SUSTAINABLE FOOD CONSUMPTION INTENTIONS RELATED TO FOOD SAFETY AMONG YOUNG ADULTS

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ABSTRACT

A long-term sustainability of food consumption is in the mainstream of the current trends in the production and consumption patterns of food. A growing number of analyses question this issue nowadays. Despite several papers investigating the profile of sustainable consumers, understanding of the determinants of consumer decision-making and intention towards sustainable food consumption needed further investigation. This study investigates determinants of sustainable food and food safety on consumer behaviour among young customers in Hungary. The objective of this paper is to explore the intention factors of food safety based on sustainable consumption patterns. To gain a better insight in sustainable consumption patterns, the research process was quantitative in nature.

Keywords: sustainable food, food safety, quantitative study, young customers

1. INTRODUCTION

Sustainable development and sustainable consumption have been studied in the last decades in various fields, such as marketing. The theoretical background of the consumer aspect of sustainable development for the current research is based on the Europe 2020 Strategy – A resource-efficient Europe, which calls for finding „new ways to reduce inputs, minimise waste, improve management of resource stocks, change consumption patterns, optimise production processes, management and business methods, and improve logistics" [1]. The Europe 2020 Strategy stresses that our natural resource base is being eroded by growing consumption amounts and the inflexibility of consumption patterns.

There are factors which makes the patterns difficult to change, the average Western diet with high intakes of meat, fat and sugar has a significant effect on social systems and the environmental life support systems as well [2]. On global demand, the energy and the food sector are priority areas and are highlighted for taking measures such as more sustainable production and consumption of food and reduction of food waste. The amount of waste throughout the whole food supply chain would be aimed such as the change of consumption patterns [1].

According to the European Sustainable Consumption and Production Policies, The Sustainable Consumption and Production Action Plan [3] „food production systems compromise the capacity of Earth to produce food in the future. Globally, and in many regions including Europe, food production is exceeding environmental limits or is close to doing so".

What exactly do we mean by 'sustainable' food? As it is defined in the EIPRO (Environmental Impact of Products) report, has a less negative effect on the environment and society: „food we produce and consume has a significant impact on the environment through, for example, greenhouse gas emissions, the use of land and water resources, pollution, depletion of phosphorus, and the impact of chemical products such as herbicides and pesticides." [4]

The Global Food Security Index 2019 [5], Hungary ranks 30th in the GFSI ranking of 113 countries with 72.8 points. It ranks 31st in terms of food affordability, 29th in terms of availability, and 33rd in terms of quality and food safety in the global rankings. Hungary scored a maximum of 100 points in the following areas: Presence and quality of food safety net programmes; Access to financing for farmers, food safety. Other strengths are: Proportion of population under global poverty line (99.3); Change in average food costs (98.7); Urban absorption capacity (95.1); Food loss (93.5); Dietary diversity (86.2); Agricultural import tariffs (81.1).

There were former studies aiming to explore the intention factors of sustainable food consumption, which found environmentally conscious food consumption as the most relevant factor [6],[8],[9], [10]. The

present study attempts to find out if consumers actually do modify their food preferences, the factors that push consumers towards this modification, how consumers overcome their consumption habits.

2. MATERIALS AND METHODS

The research focuses on the principles of sustainable food consumption related to food safety. A quantitative online survey was used for data collection through self-administered questionnaires. The questionnaire consisted of several multi-item structure measurement on five-point scales and open-ended questions. The questionnaire included three qualitative questions on conscious purchasing behaviour, Top-of-mind sources of sustainable food and food types which are considered to be the most important in connection with sustainability. All scales to measure the study variables were adapted from former studies [8].

The data were collected between March 2019 and May 2019, a purposive sampling along with snowball sampling was applied and quota method was applied to ensure the appropriate rate of socio-demographic characteristics of the sample. The sampling strategy employed in this research was designed to obtain a sample based on the following criteria: the first criterion was demographic status of the respondents. All respondents in the sample were filtered by the age group 18–25. The second criterion was a purchasing one: the respondents had to be active in food purchasing; had to take part in at least 60 percent of the household food purchase. A sample of 1608 adult's socio-demographic characteristics are presented in Table 1.

Table 1. The socio-demographic characteristics of the sample and the Hungarian population according to the data of the Hungarian Central Statistical Office

	HCSO			Sample		
	Male	Female	Total	Male	Female	Total
Budapest	28.33	28.38	56.71	32.24	32.88	65.12
Pest county towns	15.27	14.40	29.66	13.20	13.46	26.66
Pest county villages	7.13	6.50	13.63	4.07	4.15	8.22
Total	50.73	49.27	100.00	49.51	50.49	100.00

Source: Hungarian Central Statistical Office (HCSO), current research 2020

3. RESULTS AND DISCUSSION

The overall objective of the study was to explore the most relevant factors of sustainable food consumption based on a former qualitative study and the validation of the scale. The structure of food safety was predicted to be multi-dimensional. A twenty-five item five-point Likert-scale (1 – "completely disagree"; 5 – "completely agree") was developed for measuring consumption intention. In the research, the validity test of the scale Cronbach's Alpha test was conducted. The value of Cronbach's Alpha was 0.797, while the Cronbach's Alpha Based on Standardized Items was 0.801. The summary item mean was 3.12. (Minimum: 1.763, Maximum: 4.646 Range: 2.883 Maximum/Minimum: 2.636, Variance: 0.531, N of Items: 25)
Descriptive and inferential statistics were used in the data analysis. The descriptive statistics of the research variables were based on a five-point Likert scale. The results highlighted the most relevant variables in case of risk avoidance: "I avoid purchasing illegal or too unexpensive food", "I purchase grocery products in the same grocery store", "I get more and more information about food (doctors, dieticians, magazines, internet)", "I better prepare and organize my purchases", "I prefer Hungarian food over foreign ones", "I trust the inspections of the Hungarian plant protection and veterinary authorities" and "I am confident in

the food risk reduction activities of food control authorities". Table 2 presents the descriptive statistics of the research variables, including medians, modes, means, standard deviations.

Table 2. Descriptive statistics of the determinants

Scale items	Median	Mode	Mean	Std. Deviation
I avoid purchasing illegal or too unexpensive food.	4.60	5.00	5.00	1.93
I purchase grocery products in the same grocery store.	5.00	5.00	4.60	1.35
I get more and more information about food (doctors, dieticians, magazines, internet).	4.00	4.00	3.41	1.27
I better prepare and organize my purchases.	4.00	4.00	3.79	1.31
I prefer Hungarian food over foreign ones.	4.00	5.00	3.73	1.64
I trust the inspections of the Hungarian plant protection and veterinary authorities.	4.00	4.00	3.69	1.63
I am confident in the food risk reduction activities of food control authorities.	4.00	4.00	3.56	1.65
I regularly read blogs and forums about healthy diet.	3.00	3.00	2.66	1.19
I change my food consumption habits.	3.00	3.00	3.28	1.25
I read the product characteristics and labels on the product package.	3.00	4.00	3.39	1.32
I buy branded food.	3.00	4.00	3.27	1.43
I buy food with Protected Designations of Origin and Protected Geographical Indications.	3.00	3.00	2.86	1.73
I buy and consume seasonal food.	3.00	3.00	3.37	1.28
I prefer products that are not produced on a large scale.	3.00	3.00	3.20	1.36
I prefer food made with traditional technology.	3.00	3.00	3.51	2.07
I trust the product identification and tracking system of the food chain (producer, processor, and trader).	3.00	3.00	3.53	1.67
I am confident in the authorities' rapid and effective food recall system (rapid alert system,	3.00	4.00	3.42	1.41

withdrawal from the market, destruction).				
I search for information on brands' websites.	2.00	1.00	2.15	1.09
I follow your favourite brand in the social media news (FB, Instagram).	2.00	1.00	2.14	1.10
I purchase products directly from producers.	2.00	1.00	2.34	1.33
I purchase organic products.	2.00	2.00	2.21	1.31
I buy from local producers and processors, not shipped remotely.	2.00	2.00	2.70	1.40
I prefer food that requires low water consumption.	2.00	1.00	2.71	2.08
I prefer food that requires low carbon production.	2.00	1.00	2.78	2.18
I buy locally from the producer.	1.00	1.00	1.93	1.30

Five-point Likert-scale (1 – "completely disagree"; 5 – "completely agree"), n=1605

The less certain intention is buying from local producers, and the following possibilities: searching for information on websites or on social media channels, purchasing organic products, and purchasing local food. The most frequent answers were completely disagreed with: "I search for information on brands' websites" (78 percent disagree or strongly disagree), "I follow your favourite brand in the social media news (FB, Instagram)" (67 percent disagree or strongly disagree), "I purchase products directly from producers" (67 percent disagree or strongly disagree, 13.2 percent agree or completely agree), "I prefer food that requires low water consumption" (58.3 percent disagree or strongly disagree, 12.7 percent agree or completely agree), "I prefer food that requires low carbon production (58.2 percent disagree or strongly disagree, 14.5 percent agree or completely agree). In terms of other variables, the answer range was higher, and mean shows higher diversity.

Based on the 25 statements, a factor analysis using a principal component technique was applied to identify food purchase intention patterns related to sustainable food consumption. To verify the suitability of the 25 food groups for the factor analysis, communalities were calculated for the scale items. Communality values were between 0.616 and 0.919.

Factor analysis was applied to examine the food safety patterns in terms of sustainable food consumption related to food safety. Exploratory factor analysis (principal component analysis with Promax and Varimax rotation) confirmed the final structure. (KMO–0.746, Bartlett's Test of Sphericity Approx. Chi-Square 19069.244, df 300, Sig. 0.000; factors accounted for 67.935% of variability of the overall original 25 scale items. A total variance Explained was 67.78%.

Cronbach's alpha coeffcients showed a high or satisfactory level of reliability. The items of all scales along with means and standard deviations are reported in Table 2.

Table 3. Measurement quality parameters of scales for determinants of food safety

Factor	Cronbach's Alpha
1 Trust in authorities' measurements	0.904
2 Health consciousness	0.702
3 Purchasing local products	0.795
4 Environmentally responsible production	0.868
5 Purchasing form local producers	0.902
6 Brand consciousness	0.882
7 Information search on the Internet	0.720

The final exploratory factor analysis of the 25 variables resulted in 7 factors. Results of an exploratory factor analysis (principal component analysis with Varimax rotation) confirmed the unidimensional structure and internal consistency of each scale. Internal consistency of sub-scales and the overall scale was tested and Cronbach's alpha coefficients showed high levels of reliability in all the factors (see Table 3).

The seven factors: trust in authorities' measurements, health consciousness, purchasing local products, environmentally responsible production, purchasing form local producers, brand consciousness, information search on the Internet are based on the 25 scale items, and all fit to the factor structure.

Table 4. Factor structure matrix

Item	Factor	Factor value
I trust the product identification and tracking system of the food chain (producer, processor, and trader).	F1	0.927
I trust the inspections of the Hungarian plant protection and veterinary authorities.	F1	0.915
I am confident in the food risk reduction activities of food control authorities.	F1	0.858
I am confident in the authorities' rapid and effective food recall system (rapid alert system, withdrawal from the market, destruction).	F1	0.821
I get more and more information about food (doctors, dieticians, magazines, internet).	F2	0.786
I regularly read blogs and forums about healthy diet.	F2	0.761
I read the product characteristics and labels on the product package.	F2	0.757
I change my food consumption habits.	F2	0.749
I buy and consume seasonal food.	F3	0.795
I prefer Hungarian food over foreign ones.	F3	0.747
I buy from local producers and processors, not shipped remotely.	F3	0.732
I prefer products that are not produced on a large scale.	F3	0.677
I prefer food that requires low carbon production.	F4	0.956
I prefer food that requires low water consumption.	F4	0.941
I prefer food made with traditional technology.	F4	0.791
I purchase products directly from producers.	F5	0.876
I buy locally from the producer.	F5	0.749
I purchase organic products.	F5	0.642
I buy food with Protected Designations of Origin and Protected Geographical Indications.	F5	0.485
I purchase grocery products in the same grocery store.	F6	0.810
I avoid purchasing illegal or too inexpensive food.	F6	0.668
I better prepare and organize my purchases.	F6	0.562
I buy branded food.	F6	0.496
I follow your favourite brand in the social media news (FB, Instagram).	F7	0.864
I search for information on brands' websites.	F7	0.766

Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.

The "trust in the authorities' measurements" factor is the most relevant one forming the factor structure. The items of that factor are visualized on Figure 1. More than half of the respondents reported that they agree or completely agree with the statements, yet 20 percent gave neutral answers. Concerning "I trust the product identification and tracking system of the food chain (producer, processor, and trader)" the neutral answers' frequency was 28.7 percent and the answers "agree" or "completely agree" were around 40 percent.
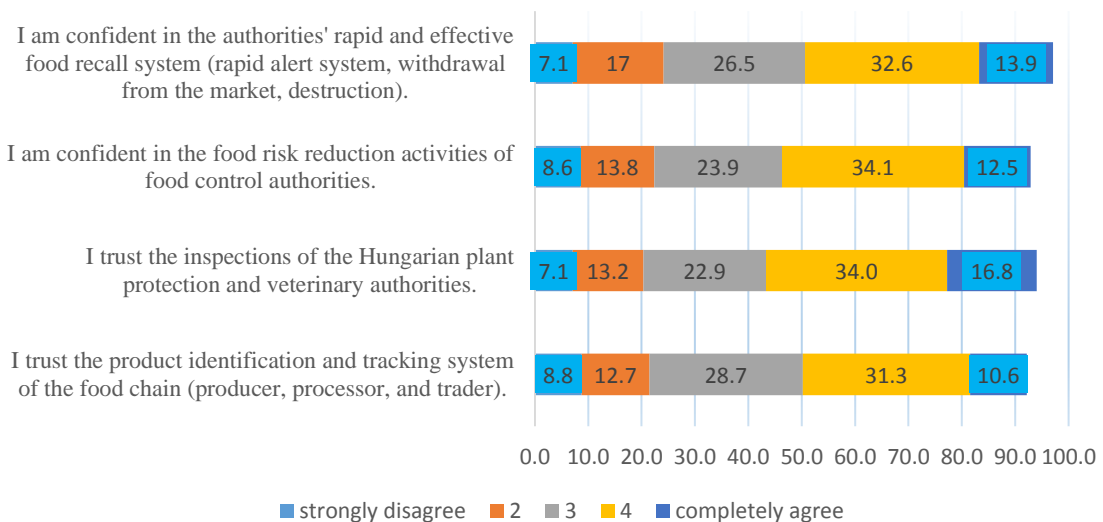

Figure 1. Trust in the authorities' measurements factor – item frequencies in percent

The seven factor components' (n=1608) value was examined in total the sample and two segments: "high sustainable consumption consciousness" versus "low sustainable consumption consciousness" segments. The sustainable consciousness was examined through structured questions. The high consciousness was associated with the focus on the importance of purchasing environmentally friendly food and the intention of influencing others (25% in the sample) and strived to purchase environmentally friendly food but not influenced others (33% in the sample).
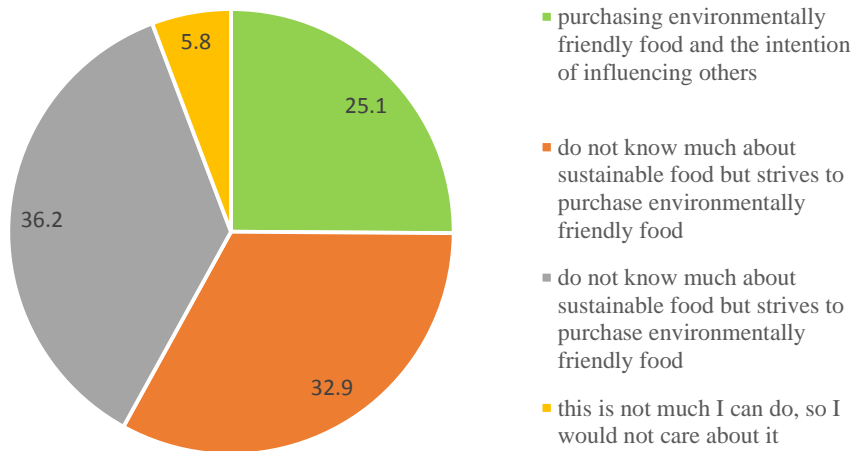
Figure 2. Sustainable conscious food purchase segments - answer frequencies

The low consciousness is associated with the following characteristics: I do not know much about sustainable food but strives to purchase environmentally friendly food (36.2%), this is not much I can do, so I would not care about it. (Figure 2) Another criterion was: the respondents in the low importance of sustainable food consumption segment could not mention relevant environmentally conscious determinant of food purchase, never or rarely purchase environmentally friendly products. For segmentation, open ended and structured questions were used in the questionnaire.

Table 4. The intention in two segments: high and low importance of sustainable food consumption

	Segment 1. High importance of sustainable food consumption	Segment 2. Low importance of sustainable food consumption	Total sample
Trust in authorities	high	high	high
Health consciousness	high	high	high
Local products	average	low	low
Environmentally responsible production	average	low	average
Local producers	low	low	low
Brand consciousness	high	average	average
Search for information on the Internet	average	low	low

The factor item values were used to establish categories high, average and low based on sum of scale items' aswers. There are significant differences between the two segments in terms of purchasing local products, searching for information on the brands' environmentally responsible production, brand consciousness and searching for information on the Internet. (Table 4) There are two dominant factors: environmentally resonsible productions and search for information on the Internet which cause the largest difference between the two groups.

4. CONCLUSIONS

The study examined the factors of food safety related to sustainable food consumption, attempting to integrate food safety issues to sustainable food consumption intentions. Food safety have had an even growing importance and would determine the near future as well. In the findings, the identified seven factors in the sustainable food purchase scale was based on former qualitative research. Stimulating sustainable food production, promoting sustainable food consumption and purchasing local food were examined in realation with sustainable consciousness.

The lack of empirical research in the area does not allow making meaningful comparisons with findings of similar former research. However, existing former research that involves sustainable consumption without the structure of consumer engagement showed trust in the authorities, positive intentions to local food and environmental characteristics, and preferring local (Hungarian) food and grocery products. In this exploratory factor analysis, the study identified seven factors that characterized food safety patterns in therms of sustainable food consumption.

Seven factors were identified: trust in authorities' measurements, health consciousness, purchasing local products, environmentally responsible production, purchasing form local producers, brand consciousness, information search on the Internet were identified. There are significant differences between the two segments: high and low importance of sustainable food consumption groups in terms of purchasing local products, searching for information on the brands' environmentally responsible production, brand consciousness and searching for information on the Internet.

The limitation of the study is the regional sample, the respondents live in Pest county or in Budapest. The other limitation comes from the age group covered by the research, therefore the findings may not be generalized.

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