

Received: 2019-02-19

Licensed under a Creative Commons Attribution 4.0 International License (CC-BY 4.0)

Accepted: 2019-10-30

Online published: 2019-10-30

DOI: <https://doi.org/10.15414/meraa.2019.05.01.43-52>*Original Paper*

## **Economic aspects of consumers' preferences when buying milk and selected dairy products**

**Dávid Červený\*, Zuzana Bajusová, Lukáš Both, Jana Ladvenicová**

Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Economics, Slovak Republic

### **ABSTRACT**

The Slovak dairy industry brings to the market a wide range of standard dairy products as well as dairy specialties. Consumers' opinions and preferences need to be known to the manufacturers of these products, because through this information they can better understand and meet their demands and requirements. The main objective of this paper is to evaluate selected economic aspects of consumers' preferences in the purchase of milk and certain dairy products. Through the questionnaire survey we obtained opinions of consumers and the existence of relationships between selected economic indicators was verified by method of the  $\chi^2$ -test. This test did not confirm the statistical significance of the analyzed relationship in any formulated hypothesis. As the important fact for producers of milk and dairy products we could state that participants of the questionnaire predominantly prefer quality of a product to its price.

**KEYWORDS:** milk, dairy products, consumer preferences

**JEL CLASSIFICATION:** D40, C12, M31

### **INTRODUCTION**

In general, dairy products are well regarded for their nutritional value. Consumer perception of dairy products is influenced by many interrelated factors but healthiness remains one of the key attributes and values for consumers. Furthermore, contemporary consumers increasingly seek out dairy products with additional health benefits and, therefore, it is essential to explore which attributes are important drivers of food choices and how producers can better respond to shifting consumer values and needs in each dairy product category [6].

World milk production has been growing by approximately 3% per year in recent years. Meanwhile, the demand for milk and dairy products has been growing at an average rate of 4% per year. As a result of the increase in population and per capita consumption, the demand for milk and dairy products worldwide is expected to continue rising. Slow growth in milk

---

\* Corresponding author: Ing. Dávid Červený, Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Economics, Trieda Andreja Hlinku 2, 949 76 Nitra, Slovakia, e-mail: [xcervený@uniag.sk](mailto:xcervený@uniag.sk)

production has been attributed to economic hardships, frequent droughts, extreme temperatures, and climate change [5].

The transformation of the Agrifood industry of developing countries in the 1980s resulted in the formalization of a greater percentage of milk and milk product suppliers. Continuous increase in the demand of milk and milk products, coupled with slow increase in milk production has, however, resulted in vast changes in the dairy industry. The emergence and growth of the informal dairy sector is being witnessed in most developing countries. Small scale businesses, middlemen and milk vendors are taking advantage of the market gap to produce and process dairy products such as fresh milk, yoghurts, cheese, and buttermilk through the informal milk marketing channels [5].

Consumption of fluid milk has steadily declined over the last few decades. Understanding the attributes of fluid milk products that are attractive to specific consumer groups may provide a sound basis for education and marketing to encourage increased dairy consumption and reverse the downward trend. Fluid milk is a product that is often treated as a dietary staple. However, fluid milk sales have decreased significantly in recent years, with a 2.6% decline observed in 2016. Several reasons for the decline have been proposed, such as the growing popularity of milk alternatives, flavor concerns, and shelf-life concerns. Although sales within the fluid milk category are generally in decline, sales of organic milk continue to climb. Dairy is an important part of this movement and is currently the second most purchased organic food category, behind only fruits and vegetables. Relatively few studies have sought to identify and profile the typical organic dairy user. The preference for organic designation in fluid milk is typically linked to increased willingness to pay a premium price. Fluid milk label claims such as pasture-raised and recombinant bovine somatotropin -free designations have been similarly associated with greater willingness to pay by certain consumer groups. With evidence of consumer interest in mind, further investigation and appropriate valuation of different features in commercially offered fluid milk products are essential for milk producers in the modern market [1].

The food industry has a long tradition in the Slovak Republic. It is based on high-quality production, which is guaranteed by strict legislation and belongs to important industries. Very high competition after the accession of the Slovak Republic to the EU, imbalances in agricultural and food aid, financially insufficient investments in innovation and the modernization of the food sector weakened its position within the national economy and agro-food complex. The overall competitiveness of the food industry has been jeopardized in particular by the weak financial flows to the sector, preparation for accession to the European Union, market opening, the emergence of trade chains, uneven prices in the sector and lack of marketing and trade experience. The dairy industry is one of the leading food industry industries. It accounts for more than 18% of the total production and sales of the food industry. The production and sales of the dairy industry are relatively stable in the long term, with the greatest impact on the economy of this sector being the development of raw cow's milk prices on the world and European markets [4].

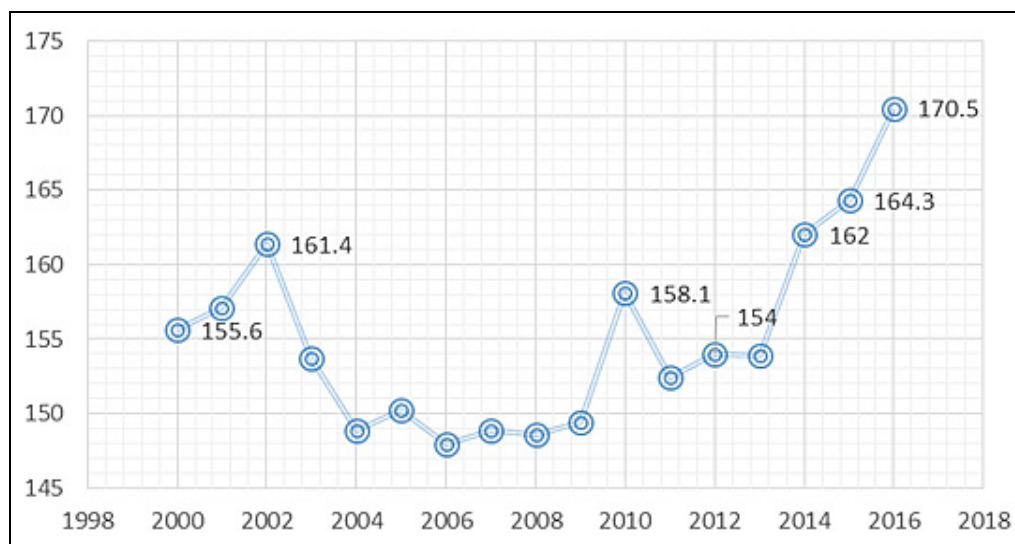
The supply (S) always expresses the relationship between the quantity (Q) of production and the price (P) for which are seller willing to sell. Factors that affect supply:

1. The cost of inputs (production factors) - for the enterprise to produce, it needs a variety of inputs (raw materials, materials, appliances, employee work). If the cost of one or more of

- these components increases, production will be less profitable and the company will offer fewer products. If input prices increase substantially, an enterprise may cease to produce;
2. Technology - is an important determinant of the quantity offered. Using newer technology increases productivity. Reducing business costs contributes to increasing the amount of production offered;
  3. The price of the goods - when the price of goods is high, the sale of goods also increases, because the company offers a large quantity. Otherwise, when the price of the goods is low, the business becomes less profitable and therefore produces less. At an even lower price, an enterprise may decide to end production and its offered quantity will drop to zero. Given that the quantity offered rises and falls together with the price, there is direct dependence between the farm's price and the quantity offered. This relationship is called bid law. If the price of the farm rises, assuming that other factors are constant, the quantity offered will increase [3].

Demand (D) represents the sum of the expected purchase volume and is also determined by the amount (but in this case the demand) and the price at which consumers are willing to buy. We distinguish between these types of demand:

- Total (aggregate) - which is determined by the total volume of production that consumers want to buy and the prices at which they are willing to buy;
- Individual - is the demand of an individual. This means how the consumer spends his / her income on the purchase of different products according to its prices and benefits;
- Market - it is the demand for one product, which represents the expected costs of different consumers [2].



**Figure 1** Development of consumption of milk and dairy products in the Slovak Republic (in liters per capita). Source: [7], own processing

Figure 1 shows that in the monitored period 2000 - 2017 the consumption of milk and dairy products in the Slovak Republic had a fluctuating tendency. At the beginning of the monitored period the consumption of milk and dairy products per capita was 155.6 liters. In 2002 it was 161.4 liters and later declined, down to 148 liters in 2006. From that moment it started to rise up to 158.1 liters in 2010. One year later, it dropped by 4 liters, but from this

year on, we recorded a steady increase in the consumption of milk and dairy products per capita, which reached 170.5 liters in 2017.

## MATERIAL AND METHODS

The aim of the article was to analyze consumer preferences when buying milk and selected dairy products.

In the analysis of respondents' opinions, we set the following hypotheses:

Hypothesis 1: Education of respondents has an impact on the value of expenditures on milk and dairy products in one purchase;

Hypothesis 2: The net monthly income of the household of respondents has an impact on motivational aspects when buying milk and dairy products;

Hypothesis 3: The expenditures for milk and milk products in one purchase are affected by motivational aspects of consumers when buying milk and milk products.

The first part of the questionnaire consisted of 11 questions related to consumer preference and consumer buying behavior. The second part consisted of 9 classification questions concerning the characteristics of the respondents.

The survey was running in February and March 2018. The questionnaire was filled by 251 respondents. In this paper we used following methods and procedures:

- Method of questionnaire – it was used in written and electronic form. This method is important in view of the further analysis of data into MS Excel;
- Graphic analysis – it was used for greater clarity and better reporting ability;
- Descriptive statistics – the tools of descriptive statistics were used for sorting qualitative data.

The result of this process was the pivot table that served as the basis for graphical analysis and testing of hypotheses.

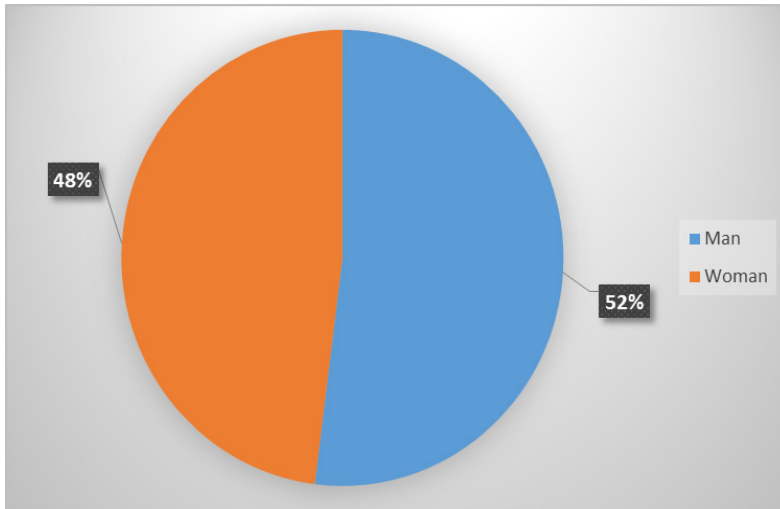
- Testing of statistical hypotheses – it was used a nonparametric test  $\chi^2$  for nominal data; criterion expression is  $\chi^2 = \frac{(E_{ij} - T_{ij})^2}{T_{ij}}$ , where  $E_{ij}$  is empirical abundance,  $T_{ij}$  is theoretical abundance.

## RESULTS AND DISCUSSION

In this part we introduce the characteristics of the respondents who participated in the questionnaire survey as well as the analysis of their opinions.

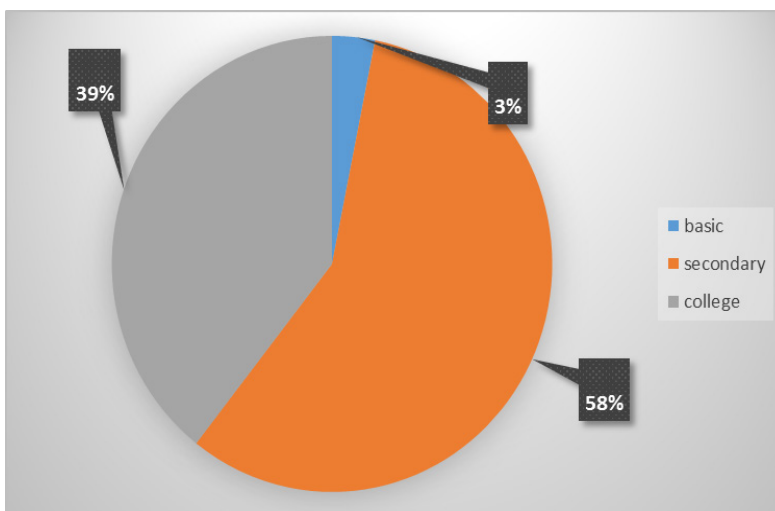
### Characteristics of respondents

The first qualifying question was focused on gender. From all 251 respondents who were interviewed, 130 were men (52%) and 121 were women (48%) (Figure 2).



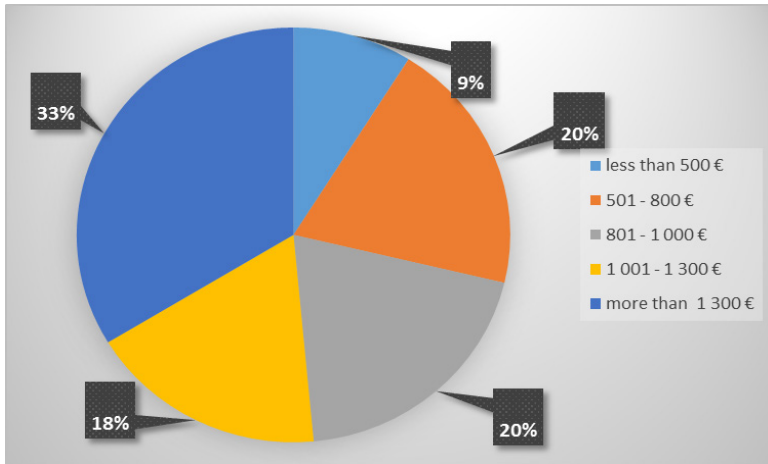
**Figure 2** Structure of respondents by gender. Source: own processing

The second question in terms of the characteristics of the respondents was focused on highest educational attainment of the people who participated in the survey. Figure 3 shows that the highest number of respondents has secondary education, almost 58% of them (142 of the respondents). The college graduates represent 39% (101) respondents. The smallest group was made up of people with only basic education. This group consisted only of 8 respondents.



**Figure 3** Structure of respondents by educational attainment. Source: own processing

Another classification question was the net monthly income of respondents' households. The most numerous were households which net monthly income exceeded 1 300 €, represented by 33% of the respondents, which in absolute terms means 84 interviewees. Figure 4 shows that the largest share, up to 40% is represent by households where the net monthly income is in the range 501 - 800 €. 50 respondents in the survey stated that the net monthly income of their household is 801 - 1 000 €. The next group consists of respondents who stated that the net monthly income of their households is between 1001 - 1 300 €, represented by 18% share (45) of interviewees. The smallest group was made up of respondents whose households had a net monthly income of only 500 €, which is in relative terms 9% represents of all respondents.



**Figure 4** Structure of respondents according to the net monthly income of respondents' households. Source: own processing

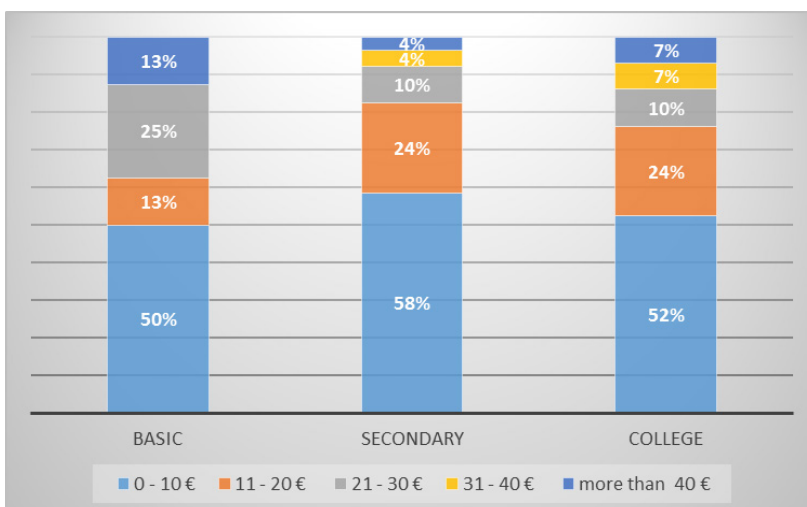
**Analysis of respondents' opinions**

In this part of the article were analyzed the opinions of the respondents regarding to the economic aspects of consumer preferences for the purchase of milk and selected dairy products.

**Question no. 1:**

Estimate the monetary value of milk and milk products bought in one purchase (€)

In this issue we analyzed the relationship between the highest education attained by the respondents and the value of the expenditure on milk and dairy products. We examined the relationship using a square test of contingency. In this case we did not reject the zero hypothesis; which means that there is not statistically significant dependence between the highest achieved education of the respondents and the value of the expenditures on the purchase of milk and dairy products. The calculated value of test criterion is 6.006 and the critical value is 15.507 at chosen significance level of 5%.



**Figure 5** Structure of respondents by education and the value of expenditure on milk and dairy products. Source: own processing

Figure 5 shows that in the category up to 10 €, approximately 50% of people, was doing purchase regardless of the level of education. In the 31- 40 € category, no one with basic education shopped, which is caused by the fact that these group of respondents were involved in the survey at least.

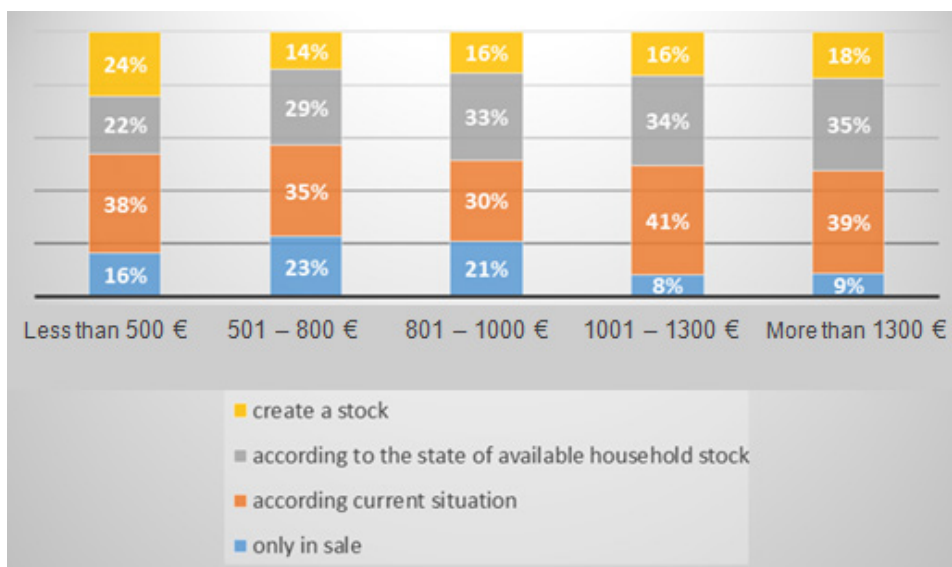
**Question no. 2:**

What are aspects of your motivation when buying milk and dairy products?

In connection with this question, we found the impact of two factors. We analyzed the relationship between the net monthly income of respondents' households and the aspects of motivation that affect the purchase of milk and dairy products as well as the relationship between the aspects of motivation which influence the purchase of milk and dairy products and the expenditures on buying milk and dairy products.

In the case of the first relationship, we can conclude that based on the square test of contingency we cannot reject the zero hypothesis, meaning that there is no statistically significant dependence between the net monthly income of respondents' households and motivating aspects that affect the purchase of milk and dairy products. Value of the test criterion is 16.485 and the critical value is 21.026 at a significance level of 5%.

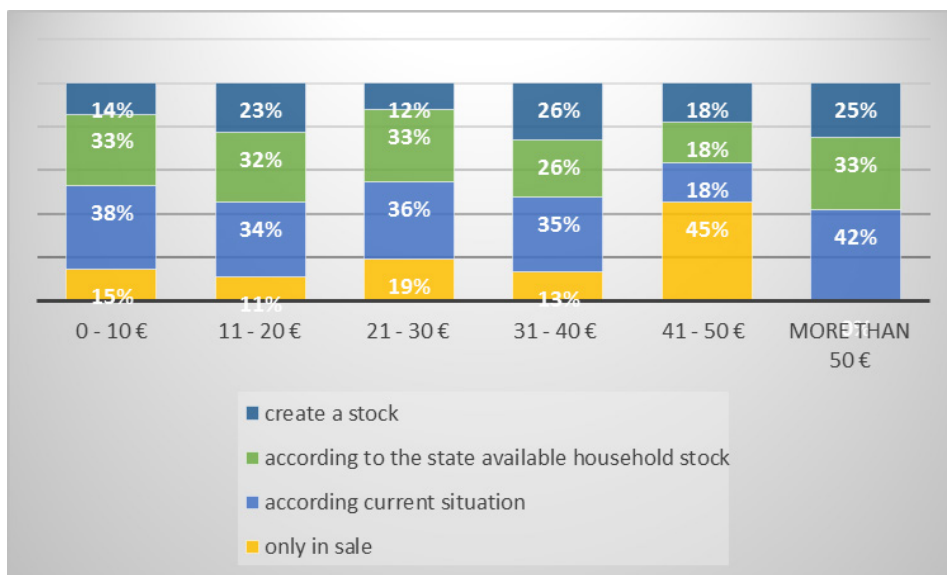
Figure 6 shows that people with an income higher than 1 300 € most often do shopping according to the current situation, or according to the state of household inventory, represented by 39% and 35%. Interesting is also fact, that consumers are also do shopping on the same occasion, are also purchasing consumers, whose income is between 1 001 € and 1 300 €. Equally interesting is the fact that almost  $\frac{1}{4}$  of respondents who said that their net monthly income is lower than 500 € buy milk and dairy products only in sale. In addition, we could see that consumers who have net monthly income in the range of 501 - 800 € (23%) buy exclusively in discount prices.



**Figure 6** Motivational aspects of milk purchase according to net monthly income.  
Source: own processing

In the case of the second relationship (between the motivation aspects of the purchase of milk and dairy products and the expenditures on the dairy and milk purchased) we found, using the same test, that we do not reject the null hypothesis anyway. Conclusion is that there is no statistically significant dependence between the incentive aspects of the dairy purchase and the expenditures on the purchase of milk and milk products because the value of test criterion is 18.013 and the critical value is 24.996 at a significance level of 5%.

Figure 7 shows that people who spend more than 50 € on buying milk and dairy products do not buy in discount prices. On the other side, people spending 41 – 50 € for milk and dairy products, buy mostly in the sale (45%) and the other aspects are at the same level. Consumers spending 0 – 10 € on milk and dairy products most often buy according to their current situation.



**Figure 7** Motivational aspects of the buying of milk and dairy products according to the purchased value. Source: own processing

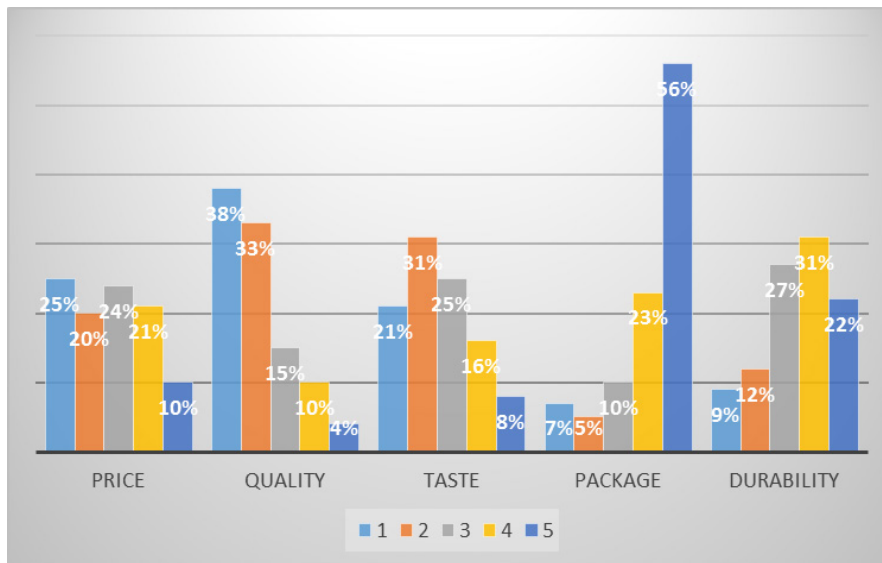
**Question no. 3:**

Sort the following factors according to your decision-making importance (1 - the most important factor, 5 - the least important factor)

The respondents were asked to set the factors that influence them when purchasing this kind of food. Individual factors were price, quality, taste, packaging and durability. Each factor was assigned a point from 1 to 5 depending on the importance. An evaluation of this question can be seen in Figure 8.

Respondents in the survey decided that the most important factor was the quality because 95 consumers identified this as their first choice, representing 38% of the sample of respondents. The second most preferred criterion was the price that was rated as the most important factor by approximately ¼ respondents (64 respondents). A total of 21% of respondents ranked among the taste factors (52 consumers) and 9% durability (22 respondents). On the other hand, up to 56% of consumers chose packaging as the least important factor.





Note: 1 means the most important factor, 5 means the least important factor

**Figure 8** Selected factors in decision of consumers. Source: own processing

## CONCLUSIONS

By analyzing selected economic aspects and consumers' preferences when buying milk and selected dairy products, we found:

1. As the first one we examined the relationship between education and the value of milk and dairy products in one purchase. Dependence has not been confirmed; the education of respondents does not have a significant impact on the value of buying milk and dairy products in one purchase.
2. As the second factor we analyzed the relationship between the net monthly income of respondents' households and the motivational aspects of respondents in the purchase of milk and dairy products. In this case, the dependence has not been confirmed, meaning that the net monthly income of the respondents does not influence aspects when buying milk and milk products.
3. As the third one we analyzed the relationship between the motivational aspects of buying milk and dairy products and the value of purchasing milk and dairy products in one purchase. Even in this case, dependence has not been confirmed.
4. Very interesting finding was the fact that participants of the questionnaire survey predominantly preferred the quality to the price as well as other factors. This finding requires manufacturers to produce quality food as they are nowadays in great demand.

## REFERENCES

- [1] Drake, M. & Harwood, W. (2018). Identification characterization of fluid milk consumer groups. *Journal of Dairy Science*, vol. 101, no. 10, pp. 8860 – 8874. Retrieved 2019-01-25 from: [http://apps.webofknowledge.com/full\\_record.do?product=WOS&search\\_mode=GeneralSearch&qid=33&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=3](http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=33&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=3)
- [2] Horejší, B. et. al. (2008). *Mikroekonomie*. Praha: Management Press. 2008. 574 s. (in Czech).

- [3] Mankiw, G. (1999). *Zásady ekonomie*. Praha: Grada Publishing a. s. 1999. 763 p. (in Czech).
- [4] Ministry of Agriculture and Rural Development of the Slovak Republic. (2014). *Concept of the development of the food industry 2014 - 2020*. Retrieved 2019-01-25 from <http://www.pdbela.sk/DOQ/2.2%20Konceptia%20rozvoja%20potravin%C3%A1rskeho%20priemyslu%202014-2020.pdf>
- [5] Paraffin, A. S. et al. (2017). Household consumption preferences of dairy products and their perceptions of milk safety. *Journal of Food Safety*, vol. 38, no. 2 pp. Retrieved 2019-01-25 from [http://apps.webofknowledge.com/full\\_record.do?product=WOS&search\\_mode=GeneralSearch&qid=8&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=17](http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=8&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=17)
- [6] Sajdakowska, M. et. al. (2018). Importance of Health Aspects in Polish Consumer Choices of Dairy Products. *Nutrients*, vol. 10, no. 8, pp. 12. Retrieved 2019-01-25 from [http://apps.webofknowledge.com/full\\_record.do?product=WOS&search\\_mode=GeneralSearch&qid=1&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=9](http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=1&SID=E5Zq1zvv87JCj5hhWhg&page=1&doc=9)
- [7] *Statistical Office of the Slovak Republic*. Retrieved 2019-01-25 from [http://datacube.statistics.sk/#!/view/sk/VBD\\_SLOVSTAT/ps2041rs/Spotreba%20vybran%C3%BDch%20druhov%20potrav%C3%ADn%20na%201%20obyvate%C4%BEa%20%5Bps2041rs%5D](http://datacube.statistics.sk/#!/view/sk/VBD_SLOVSTAT/ps2041rs/Spotreba%20vybran%C3%BDch%20druhov%20potrav%C3%ADn%20na%201%20obyvate%C4%BEa%20%5Bps2041rs%5D)