures on education

For explanation see page 279

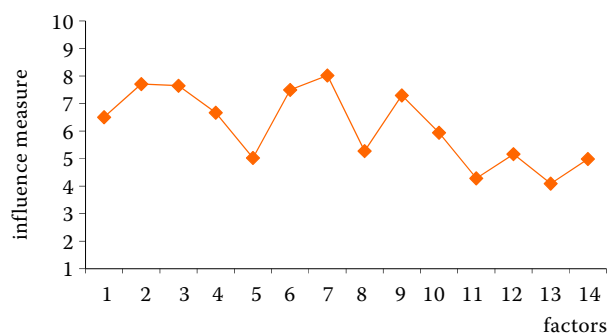


Figure 11. Measure of interference by factors at decision making about expenditures on boarding and accommodation

For explanation see page 279

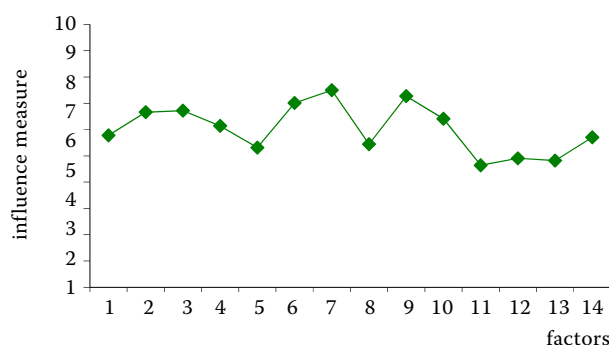


Figure 12. Measure of interference by factors at decision making about expenditures on other goods and services

For explanation see page 279

Transport

Transport constitutes the second most considerable households' expenditure item, it forms 13.5% of the households' expenses. This commodity is ranked among rather necessary goods. Respondents mainly stated that they are influenced by the necessity of their need (8.08), price of transport (7.58) and its quality (7.33), further also products' characteristics and parameters (7.19) and former experience (7.04) (Figure 7).

The most considerable expenditure items are housing, water, energy and fuelling expenditures. This expenditure item was not the subject of investigation and that is why it is not part of the commodities expenditure analyses.

Postage and telecommunication

Nowadays communication services gain on importance. Households' expenditures on this commodity grow. It constitutes 2.8% of the expenses calculated per one household (Eurostat 2005), in the Czech Republic it was even 4.8% in 2006 (ČSÚ 2008). Purchase decision making of informants is mostly formed by the necessity of need (7.29), price (6.96), quality (6.76), former experience (6.59) and products' characteristics and parameters (6.38) (Figure 8).

Recreation and culture

Recreation and culture expenditures constitute 9.4% of the general expenses per one household member. It is necessary to say that this number did not notably change over the last years. It means that the economic development in the Czech Republic did not affect the expenditures on the commodity recreation and culture.

At purchase decision-making, informants were mostly influenced by decision making quality of products (7.92), price (7.70), former experience (7.39), products' characteristics and parameters (7.37) and recommendation of relatives and friends (7.05). Quality and price are decisive with the high measure of consumers' involvement (Figure 9).

Education

Education presents only 1% from the general households' expenses. Consumers are mostly influenced by the quality of education (8.19), realize it is a necessity (7.31), characteristics and parameters (7.27), former experience (6.58) and price of education (6.48). Decision making proceeds according to the extramural purchase model with a high personal involvement (Figure 10).

Table 1. Factors influencing purchase of particular commodities

Commodity/factor	Necessity of need	Former experience	Recommendation of friends and relatives	Recommendation of specialists	Products' characteristics and parameters	Quality	Brand	Price	Discount action	Design
Food, non-alcoholic drinks	9.02	7.57	6.33	5.25	7.07	8.06	5.60	7.32	6.75	4.78
Alcoholic drinks, tobacco	4.40	6.48	5.43	4.10	6.13	7.28	6.55	6.65	6.11	3.83
Clothing and footwear	7.87	7.00	5.09	4.53	8.14	8.55	6.65	7.63	7.07	8.05
Health, pharmaceuticals, vitamins	8.39	7.68	6.49	7.33	7.87	8.30	5.42	5.80	5.03	3.09
Transport	8.08	7.04	5.26	5.04	7.19	7.33	5.69	7.58	5.87	5.38
Post, telecommunications	7.29	6.59	5.21	4.66	6.38	6.76	4.91	6.96	5.54	4.14
Recreation, culture	5.48	7.39	7.05	5.19	7.37	7.92	5.18	7.70	6.74	4.74
Education	7.31	6.58	6.45	6.11	7.27	8.19	5.50	6.48	5.25	3.76
Boarding, accommodation	7.71	7.65	6.67	5.02	7.49	8.02	5.27	7.29	5.94	4.99
Other goods and services	6.66	6.72	6.14	5.31	7.01	7.50	5.44	7.27	6.41	5.70
Housing equipment, contents	7.30	6.67	5.66	5.36	8.23	8.28	6.02	7.80	6.80	7.78

Source: authors' calculations

Boarding and accommodation

This commodity constitutes 9.0% of the consumers' expenses. At the purchase decision making, he is mostly influenced by the quality of these services (8.02), necessity of need (7.71), former experience (7.65), products' characteristics and parameters (7.49) and by price (7.29).

Consumer involvement is ranked among the impulsive or habit-based types of purchase and it is necessary to adapt the used marketing tools to this (Figure 11).

Other goods and services

Purchase expenditures on these commodities constitute 9.9% of all consumers' expenses. Decision making is mostly influenced by the quality of goods and services (7.50), price (7.27), products' characteristics and parameters (7.01), former experience (6.72) and the necessity of need (6.66) (Figure 12).

Factors influencing purchase of particular commodities are shown in the Table 1.

CONCLUSION

The Table 1 mentioned above was constructed for all commodities and all factors placed on 1st to 5th place concerning their perceived importance to purchase decision. The results of the survey and following data processing showed that the most important factors for all commodities are products' characteristics and the quality of product. Along with those factors, there goes the importance of price, although it never appeared on 1st place of importance and for health the price was not among 5 most considerable factors at all.

Necessity of need showed itself like a significant factor to purchase decision making nearly for all commodities with the exception of alcoholic drinks and tobacco and recreation and culture. Former experience is decisive for most commodities with the exception of clothing and footwear and housing equipment and contents.

As to the others factors, there proved itself as significant the design for commodities clothing and footwear and furnishings and household equipment and factor recommendation of relatives and friends for recreation and culture and factor recommendation of specialists for health, medicines and vitamins. For purchasing alcoholic drinks and tobacco, there is notable also the products' brand.

The effected analysis enabled defining of rules for decision making and thereby possibility to define

what factors should be targeted by the help of the marketing doyens.

REFERENCES

- Berkowitz E.N., Kerin R.A., Hartley S.W., Rudelius W. (1992): Marketing. 3th edition, Irwin, Boston; ISBN 0-256-09182-X.
- Foret M., Procházka P. (2007): Buying behaviour of households in the Czech Republic. *Agricultural Economics – Czech*, 53 (7): 318–324.
- Horská E., Sparke K. (2007): Marketing attitudes towards the functional food and implications for market segmentation. *Agricultural Economics – Czech*, 53 (7): 349–353.
- Kotler P. (2001): Marketing management. Grada, Praha, 10th edition; ISBN 80-247-0016-6.
- Koudelka J. (1997): Spotřební chování a marketing (Consumer behaviour and marketing). Grada, Praha; ISBN 80-7169-372-3.
- Nagyová L. (2001a): Faktory ovplivňující proces rozhodovania zákazníka pri kúpe cestovín (Factor influencing the customer decision process when purchasing pasta). In: Zborník s vedeckej konferencii Výživa a potraviny pre tretie tisícročie. SPU, Nitra, pp. 242–245; ISBN 80-7137-847-X.
- Nagyová L. (2001b): Súčasná situácia na trhu potravín a jej dopad na účastníkov marketingové vertikály. In: Zborník vedeckých prac K aktuálnym otázkam v PPok pri vstupe do tretieho tisícročia. SPU, Nitra, pp. 102–106; ISBN 80-7137-878-X.
- Schiffman L.G., Kanuk L. (2004): Nákupní chování (Purchasing behaviour). Computer Press, Brno; ISBN 80-251-0094-4.
- Solomon M.R. (2004): Consumer Behavior. Buying, Having, and Being. Pearson Prentice Hall. Saddle River; ISBN: 0-13-123011-5.
- Souček M., Pavlíček M. (2005): Aplikace dotazníkového systému (Questionnaire system application). In: Zborník vedeckých prac z medzinárodne vedecké konferencie mladých vedeckých pracovníkov a doktorandov Mladá veda 2005: Budúcnosť Európy je v rukách mladých. SPU, Nitra, pp. 1–8; ISBN 80-8069-673-X.
- Stávková J., Prudilová H., Toufarová Z., Nagyová L. (2007): Factors influencing the consumer behaviour when buying food. *Agricultural Economics – Czech*, 53 (7): 276–284.
- Trommsdorff V. (2002): Konsumentenverhalten. Kohlhammer, Stuttgart, 4th edition; ISBN 3-17-017004-X.
- Vysekalová J. (2004): Psychologie spotřebitele: Jak zákazníci nakupují (Consumers psychology: How

do the customers shop?). GRADA Publishing, Praha, 1st edition; ISBN 80-247-0393-9.

Electronic resources

Brown A.: Chapter 6 Class Notes. Available at <http://www.udel.edu/alex/chapt6.html> [quoted 2006-07-05].

Vydání a spotřeba domácností zpravodajského souboru v časové řadě (Expenditures and consumption of households of the controlled sample in time series data). Available at <http://www.czso.cz/csu/>

2007edicniplan.nsf/kapitola/10n1-07-2007-0900 [quoted 2008-04-24].

Europe in figures – Eurostat Yearbook 2004 (2005).

Office for Official Publications of European Communities, Luxembourg, 1nd vyd.; ISBN 92-894-9122-1. Available at http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1334,49092079,1334_49092702&_dad=portal&_schema=PORTAL [quoted 2006-10-10].

Arrived on 13th May 2008

Contact address:

Jana Stávková, Ladislav Stejskal, Zuzana Toufarová, Mendel University of Agriculture and Forestry in Brno, Zemědělská 1, 613 00 Brno, Czech Republic
e-mail: stavkova@mendelu.cz, xstejsk4@mendelu.cz, xtoufaro@mendelu.cz
