Consumer habits of food supplements from the perspective of food safety

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Abstract
The topicality of the subject has been shown by the fact that the number of food supplements has been increasing in the last few years. These products are different from the traditional food products and the risks associated with them may also differ from the traditional food risks. On one hand, the typical food risks still apply; on the other hand dietary supplements can have significant nutritional risks since they contain special ingredients which may be dangerous if they are not consumed properly. Meanwhile, on the market customers are given significant amounts of information about food supplements, but this information sometimes can be misleading and may influence consumer habits.

The aim of our research therefore is to examine the consumption patterns of adult dietary supplements users, highlighting some of the determinants of food safety as well, such as quality, availability of information and risks.

Within the framework of primary research, focus group interviews were conducted and a survey was also used. Based on both the focus group and the survey results, it can be seen that uses of food supplements are judged differently by the respondents.

In data processing, factor- and cluster analysis were used to segment consumers based upon how they consider the use of food supplements. Four homogenous groups were identified among the respondents on the market of food-supplements and the research examined which consumer characteristics were applicable to each group.

Keywords: consumer behaviour, segmentation, information, quality, risk

JEL Classification: Q1, M31

1. Introduction

According to different surveys, in Central Europe the average life expectancy and health condition of people are worse than the average of the EU. Thus, health conscious behaviour and nutrition play an important role in health protection.

As a result of a change in living conditions, people being in constant stress, not doing enough physical activities and living in polluted cities need vitamins, micro- and macroelements with greater effects. Eating habits have changed; there are plenty of ready-to-eat meals that often do not contain necessary nutrients. Nowadays, it is not enough to consume traditional foods only. Food supplements are those products that can supply us with essential nutrients. Customer needs and expectations toward products are changing rapidly. This applies to food supplements as well. These changes should be taking into account in the process of innovation. The most important factor in a successful marketing strategy is the knowledge of consumer and market habits.

1.1 The market of food supplements

In the last few decades there has been a significant change in the use of health care products. The interest towards natural things has increased. Besides, alternative medical trends, methods of
treatment have started to strengthen. It turned out, that herbs, animal and mineral materials are important, not only because they contain necessary nutrients, but also because they have special effects that can be used in disease prevention. Due to this, different types of non-medicine products have appeared all over the world and they have become known as phytoterapical products, functional food or food supplements.

Functional food consumption is increasing in almost all industrialized countries. Interest in functional foods and drinks has been fuelled by a desire for convenience, as well as health. Frewer et al. (2003) pointed out that the development of functional foods will continue to grow in industrialized countries, fuelled by increasing life expectancy, higher prevalence of non-communicable diseases, increasing healthcare costs and the acceptance of the strong link between diet and health. Consumers, however, remain somewhat wary about health-related claims on food and drink products and sceptical of their efficacy. Therefore, success in the functional food market is increasingly dependant on establishing a relationship of trust with the consumer.

In literature, there are many possible definitions for the term 'functional food', but so far there is no global consensus on its meaning. The term was first used in Japan in the 1980's for food products fortified with special constituents that possess advantageous physiological effects. Functional foods may improve the general conditions of the body and decrease the risk of some diseases. The Japanese interest for functional food has brought awareness for the need of such products in places like Europe and the United States. Experts in these countries realised that besides being able to lower the cost of healthcare of the aging population, functional food might also give a commercial potential for the food industry (Siro, 2013). This new category of products also bring science and high technology into everyday life by promising certain health benefits (Niva, 2007).

The definition of food supplements according to European Commission Regulations¹ is: “as an addition to a normal diet, food business operators market food supplements, which are concentrated sources of nutrients (or other substances) with a nutritional or physiological effect. Such food supplements can be marketed in “dose” form, such as pills, tablets, capsules, liquids in measured doses, etc.”

In the last few years the market of food supplements has increased extremely. A general trend can be observed on health market: consumers tend to switch from Rx (medical prescription) to OTC (over-the-counter) products increasingly. Based on a literature review, prospects of OTC market seem to be good in future, however this requires the accurate understanding of constantly increasing consumer demands.

Globally, Western Europe and The United States are the biggest regions of OTC market representing about 43% of the sales in the sector. However, the real drivers of the changes are South-East Asia, Latin America and the emerging countries of Central-Eastern Europe, especially the V4 countries (Figure 1.) As for the yearly change of the expenditure, the most significant development was taken by Russia and Poland (Tisman, 2010).

Tisman (2010) pointed out that growth of almost a quarter in the European OTC market recently had come from innovation. "So innovating to provide better products with additional benefits for which consumers are willing to pay more money is really the key". Tisman advised innovation

should be more than just product development. He emphasized: "the majority of innovations come from line extensions which probably are not adding huge benefits to the consumer". For example, social media is now present in consumers' daily lives, so it should be used better by consumer health care. As well as innovation is dosage or delivery technologies also could add benefits to customers.

Figure 1: OTC expenditures per capita in the European countries, euro

![Graph showing OTC expenditures per capita in the European countries, euro](image)

Source: Tisman, 2010

Siro et al (2013) however emphasized in their study that the development of functional food products is "rather complex, expensive and risky" as special requirements should be answered. In product development, attention should be paid both to consumer demands and technical conditions, as well as the legislation background.

1.1.1 Marketing of food supplements

The food industry is one of the most important branches of the national economies in the European Union, playing a central role for the processing of agricultural raw materials and food supply. In this industry, innovations are recognized as an important instrument for companies belonging to the food industry in order to stand out from competitors and to satisfy consumer expectations (Briagliardi et al, 2013). Markets for this category show intense competition and in order to survive, companies must carefully plan new product processes. This competitive atmosphere suffers from a lack of information and understanding of consumer attitudes and behavior and this could lead to poor market acceptance (Verbeke, 2005).

The number of companies producing and distributing health care products has been continuously increasing. The available range of products is very wide, at rather different price levels. In many cases customers - in the hope of healing - are willing to pay extra for food supplements.

The most frequent forms of advertisements of health care products are: paid advertisements, leaflets, other promotional tools, direct mail, electronic media advertisements, information via Internet, professional events, conferences.
Food supplements can be purchased through multiple sales channels; typical places: pharmacies, drugstores, hiper/supermarkets, shops, Internet, MLM. Among distribution places pharmacies represent the top level of distribution. Network of pharmacies can cover the whole country, they operate under strict regulations with a highly qualified expert team. Pharmacist can give high level of information during purchase and can help with choosing the right and safe product. Drugstore is another important segment of sale where sales staff usually hold a qualification of commerce. In the case of hiper-, supermarkets, it can be a problem that there are no professionals giving information on products. A patient can only rely on her own knowledge.

With the spread of webshops, the range of products that can be purcased on Internet has been expanding. Nowadays, we can easily order food supplements, cosmetics as well as medicines from home. Purchases in other places (MLM, network of brokers, markets, telephone orders), however can be sometimes dangerous. The origin of these products is uncertain, the ingredients are unknown and they usually do not hold an authentic label.

In literature, the research techniques of consumer behaviour have spreaded to most in functional food researches (Gilbert, 1997; Menrad, 2003; Verbeke, 2005). Gilbert (1997) examined the specific demographic segments in her study and their attitudes towards health, nutrition and functional foods. She defined the segment of "Food as medicine" shoppers as the main consumers of functional food. Menrad (2003) studied how knowledge of ingredients influence the acceptance of functional food, and to what extent they are willing to pay price premia.

Childs (2002) described the typical american functional food consumer as: "elite, educated and well-informed". Whereas, Verbeke (2005) describes the typical functional food user as „benefit believers who faced illness among relatives and whose eventual criticism towards functional food information fades away with ageing”.

Wansink et al (2005) examined the consumer behaviour of functional food on the basis of the hierarchy of nutritional knowledge. The first level is: "No knowledge", the second is: "food specific attribute knowlegde", the third level is: "consumption consequences knowledge" and "consumption".

Black and Campbell (2006) asessed the ingredients of functional food consumer behaviour on the basis of food-choice model of Khan (1981). Szakaly et al (2012) revealed the relationship between lifestyle, health behaviour and the consumption of functional food on the basis of Grunert's food-related lifestyle model. By the authors, different lifestyle segments were defined: the rational, uninvolved, conservative, careless and adventurous consumer segments. Among these, consumers with a rational approach provide the primary target group for the functional food market.

2. Data and Methods

To base our research, we used focus group interviews as a qualitative technique. The group discussion was conducted twice - with 6-6 persons in each - to identify trends and patterns in perceptions. The results provide clues and insights as to how a product is perceived by the group (Table 1.).
Table 1: Demographic composition of participants in focus group interviews, person

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Age 18–29</th>
<th>30–39</th>
<th>40–49</th>
<th>50–59</th>
<th>60 yrs +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic level</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Intermediate level</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Higher level</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Own research, 2014

Criterias for participation in the group: the age of 18 or above and earlier experience in the use of food supplements. A total of 12 individuals participated (3 men and 9 women) in the interviews.

In the quantitative technique, online survey was used as the main primer method. 280 survey were sent by email and 104 were successfully completed and returned. The response rate in adult men and women was 37,14% in the research.

The following table shows the definition of target population of the survey.

Table 2: The definition of target population

<table>
<thead>
<tr>
<th>Basic file (population)</th>
<th>Unit of sampling</th>
<th>Geographical area</th>
<th>Period of survey</th>
<th>Sampling frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>The adult population of Hungary (women and men, 18 yrs+)</td>
<td>Individuals</td>
<td>The area of Hungary</td>
<td>August-September 2014</td>
<td>Predefined list of individuals (database with names and email addresses)</td>
</tr>
</tbody>
</table>

Source: Own research, 2014

280 survey were sent by email and 104 were successfully completed and returned. The response rate in adult men and women was 37,14% in the research. As a research tool a standardized questionnaire was applied. Questions were grouped around 4 main topics:

1. Attitudes toward health and healthy lifestyle.
2. Consumer judgement of the use of food supplements.
3. Consumption patterns of food supplements.
4. Factors influencing purchase decision; especially
   • quality;
   • information and
   • risks.

The applied sampling is convenience sampling, thus it may limits generalizibility. The survey was carried out in August-September 2014, in Hungary. SPSS statistical softwer was used for data processing and MS EXCEL for presenting the results.
3. Results and Discussion

Participants in focus group interviews shared similar opinion about health and healthy lifestyle. From the factors that can determine healthy lifestyle, participants emphasized the importance of healthy nutrition. They agreed that in healthy nutrition diversity is the key. Participants also agreed that there can be different situation in life when the use of food supplements is unavoidable.

Data from the survey results show that respondents feel protection of their health is rather important (4.58 average). It can also be seen from the results that consumers pay attention to the quality of food (3.97). They are willing to pay extra money in order to protect their health (3.67) and are willing to apply health care products (3.61). Respondents pay attention to their family nutrition moderately (3.06). Doing regular physical activity usually is not applicable to them (2.30).

As for the motivation of food supplement consumption, the most frequent reason of consumption is vitamin supplement, followed by health protection and than attractive appearance. Treatment of diseases and pregnancy were chosen less by the respondents.

In our paper, we studied the correlation between gender and the motivation factors and we have found that 43.7% of women chose health protection as their main motivation (p = 0.0). Around 41% of men and 33% of women chose vitamin supplement as the reason of consumption. Attractive appearance was chose by 19% of women and only 3% of men. (p = 0.02).

As for the consumption patterns of food supplements, most of the respondents use food supplements seasonally (42%), followed by the customers who consume such kind of products several times in a month (21%). 18% of respondents use the products daily and 11% consume food supplements relatively frequently (3 or four times in a week). Finally, 8% of customers use them once or twice in a week (Figure 2).

Figure 2: Frequency of consumption of food supplements, percent

![Pie chart showing consumption frequency]

Source: Own research, 2014
We examined whether there is a relationship between the different motivation factors and the frequency of consumption. We founded that there is a significant relationship between health protection and the frequency of consumption: those customers, who has choosen health protection as a main motivation, they tend to consume food supplement more frequently: once or twice per day (18%), several times per month (21%) and 3 or 4 timer per week (11%). Those customers who consume food supplements for the reason of vitamin supplements consume these products sesonally; whereas those customers who want to be attractive use the products once or twice per day.

Among factors that influence customer decision making, experience in earlier food supplement consumption received the highest value (4,30), followed by quality (4,28) and price (4,02). Other influencing factors, such as function, manufacturer, safety, taste or brand affect consumer behaviour less (Figure 3.)

**Figure 3: Factors influencing food supplement consumption on 1-5 range scale, based on the average of the answers**

![Figure 3](image)

Source: Own research, 2014

Figure 4 shows the most important sources of information. Respondents believe that the opinion of healthcare professionals (doctors, pharmacists) is the most authentic, followed by sales persons, and then articals and tv/radio programmes connected to the topic. Costumers obtain information from the acquaintances moderately. Examining the question on basis of gender, 94% of women and 56% of men listen to health care professionals completely. Whereas, 44% of men and only 3% of women mostly accept doctor's and pharmacist's advice.
In our research we examined how customers judge the characteristics of food supplements. To measure respondents' attitude we applied a 1-5 range Likert-scale, where "1" means customers strongly disagree with the particular statement and "5" means they strongly agree with the statement. Statements that have received the highest rates are as follows:

Food supplements can be purchased without a prescription (4,63), They play an important role in disease prevention (4,59), They must be applied in specific doses (4,50), They supply improper diet (4,34).

Since respondents had to assess 12 possible answers at this question, in data processing our aim was to reduce the number of statements for easier legibility (Table 3.)

Table 3: Name and contents of the factors, Rotated Component Matrix

<table>
<thead>
<tr>
<th>Name of factor</th>
<th>Factor statement</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
<th>Component 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 – consideration of health protection</td>
<td>K5_1. Food supplements supply improper diet.</td>
<td>0.77</td>
<td>-0.10</td>
<td>-0.02</td>
<td>-0.04</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>K5_2. They play an important role in prevention of diseases.</td>
<td>0.72</td>
<td>0.29</td>
<td>0.17</td>
<td>0.04</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>K5_4. They can be purchased without a prescription.</td>
<td>0.56</td>
<td>0.18</td>
<td>0.45</td>
<td>0.00</td>
<td>-0.05</td>
</tr>
<tr>
<td>F2 – factors of uncertainty</td>
<td>K5_7. You need a lot of inmformation for their use.</td>
<td>-0.21</td>
<td>0.75</td>
<td>-0.06</td>
<td>-0.19</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>K5_8. There is no need for a permission for their distribution.</td>
<td>0.15</td>
<td>0.74</td>
<td>0.29</td>
<td>0.11</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>K5_12. Their unnecessary use can be dangerous.</td>
<td>0.32</td>
<td>0.68</td>
<td>0.04</td>
<td>0.09</td>
<td>-0.23</td>
</tr>
<tr>
<td>F3 – knowledge of ingredients</td>
<td>K5_5. They migh interact with other medicines.</td>
<td>0.00</td>
<td>0.01</td>
<td>0.84</td>
<td>-0.11</td>
<td>-0.24</td>
</tr>
<tr>
<td></td>
<td>K5_6. They contain natural ingredients only.</td>
<td>0.32</td>
<td>0.28</td>
<td>0.61</td>
<td>0.25</td>
<td>0.37</td>
</tr>
<tr>
<td>F4 – importance of dosage</td>
<td>K5_9. They can be used without a doctor's supervision.</td>
<td>0.06</td>
<td>-0.12</td>
<td>-0.08</td>
<td>0.74</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>K5_11. They have to be used in specific</td>
<td>0.40</td>
<td>0.42</td>
<td>-0.10</td>
<td>0.63</td>
<td>-0.26</td>
</tr>
</tbody>
</table>
We have classified the respondents into homogenous groups by the help of variables that were generated during factor analysis. 104 cases could be included in the analysis. Clusters contain 24, 40, 12, 28 elements respectively in a 4-cluster-solution (Figure 5).

Figure 5: Distribution of respondents in the four cluster, percent

| Source: Own research, 2014 |

The clusters were characterized by the analysis of clustercentroids, i.e. we defined the average of the factor within each group and we have made our consequences to the specie group. We have characterised the generated groups by demograpfic variables as well. Based on chi-square test, we studied the relationship between cluster membership and the following variables:

- gender (P=0.004): significant
- age (p=0.11): no significant
- qualification (p=0.0): significant
- location (p=0.281): no significant
- marital status (p=0.173): no significant relationship.

In the case of each segment, we also identified the elements of marketing-mix. In summary, the four segments can be described as follows:

Cluster 1 – the segment of Cozy customers contain those customers, who consider health protection very important, but who are tend to do less in order to protect it. On the other hand, they are willingly use alternative health products. Customers of this group believe that everybody needs to consume food supplements. Most of them are women (80%); mainly from the young age groups. The main motivation for them is health conservation. Attractive appearance is another important motivation factor in this segment. In the consumption of food supplements, they are afraid the most that the product is not of a proper quality and they might overuse them. In order
to avoid the risks, they usually choose those products that have already been tried by themselves or by their relatives and friends. One of the main characteristics of this cluster is that customers listen to their close or distant acquaintances' opinion.

Cluster 2 – Customers, belonging to the segments of Skeptics, think that their health is important, but - unlike Cozy customers - they live a more active life; however they tend to use alternative therapies less. Skeptic customers answered negatively to the questions regarding to health protection as well as safety. They considered the importance of necessity of food supplements negatively. In this group, men can be found mainly (65%), who are mostly over the age of 40. They purchase food supplements in order to vitamin supplements mostly. Customers of the segment are afraid that food supplements might cause allergy.

Cluster 3 – the members of Careful users seem to be rather careful in the usage of food supplements. It is very important for them to use these products carefully: they read the instructions and dosage thoroughly, They take it into account that food supplements might interact with medicines. Their knowledge of ingredients is high. Gender ratio is well-balanced in this cluster. Consumers of this group have low income usually. A Members of the group consume food supplements for the reason of vitamin supplements mainly.

Cluster 4 – Conscious Health Protectors attach high importance to health protection: among all groups, they are most willing to act for the favour of their health: they do sports regularly; they pay attention to their own and their family members' health, and they tend to use alternative health products more than the consumers of the other groups. These are the customers who are less afraid of the risks associated with the usage of food supplements, than the members of other segments and also, they are most willing to spend money in order to protect their health. The main motivation for them is protection of their health. Gender ratio is well-balanced in this groups as well; members are usually middle-aged (30–50). In this cluster, consumers have usually high income and high qualification.

4. Conclusion

On the health market (and on the food supplement market) it can be observed that customers becoming more health-conscious and they choose carefully the food that they eat. This observation is supported by literature review and the results of our primary research as well.

Consumers of food supplements are motivated by different reasons and they attach different degrees of importance to the roles of these products. Based on the characteristics of the clusters and taking the elements of marketing-mix into account, our suggestions are the following considering each group:

Cozy customers: at this segment it is advisable to draw customers' attention how important it is to take part actively in the protection of their health.

Skeptics: marketing strategy should convince customers - even with the help of a health care professional, such as doctors and pharmacists - about how food supplements can contribute to their health and the prevention of diseases.

Careful users: companies must win the trust of these customers and have to give more detailed information on the products: either by developing proper instructions, either by the training of health care professionals. Regarding to the fact that members of this group can be influenced by
Advertisements and customers often obtain information from magazine articles and TV programmes connected to the topic, companies should use these tools to send their messages to the customers. In marketing communication messages should emphasize safety. On the other hand, members of this group are price-sensitive and this means that discounts also could draw customers’ attention to the products.

Conscious health protectors: have got a wide range of knowledge on health care topics and they believe it is important to be active in order to protect their health. For these customers, quality is extremely important, thus the main aim in defining the right marketing strategy could be developing products with high quality. High quality should be emphasize in communication. Since, members obtain high educational level and income, their expectation toward food supplements may be high as well.

Therefore, it is advisable to pay attention to other characteristics of the products: such as packing. With the extention of selection (producing different tastes) companies could increase their turnover in this segment.

We conclude that - although the sample is not representative - the results can give a good base for the conduction of a further, advanced level of research. Besides, we have found the results to be useful in understanding how people hold certain beliefs about food supplements. Findings can also improve the innovation of new products that suit better to costumers’ unique needs. Since small and medium sized companies are more flexible than multinational companies, they are advised to develop niche products. Segmentation can help SMEs to define the right niche marketing strategy in order to succeed among the strong competition relations of food supplement market.

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