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Education for Sustainable Development: Sustainability-Related Food Labels

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Abstract: The aim of this study is to predict sustainable behavior based on the awareness of food labels and to assess the role of food quality certification on consumer choice. A quantitative descriptive study was performed to implement the research objectives, while the qualitative data was obtained by an online survey. The sample consisted of 384 subjects; the sample was calculated with 95% reliability and a 5% scattering range. The survey was conducted in August 2020. After rejecting incorrectly completed questionnaires, 392 questionnaires were suitable for further analysis. The study concluded that consumers are not yet familiar with the Lithuanian national food quality system: they are characterized by a relatively low focus on food quality labels. The level of attractiveness and awareness of the Lithuanian NQP label is low: a small proportion of consumers name it as a memorable, clear and targeted food label. The consumers' behavior is related to the importance of health and nutrition, the price–quality ratio, the regional label (such as Lithuanianness), when raw materials and production are used from/in Lithuania, as well as environmental sustainability.

Keywords: consumer attitudes; sustainable behavior; food product labels

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1. Introduction

Over the last few decades, a multitude of sustainability-related food labels (sometimes referred to as ecolabels) have emerged to help consumers make more informed food purchasing decisions by considering the environmental, ethical, and social impacts on their food choices [1]. Specifically, sustainability-related food labels increase transparency by reducing the information asymmetry that exists between food chain stakeholders (e.g., producers and retailers) and consumers along the food chain and informing consumers in a way that can promote sustainable consumption [2]. Marketing specialists, using a regional indication, are able to exploit the existing associations consumers have with a particular region and create a certain image for a product. Together with the specific product qualities, this regional image can create a unique identity for such regional products and in this way add value to them [3]. In 2007, the Lithuanian national quality product (NQP) scheme was approved; it includes production, certification, surveillance, marking and other quality requirements.

Certifications are often subject to misunderstandings, misinterpretations and generalizations [4]. Numerous studies have shown that these trademarks do not always work as indicators of quality [5]: consumers may be unaware of the information on the label, they may not know the region/area of origin or they may fail to interpret their meaning. Furthermore, many other brands and trademarks, owned by private companies or contemporary distribution chains, with a broad range of geographical links confuse consumers and flood the food market. A variety of factors influence this situation, the most obvious being poor recognition of graphic logos; confusing, fragmented and sporadic information; and also the emergence of numerous other brands and logos that promote the local origin of food products. The regional products have a positive impact on the local economy, the environment and the social side and can, therefore, be considered as an instrument of sustainable regional development [6]. The regional label is in line with all three pillars of sustainable

development. The regional products contribute to the development of agriculture and local businesses, create new jobs, strengthen the development of tourism, increase the volume of local taxes and contribute to building regional identity and culture [6]. With regard to local residents, a brand can strengthen solidarity with the region, encourage public participation in regional development and mediate contacts between producers and other local participants [7]. The Lithuanian national quality product (NQP) scheme follows a similar pattern: products should be nutritious, natural and produced in an environmentally friendly manner using as many local raw materials as possible. The labels allow consumers to express their individual value perception of product characteristics, including the credence quality attributes and which characteristics they prefer when comparing different product alternatives. This then transfers into whether and which environmental and social problems should be tackled based on consumers' preferences [8]. To gain a better understanding about consumers' appreciation of sustainability-related food labels, in this paper, consumers' appreciation of food certification labels is analyzed by investigating the dimensions that make up the consumers' image of these labels and how these dimensions relate to consumers' willingness to buy a sustainability-related food product. The hypothesis of this paper states that the quality warranty and the economic support dimension of consumers' images of sustainability-related food certification labels—NQP—have a distinctive effect on the relative attitude towards protected sustainability-related food products.

The aim of the study is to predict sustainable behavior based on the awareness of food labels and to assess the role of food quality certification in consumer choice.

2. Materials and Methods

2.1. Research Design

In order to achieve the aim of the research, the following detailed tasks are set:

(1) to describe the sociodemographic characteristics of the sample;
(2) to assess the level of understanding and attractiveness of the Lithuanian NQP label;
(3) to analyze consumers' appreciation of sustainability-related food certification labels—Lithuanian NQP—and to determine the role of food quality certification in consumer choice.

Before conducting the survey, a pilot test of the questionnaire items was tested on a small sample of the intended respondents (about 30–50) [9]. The questionnaire items were revised upon reviewing the results of the preliminary pilot testing. This process was repeated four times before finalizing the final draft of the questionnaire [9].

To determine the size of the consumer sample, the formula proposed by J. Schwarze [10] for very large populations when it is difficult to select study groups at random was applied. Meanwhile, the sample size $n = 384$ was determined: where the sample is calculated with 95% reliability and a 5% scattering range. The survey was conducted during the period of August 1 until 28, in 2020. After rejecting incorrectly completed questionnaires, 392 questionnaires were suitable for further analysis.

2.2. Methodology

Nominal and ranking scales were used to assess the sociodemographic characteristics of the respondents as well as to determine purchasing habits. The identification of factors influencing the choice of food products is based on the analysis of the scientific literature. The importance of factors was assessed using a five-point ranking scale from 1 (not at all important) to 5 (very important). To assess the awareness of quality labels for food products, respondents were given two questions. The first question sought to assess respondents' attention to quality labels in general (the ranking scale proposed by Velcovska [11] was applied, asking respondents to choose "always", "sometimes" or "never"). In the second question, on awareness, respondents were asked to indicate which of the five food quality labels on the list they recognized and which of the statements in the list they considered to be related to the NQP label. The claims on the list described the national NQP label, while the rest characterized the EU food quality labels. Respondents were provided

with features characterizing the attractiveness of the NQP label, asking them to rate it according to the five-point Likert-type scale. Assessing the overall attractiveness of the NQP label, the negative attribute "inappropriate" was inversely identified. Respondents were asked to indicate the sources of information where they learned about the quality of national products. The survey provided several possible answers: TV commercials, radio commercials, recommendations from friends and relatives, during fairs and on the internet/social networks; some respondents did not answer this question. Opinions were sought on what would encourage the choice of NQP-labeled products. Respondents were provided with features characterizing brand choices upon request on a five-point Likert-type scale.

2.3. Data Analysis

The reliability of the research results was assessed by calculating the average of the population, standard deviation, and intraclass correlation coefficient (ICC). The ICCs were used to analyze the correlations between the values obtained on different days [12]. The ICC was computed as a single-measure ICC using a two-way random-effect model (absolute agreement). The level of significance was set at $p < 0.05$. Statistical analyses were performed using IBM SPSS Statistics software (v. 22; IBM Corporation, Armonk, NY, USA) [12].

IBM SPSS 20 package was used for data analysis. The following statistical data methods were used: descriptive statistics, non-parametric statistics (Kruskal–Wallis test), chi-squared independence criterion and correlation analysis (Spearman correlation coefficient). The consumer survey was completed by 392 respondents. The representativeness of the group of respondents depends on the gender and the geographical location in Lithuania. In order to verify the representativeness of the sample, the research included the nonparametric chi-squared test (χ^2-test) which, in principle, consists of verifying the compliance of the expected theoretical distribution with the (empirical) distribution. According to the results of the test, the sample is represented by gender (p-value = 0.573) and region (p-value = 0.848). The data obtained were processed with cross-tabulation analysis and Pearson's chi-squared test. The chi-squared is the primary statistical means used for testing the statistical significance of the cross-tabulation table. The chi-squared statistic, with the associated probability of chance observation, may be computed for any table. If the variables are related (i.e., if the observed table relationships occurred with very low probability—only 5%), it could be stated that the results are "statistically significant" at the "0.05 or 5% level". This means that the variables have a low chance of being independent [10]. The Pearson's chi-squared test determined the degree of dependence coefficient, which showed the dependence among the gender, age, education, monthly income, locality and selected factors of consumer behavior. This coefficient has values from the interval <0.1> or <1.1>. Value 0 means independence [10].

3. Results

3.1. Socio-Demographic Characteristics of the Study Sample

In the survey, 79.3% females and 20.7% males participated. A larger part (40.1%) of respondents fell into the age group of 36–45 years, the respondents of the second largest sample (26%) indicated that they belonged to the age group of 26–45 years. The distribution of respondents by income revealed a relatively even distribution in the last two groups, with 40.1% having an income between €436 and €725, and 54.6% with the highest income (more than €726). Such results suggest that the income received by respondents in the 36–45 age group implies their independence as purchasers and their corresponding purchasing power. As many as 64.5% of the respondents indicated that they had higher education and 24.2% of the respondents had higher non-university education (Table 1).

Table 1. Socio-demographic characteristics of the sample N = 392.

Characteristics of Respondents	N #	%
Gender:		
Male	81	20.7
Female	311	79.3
Age:		
Up to 25	18	4.6
26–35	102	26
36–45	157	40.1
46–55	76	19.4
56 and older	39	9.9
Education:		
Secondary	13	3.3
Special secondary	31	7.9
College	95	24.2
Higher	253	64.5
Average monthly income (€):		
Up to 290		
291–435		
436–725		
More than 726		

#—natural numbers.

3.2. The Recognition of Food Quality Labels

To identify the NQP label, respondents were provided with six food quality certification symbols (EU organic products, national label "Organic Agriculture" (NOG), national quality product (NQP) label, traditional specialities guaranteed (TSG) mark, geographical indication (GI) mark and protected designation of origin (PDO) mark) and were asked to mark the labels they recognized. The results of the recognition of food quality labels are presented in Table 2.

Table 2. Awareness of food quality certification marks (%).

Certification Marks	EU Organic Products Label	NOG Label	NQP Label	TSG Mark	GI Mark	PDO Mark
% respondents who recognize marks	72.7	86	46.9	49.2	48.5	50

The results showed that the most well-known product label is the national label "Organic Agriculture" (86% of all respondents indicated that they recognized the label), and 72.7% of respondents indicated that they recognized the EU organic food label. The level of awareness of all other food quality labels provided to respondents was significantly lower. Of the respondents, 46.9% indicated that the National Quality Product (NQP) label was known, and 48.5% indicated the protected geographical indication was known. A slightly higher profile is observed for protected designations of origin (PDOs) (50%) and traditional specialities guaranteed (TSG) (49.2%) (Table 2).

3.3. The Choice to Buy NQP-Labeled Products

The consumers were asked to share their opinion of whether they would choose to buy NQP-labeled products or not. The results showed (Table 3) that 34.4% have already bought these products, but 44.9% of the respondents were not sure.

3.4. The Comparison of Averages of NQP Buying Individual Groups by Sex, Education, and Income

The results of the choice to buy NQP-labeled products survey were compared with the socio-demographic characteristic results using the criterion of two independent samples (Table 4). The results did not significantly differ statistically between the genders, nor

did they depend on the income. However, when analyzing the results of the purchase of NQP-labeled products in groups of different education, these results showed a statistically significant difference. In the group of respondents with higher education, the share of those buying NQP-labeled products was slightly higher (74.23%) than with those of lower education (68.14%).

Table 3. Buying of NQP (%).

	Yes	SN *	No	SN *	Not Sure	SN *
% respondents who buy NQP	34.4%	25.69	19.9%	21.41	44.9%	27.74

*—standard deviation.

Table 4. Comparison of averages of NQP-buying individual groups by sex, education, and income.

Buying of NQP	Average	SN *	Average Difference	*p*	Chi-Squared
Gender:					
Male Female	72 70.21	25.7 25.74	1.79	$p = 0.6$	0.00083 small effect
Education:					
Secondary/college Higher	68.14 74.23	28.02 21.32	6.14	$p = 0.04$	0.015 small effect
Income €:					
436–725 More than 726	69.37 72.38	24.5 27.35	−3.01	$p = 0.3$	0.0033 small effect

*—standard deviation.

3.5. Factors in the Selection of NQP

Respondents were asked what would motivate them to buy products with the NQP label. The results showed (Table 5) that health and nutrition (less sugar, salt, fat, more fiber, no hydrogenated fat and/or no food additives, no yeast, etc.; average = 4.92, SN = 0.94), good price–quality ratio (average = 4.84, SN = 0.92), regional labels such as Lithuanianness (when raw materials and production are used from/in Lithuania; average = 4.69, SN = 0.826), Lithuanianness (made in Lithuania; average = 4.53, SN = 0.945), environmental friendliness (less synthetic chemicals, degradable packaging, etc.; average = 4.49, SN = 0.83) are the most important factors influencing consumers' choice to buy NQP-labeled food products. Less important factors indicated by the consumers when buying agricultural and food products were recommendations from friends and relatives (average = 3.12, SN = 0.66), memorable brand (average = 3.09, SN = 0.95), eye-catching packaging (average = 2.69, SN = 0.83), and compelling advertising (average = 2.56, SN = 0.66).

A correlation analysis was performed to determine whether there was a relationship among food selection criteria, the attractiveness of the NQP label, and the behavior of respondents (purchasing NQP brand products). The relationship between the variables was checked by calculating the Spearman correlation coefficient. A statistically significant, weak and negative relationship was found among the importance of the price–quality ratio and the purchase of NQP-labeled products ($rs = -0.153$, $p < 0.05$). The more important the price–quality ratio, the less often NQP-labeled products were purchased. A statistically significant, weak and positive relationship was observed among health and nutrition and the purchase of NQP-labeled products ($rs = 0.118$, $p < 0.05$). A statistically significant, positive relationship was found between Lithuanianness, when Lithuanian raw materials were used to produce a Lithuanian product, and a customer's wish to purchase it ($rs = 0.138$, $p < 0.05$). The results of the study also revealed that the higher attractiveness of the NQP brand is associated with higher purchases ($rs = 0.144$, $p < 0.05$). In summary, it can be stated that the intentions of consumer behavior are related to the importance given by consumers to health and nutrition, price–quality ratio, Lithuanianness, when Lithuanian raw materials

are used in the production of the product and the product is produced in Lithuania, and the attractiveness of the NQP label to consumers.

Table 5. Factors in the selection of NQP.

Factors	Smallest Value	Max Value	Average	SN *
Health and nutrition (less sugar, salt, fat, more fiber, no hydrogenated fat and/or no food additives, no yeast, etc.)	2	5	4.92	0.944
Price quality ratio	2	5	4.84	0.921
Lithuanianness (made in Lithuania and the main raw materials are Lithuanian)	2	5	4.69	0.826
Lithuanianness (made in Lithuania)	2	5	4.53	0.945
Environmentally friendly (less synthetic chemicals, degradable packaging, etc.)	2	5	4.49	0.830
Recommendations from friends and relatives	1	5	3.12	0.660
A memorable brand	1	5	3.09	0.949
Eye-catching packaging	1	5	2.69	0.826
Persuasive advertising	1	5	2.56	0.655

*—standard deviation.

4. Discussion

When trying to predict sustainable behavior based on the awareness of Lithuanian NQP labels, it was found that consumers are not yet familiar with the Lithuanian NQP system: only 46.9% respondents knew the Lithuanian NQP label. The level of attractiveness of the Lithuanian NQP label is low: a small proportion of consumers name it as a memorable, clear and targeted food label. The consumers were characterized not only by a low level of perception of the NQP label, but also by their misunderstanding of it. Incorrect interpretations of the meaning of the NQP label show that consumers have insufficient knowledge about the NQP label, which confirms that there is no sustainable behavior based on an awareness of the related food labels. Moreover, as shown by the recent studies [5], the information about food quality can only be effective when it is processed and used by its target audience, which is familiar with the sustainability-related food labels. Furthermore, the findings are consistent with some insights of the research and suggest that marketing plans for typical foods should mainly focus on local consumers, as recommended by Giraud [13]. Other research, based on different methodologies, revealed a much higher level of awareness, with 25% of respondents being aware of the label name of traditional products, and 36% and 68% of respondents being aware of geographical indications and designations of origin, respectively [14]. According to Grunert and Aachman [15], the results of a number of studies at a national level show that the level of awareness of these European Union (EU) food quality labels among consumers varies from 20% to 34%. The research also shows that the awareness of EU food quality labels is significantly higher in southern EU countries (Greece, Italy, France) compared to more northern countries (Belgium, Poland, Norway) [5,11]. According to Teuber [14], such differences in the level of awareness can be explained by differences in food culture and agriculture in northern and southern European countries: northern European food culture is described as functional and consumer-oriented. In comparison, the research by other authors shows that as many as one third (36.9%) of respondents are reluctant to pay more for, for example, organic products and that the intention to pay more depends on the product category [16]. The results of the Vecchio and Annunziata survey show that 37.5% of all respondents, who have demonstrated a thorough knowledge of the designation of origin, tend to pay up to 40% more for products with a designation of origin [17].

The results showed that consumer behavior is related to health and nutrition, the price–quality ratio, regional labels such as Lithuanianness, when raw materials and production are used from/in Lithuania, and environmental sustainability. It would be interesting to investigate consumer knowledge and the use of certification labels in other European (or extra-EU) countries with different food quality policy environments; several studies

have demonstrated that cultural variation in food choices throughout Europe are even greater when dealing with typical foods that are based mainly on the natural resources available in the area. The Lithuanian NQP label ensures a wider choice of opportunities for consumers, as healthier products and products with special characteristics appear in the market; therefore, the culture of consumption is improving. The sustainability-related labels can empower consumers. The labels allow consumers to express their individual value perception of product characteristics, including the credence quality attributes and characteristics they prefer when comparing product alternatives. Later consumer preferences allow the identification of which environmental and social problems should be tackled. Without sustainability-related labels, consumers might feel concern, benevolence and care for others who are not able financially or timewise to focus on sustainability [9].

From a sustainable development perspective, sustainability-related food labels are deemed more effective if they improve the quality of products and increase market share. In addition, labels serve their function when their effect on a consumer goes further than just purchasing, for instance, if they raise awareness or result in habit change, and are embedded in a much broader set of policy efforts toward sustainable consumption [17]. Furthermore, labels that accelerate technological innovation and improvement in the market might also offset some of the issues connected to consumption of ecolabels, since it has been found that labels effect less change in the market compared to technological advancement during the same time frame [18].

However, when analyzing the current results of the purchase of NQP-labeled products in groups of different education, these results showed a statistically significant difference. In the group of respondents with higher education, the share of NQP-labeled products would be slightly higher than with those with lower education. Educational interventions with content concerning nutrition labels can be seen to have a positive impact on the use and/or understanding of this complex numerical information. It is therefore possible that education on nutrition labels together with education on general healthy eating recommendations are important elements in interventions designed to impact on label use and subsequent food behaviors, including purchase choices [19]. The impact of current initiatives to improve nutrition label use, including legislation to enhance the comprehensibility of this information, may also be enhanced by corresponding improvements to consumer understanding of this newly presented information. This research can be used to inform future development of educational initiatives aiming to increase the efficacy of mandatory nutrition label information. Future evaluation is needed to confirm if education, which optimizes comprehension and the use of nutrition labels, has the potential to improve the impact of this information on dietary health.

In response to consumer behavioral intentions and based on the experience of the EU countries, where emphasis is placed on the value of money, regional labels such as Lithuanianness as well as environmental sustainability, this research proposes changing the general requirements (naturalness, nutrition, environmental friendliness) to high product quality, traceability and environmental friendliness. It is recommended that the implementation of the publicity and promotion strategy is consistent and long-term.

5. Conclusions

When trying to predict sustainable behavior based on the awareness of food labels and to assess the role of food quality certification on consumer choice, the following conclusions were drawn:

1. Consumers are not yet familiar with the Lithuanian national food quality system: they are characterized by a relatively low focus on food quality labels.
2. The level of attractiveness and awareness of the Lithuanian NQP label is low: a small proportion of consumers name it as a memorable, clear and targeted food label.
3. Consumer behavior is related to health and nutrition, the price–quality ratio, regional labels such as Lithuanianness, when raw materials and production are used from/in Lithuania, and environmental sustainability.

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