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Qualitative and Quantitative Research of Vegetable Consumption, Especially in the Case Of Bonduelle Canned Goods

SUMMARY

According to our expert interviews consumers realized during the coronavirus period that food reserves are important, but they should not be overdone.

Only 22.0% of the respondents of quantitative research consume Bonduelle canned vegetables on a monthly basis, the reason for this being the high price. 43.1% of the respondents consume no more than 1-2 kg of vegetables per week. Based on the results of significance and variance analysis:

- the most important thing for women aged 28-37 with a higher education is to develop a healthy lifestyle, one of which is healthy nutrition, which includes consuming the right amount of vegetables
- there is a significant difference between the consumption of frozen and canned vegetables, with a probability of 70.4% that they prefer to consume frozen vegetables because they consider it healthier.

The shopping frenzy during the first wave of the coronavirus was real, but it did not cause increased demand for Bonduelle canned vegetables.

Keywords: vegetable consumption, Bonduelle, customer focus group, expert interviews, quantitative research

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INTRODUCTION

In order to protect the environment and reduce the ecological footprint, it is necessary to increase plant-based nutrition and reduce meat-based consumption (Németh, 2018). Vegetable consumption is essential for the human body, it reduces the development of diseases (Wirth, 2013), for example the risk of developing obesity and diabetes (Szakály, 2017). Low vegetable consumption may be the reason behind large-scale deaths worldwide (Pearly, 2021). Among the 23 vegetable-growing countries of the EU, Hungary ranked 12th (Wollbold - Behr, 2020). The European Health Interview Survey investigated how many vegetables are consumed by EU citizens. Compared to the data of the other EU countries, Hungary performed very poorly. 36.3% of the Hungarian population does not consume vegetables on a daily basis. In Hungary, the annual consumption of vegetables (excluding potatoes) was 60.3 kg/year/person in 2020, and preserved vegetable products were as follows: 13.6 kg/year/person. (Kocsis, 2022) Daily consumption of 400 g of vegetables would mean 12 kilograms/person on a monthly basis, and 144 kilograms/person on an annual basis. Not only our country, but also the vast majority of EU member states do not reach this value. In Hungary, the average consumption of vegetables in the last 10 years was 115-135 kg/person. (Szabó et

al., 2022) Half a kilo of vegetables and fruits per day would be the ideal amount for an adult (Frumkin - Mwatsama, 2019). According to the Health Country Profile, more than half (55%) of Hungarian adults do not consume vegetables every day, with this result we are below the EU average. Incorrect eating habits explain the growing number of obese people for a reason. (State of Health, 2021) In general, the largest consumers of vegetables (and fruits) are typically highly educated, financially well-off, young, urban women. (Malota et al., 2019)

The emergence of the pandemic played a major role in the re-organization of the supply and demand side of the market. The market was not controlled by the „invisible hand”, but by the measures taken by the government and the stimulus responses to them. This was reflected in the upward demand for durable foods within a short period of time. (Posgay et al., 2020) With the appearance of the epidemic, the role of the food industry became more important, countries recognized their strategic role, began to open up to self-sufficiency and, at the same time, the food industry became increasingly important. (Jámbor – Nagy, 2022) The spread of the coronavirus changed the operation of trade, the structure of shopping baskets, prices and the supply-demand relationship. Thanks to its technical development, it gave space to e-commerce, online shops, and home delivery options. The country started towards a globalized, more developed value system. (Oláh, 2021) Shopping times have decreased, shopping combined with entertainment has been replaced by rare bulk purchases, which are basic items, so-called they were limited to the acquisition of necessities of life. During the purchases, the customers bought in large quantities. On average, they accumulated enough reserves in their pantry for 1-2 weeks (Nébih, 2021) According to the results of a quantitative research conducted during panic buying, ¾ of consumers acquired a significant amount of food for the purpose of stockpiling. 23.1% of consumers stored enough food for more than two weeks during the pandemic (Kasza et al., 2020)

With the outbreak of the epidemic, vegetable consumption remained unchanged. However, customer habits have changed:

- 62% of buyers checked the country of origin of imported vegetables
- hygienic aspects became important
- the proportion of consumption of canned vegetables increased significantly
- 54.9% of the Hungarian population changed the regularity of their shopping, and 25.9% changed the place and frequency of shopping
- small shops located in the vicinity of the residence enjoyed an advantage

- in the 2nd wave of the epidemic, 42.5% of those surveyed did not change, 40% decreased, and 17.5% increased their consumption of vegetables
- customers mainly tried to consume boiled/heat-treated vegetables. (Tisza et al., 2021)

Experiences are similar internationally. Almost as many people said that their vegetable consumption increased during the coronavirus epidemic as reported that their vegetable consumption decreased. So there was no change in vegetable consumption, but there was a decrease in the variety of vegetables. Also, instead of consuming fresh vegetables, consumers have switched to canned vegetables, the reason behind this is limited access, hygienic aspects, and a decrease in the frequency of purchases. (Jordan et al., 2021) The consumption of canned vegetables and fruits has become popular among Americans. Del Monte Foods saw a 200% year-over-year increase in sales in March 2020. (Hiebert, 2021) There is a unique store in France in Saint Priest, where you can buy 100% only vegetables, mainly in canned format. Bonduelle la bouTiQUe is a 2,000 square meter store where you can shop, learn, taste and relax at the same time. The store also has a webshop (Bonduelle, 2018).

RESULTS

In order to get a more accurate and complex picture of the subject, we first conducted secondary (domestic and foreign literature books, journal articles, statistical databases and internet sources) and then primary (qualitative and quantitative) research. In the framework of qualitative research, we conducted netnographic research, conducted two focus group interviews with vegetable consumers and expert interviews with food industry workers with decades of work experience at Bonduelle Central Europe Kft. With netnographic research, we confirmed the relevance of the topic, we learned how many people search for words related to the research topic and in how many ways.

The purpose of our focus group interview is to explore consumers' vegetable buying habits in the period before and during the coronavirus. During the selection of the interview subjects, we tried to involve people of different ages, occupations, genders and family life cycles, since other preferences can shape the purchase of vegetables. The number of interview subjects is 10 people, their age is between 18 and 55 years. The dates of the focus group interviews are June 17 and 18, 2022. The moderator started the interviews with word associations (coronavirus, healthy lifestyle, shopping, vegetables, Bonduelle) after the introduction, which was followed by three questions. The first issue is healthy lifestyle, which we have narrowed down to vegetable consumption habits, including only attitudes before and during the coronavirus (1st wave). This was followed by Bonduelle branded vegetable consumption habits. This research method also created an opportunity to express opinions and feelings. Word association results of focus group interview subjects for two highlighted words, which are vegetables and Bonduelle. Vegetables were associated with health, and many were reminded of specific vegetables („cucumber”, „onion”, „carrot”) and the fact that they like to eat them. In the case of the word Bonduelle, the first thought of the overwhelming majority of the interviewees was canned food. The coronavirus affected the food purchasing habits of most of them by reducing the frequency of their purchases and increasing awareness. During the virus, customers tried to have food reserves. They mentioned pur-

chasing food online, which has remained a practice ever since. The interviewees believe that the key to a healthy lifestyle is balance, which lies in the equal sharing of sports and work, as well as good nutrition. In order to protect their health, they strive to eat well, eat fruits and vegetables, and take vitamins in tablet form. Without exception, all interviewees reported that the coronavirus had no influence on their vegetable consumption habits. Weekly consumption of vegetables can be said to be very low, the vast majority of interviewees consume very few vegetables, no more than 1-2 kg. Vegetables are primarily eaten fresh, because they believe that they have a higher nutritional content, are tastier and last but not least, the taste and smell play an important role. Canned vegetables are not or very rarely consumed on a weekly basis, rather they are kept as a reserve in households. Opinions about canned vegetables are divided, some of the interviewees like it, while the other half find it more of a final, quick solution. It is considered an advantage that it can be stored due to its longer shelf life. In winter, it is considered an ideal choice for vitamin supplementation. Most of them have tasted the Bonduelle branded vegetables, but they consider the price of the brand to be very high, which is justified by its quality. However, they believe that Bonduelle's products are much tastier and of higher quality. The product range was found to be very wide. They unanimously had a positive opinion about the packaging of the product („aesthetic”, „beautiful”, „attracts the eye”). Customers are particularly satisfied with the choice of flavors, the vast majority of respondents described it with the word „delicious”. To widen or deepen the selection made suggestions: Bonduelle-quality fruit preserves (e.g. peaches, pineapple, and sugar-free fruit preserves), a four-part vegetable mixture.

The purpose of our expert interviews is to explore the opinions of employees of Bonduelle Central Europe Kft. regarding the consumption of vegetables in the period before and during the coronavirus. When selecting the interviewees, it was important to interview the most experienced Bonduelle employees, taking into account that they have different positions. Our 4 interviewees are logistics managers, semi-finished warehouse managers and assistants, and logistics employees, with 18-27 years of experience at Bonduelle. Expert interviews took place on June 24, 2022. The expert interview subjects associate the word Bonduelle with much more than a canned goods manufacturer. An international company where they enjoy working (for more than 20 years), and when they think of Bonduelle, the names of their specific favorite products come to mind („corn”, „beans”). The main difference between consumers and food industry workers is in their attitude towards a healthy lifestyle. Workers in the food industry are much more aware thanks to the Bonduelle health programs (for example: Longevity project) and the promotion of the vegetable consumption culture within the company. Respondents consumed it both raw and frozen. They are happy to make side dishes from canned vegetables. They emphasized the importance of a peaceful family life in a healthy lifestyle. It is not enough to eat well, but you also have to be well. Regarding vegetable consumption, the answers were almost identical to the answers of the focus group interviewees. They get vegetables 1-2 times a week. The place of purchase is mainly one's own vegetable garden or shopping centers. As experienced workers in the canning industry, they emphasized that, contrary to misconceptions, canned vegetables are just as delicious as fresh ones and do not contain

any added substances or preservatives. They are manufactured using the most modern technology. All four interviewees shared the same point of view, that compared to other manufacturers' products, Bonduelle's products are the most beautiful, the most decorative and at the same time the most expensive. The price provides a guarantee of excellent quality, natural taste, and after opening, it faithfully reproduces the taste of fresh corn. They agree that products are made with the highest level of technology and expertise. With the constantly expanding range, they want to favor a wide range of consumers, despite this, the most popular product is still the Bonduelle sweet corn tin. The main goal of the netnographic research was to learn about consumer attitudes regarding the consumption of vegetables (canned, Bonduelle) during the coronavirus period and to reveal the platforms through which information is collected. How they process the information they receive and how it affects their attitude. In relation to the research topic, we collected six terms and used data from different search result analysis sites in order to get a complete picture. First, we examined how many times the research keywords were searched for in domestic and global terms. (Table 1) We searched for the various expressions in both English and Hungarian. When translating some words from Hungarian to English, we chose the phrase for which there were the most searches. (Eg: there were 15.3 million searches for the translation of coronavirus covid, while there were 29.5 million searches for the term coronavirus).

It was important to discover which platform they preferred. Table 1 clearly shows that Google is the main portal for obtaining information. The current research of the MCC Youth Research Institute and the Social Researcher supports the statement just made. At the same time, he draws attention to the fact that the majority of young people (48%) find information about economic and public affairs on Facebook, 28% on YouTube and 24% on TikTok. (MCC, 2022) Table 2 shows the number of ways the given word was searched for. The word Bonduelle was searched 642 ways on Google, 255 ways on YouTube, 156 ways on Bing and only 120 people searched for it on Instagram

We planned to verify the following hypotheses with our quantitative research:

- H1: Before the coronavirus, people bought Bonduelle canned vegetables once a month.
- H2: Before the coronavirus, a maximum of 1-2 kg of vegetables were consumed raw per week.
- H3: Most vegetables are consumed by young women.
- H4: Consumers find canned vegetables unhealthy, so they prefer to eat frozen vegetables.

The questionnaire was created as a google form, which was preceded by a test query in order to clarify the wording of the questions and make the answer options more concrete. Duration of filling: from July 20 to August 20, 2022. The question areas of the questionnaire: vegetable consumption habits, vegetable consumption before the coronavirus and during the first wave of the coronavirus, Bonduelle vegetable consumption.

Table No. 1: How many times were you searching for each search term?

Words searched in Hungarian	Domestically	Globally	Words searched in English
koronavírus	550K	29,5M	coronavirus
vásárlás	1,6K	2,2M	shopping
konzerv	880	2,1M	can
egészséges életmód	2,4K	102,7K	healthy lifestyle
zöldségek	9,9K	859,9K	vegetables
Bonduelle	1,6K	44,5K	Bonduelle

Source: edited by the authors based on data from their own research, based on data from the semrush.com interface

Table No. 2: On which platform were the individual words searched?

Social media	coronavirus	shopping	can	healthy lifestyles	vegetable	Bonduelle
GOOGLE	850	693	550	430	554	642
YOUTUBE	420	300	300	103	218	255
BING	212	112	200	32	35	156
INSTAGRAM	194	117	123	48	54	120
TWITTER	105	0	2	0	0	0

Source: edited by the authors based on their own research data, based on keywordtool search analysis data

Only closed questions were included in the questionnaire, multiple-choice, alternative and Likert scale questions were used. The 318 responses received were processed using the Google Form and SPSS system. During the evaluation, we prepared descriptive statistics (we calculated mean, mode, median, standard deviation, relative standard deviation) and cross-tab analysis to examine the relationships between deeper topics, but we also used variance analysis

The sociodemographic variables of the respondents are listed in Table 3.

The respondents' favorite consumption of vegetables (48.1%) is fresh, 33.3% like to consume them in all three formats (fresh, frozen, canned). When evaluating the claims related to a healthy lifestyle, we conducted an analysis of variance to determine which sociodemographic parameters have a significant relationship. The result of the significance test is illustrated in Table 4.

Based on the results of the variance analysis, it can be said that the most important thing for women between the ages of 28 and 37 with a higher education is to develop a healthy lifestyle. This is manifested in two factors: one is that they choose what food they consume during their meals and in what quantity. In addition to all this, they make sure that they get enough vegetables into their bodies. Food awareness is the least typical of the young age group (under 20). It can be established that the degree of conscious nutrition increases with age, and then with old age, nutritional awareness declines again. The average is 2.88 and the standard deviation between individual factors is 0.876.

An inverse relationship can be observed in men's and women's attitudes towards a healthy lifestyle. Unlike women, men consume fewer vegetables and are less aware of their nutrition, however, they „compensate” for the latter by playing sports.

Table No. 3: Sociodemographic variables of the respondents

Distribution of respondents by gender	People	%
Female	172	54,09
Male	146	45,91
Distribution of respondents by age	People	%
below 20 years	23	7,2%
20 – 27	79	24,8%
28 – 37	59	18,6%
38 – 47	54	17,0%
48 – 57	59	18,6%
58 – 67	29	9,1%
above 67 years	15	4,7%
Distribution of respondents by marital status	People	%
Single	67	21,07
Relationship	120	37,74
Married without child/children	32	10,06
Married with child/children	75	23,58
Divorced	11	3,46
Widow	13	4,09
Distribution of respondents by education	Fő	%
Less than elementary school	3	0,9
Elementary school	19	6,0
High school	103	32,4
Vocational school	53	16,7
College/University degree	140	44,0

Source: The authors' own editing

Table No. 4: Significance test

Significance test (accepted sig.: $p \leq 0,05$)	Gender	Age	Education
Developing a healthy lifestyle is important to me.	0,001	0,095	0
I select what and how much I eat.	0,046	0,015	0,001
I do sports regularly.	0,091	0,782	0,699
I eat a lot of vegetables.	0,004	0,615	0,189
I follow trends related to a healthy lifestyle. (Ex: intermittent fasting)	0,995	0,089	0,102

Source: The authors' own editing

The vast majority of respondents (43.1%) consumed no more than 1-2 kg of vegetables per week before the virus and during the first wave of the virus, while 28.6% of the respondents consumed less than 1 kilogram(!), 22.6 % consumes 3-4 kg of vegetables per week.

There is a significant difference between gender and frequency of vegetable consumption ($p < 0$). The Chi-square value (χ^2) is 27.797. The closeness of the relationship can be said to be weak: 0.296 based on Phi, 0.296 according to Cramer's V, and 0.284 according to the contingency coefficient. 39.0% of women consume vegetables on a daily basis, while only 24.7% of men consume vegetables on a daily basis. The proportion of those

who do not consume vegetables on a weekly basis is 8.9% for men and only 0.6% for women. The value of the correlation between the consumption of frozen vegetables and canned vegetables is 0.268, there is a weak relationship between the two variables. There is no significant difference in terms of gender. The majority of respondents (26.4% and 27.7%) do not consume Bonduelle brand canned vegetables. 22.0% of consumers (before covid) and 21.1% (during covid) consumed canned vegetables produced by Bonduelle on a monthly basis. The difference between Bonduelle canned vegetable consumption and education is significant (Sig=0.031), the value of Pearson's Chi square is 33.332. Bonduelle products were not affected by the buying spree, with a 4.3% drop in monthly consumption. 61.3% of consumers explained that they find the price of Bonduelle canned vegetables very expensive.

Price is typically important to 37.8% of women, while price is less important to 30.8% of men. It can also be concluded that typically the price is the least important for young people (under 20), while the price is especially important for 46.7% of the elderly. In the course of our research, we wanted to find out whether the packaging of the product has an effect on the perception of the product's taste, so we performed the Pearson's Chi-square test, based on the value ($\chi^2 = 98.018$) there was a significant difference (Sig=0.000) between the two variables between, it can be said with a probability of 87.6% that consumers will judge a well-packaged can as having better taste. Symmetric indicators were used to analyze the strength of the relationship between the two variables. Based on Phi (0.555) and the value of the contingency coefficient (0.485), we can speak of a medium relationship. According to 29.6% of respondents, the packaging of Bonduelle products is eye-catching, 21.1% like it and 1.3% of customers do not like it. Those consumers who had a positive opinion about the packaging were also satisfied with the taste of the product.

CONCLUSIONS

Hungarians perform poorly in vegetable consumption, as a result of which they struggle with a series of health problems. Weekly vegetable consumption in Hungary means a maximum of 1-2 kg of vegetables. The coronavirus had no effect on the demand for fresh vegetables and canned vegetables. We also managed to highlight an interesting correlation, according to which customers prefer frozen vegetables to canned ones. Canned vegetables are considered by many to be unhealthy, but it is clear from expert interviews that this assumption is wrong. Preserved vegetables are controlled according to strict rules, no preservatives are added to Bonduelle cans during production.

Based on the research results, we confirmed two of the four hypotheses and refuted 2 hypotheses

H1: We refuted that before the coronavirus they consumed Bonduelle canned vegetables every month. 52.4% of men and 47.6% of women typically do not consume Bonduelle canned vegetables, while only 22.0% of respondents consume Bonduelle canned vegetables on a monthly basis. The reason for this is the high price. 61.3% of the respondents found the price of Bonduelle cans high. The attractive, attention-grabbing appearance is in vain, if they do not buy based on the price - they are otherwise satisfied with the quality.

H2: When researching the literature, we found surprising vegetable consumption results, according to which Hungarians perform below the EU average. In 2020, the annual vegetable consumption of Hungarians was 60.3 kg/person/year. Thus, in the second hypothesis, we stated that the Hungarian population consumes no more than 1-2 kg of vegetables per week. We have verified this claim. 43.1% of the respondents consume no more than 1-2 kg of vegetables per week, and what is even more disheartening is that the proportion of those who consume less than 1 kg is a significant 28.0%.

H3: We could only partially confirm that young women consume the most vegetables. Thus, the hypothesis was rejected. Based on the results of significance and variance analysis, it can be concluded that the most important thing for women aged 28-37 with a higher education is to develop a healthy lifestyle.

H4: Consumers prefer frozen vegetables to canned vegetables, presumably they consider canned vegetables unhealthy. Based on the results of correlation and cross-tab analysis, the difference between the two factors is significant, with a probability of 70.4% they prefer to eat frozen vegetables because they consider it healthier than canned vegetables.

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