Analyzing Consumer Awareness and Perceptions about Food Safety in the Context of a European Transition Country Applying Segmentation Approach

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Abstract
Albania has faced serious problems with the national food safety control system in terms of legislation, control and enforcement, which represents a major concern for consumers. The objective of this paper is to analyze consumer awareness about food safety in Tirana, the capital and the largest city of Albania. Analyzes is based on segmentation based on socio-demographic factors, applying two-step clustering. Most consumer state that they are not aware about HACCP, ISO or National Food Authority – however awareness varies by consumer clusters according to socio-demographic background. Clusters consisting of higher educated consumers tend to be more familiar with food safety institutions and certification.

Keywords: Food safety, consumer behavior, cluster analysis, certification, Albania

JEL Codes: D12; D18

1. Introduction

Albania was a planned economy, until 1990 but it embraced market liberalization in the following decades. Since early transition, the country has been characterized by political instability, weak law enforcement and weak institutions which also affect agrifood sector. Albanian agriculture sector has marked remarkable growth over the past decade, achieving surplus in some subsectors. Despite the achievements, it is still struggling with serious concerns about food safety, conditioned by limited resources in the private sector and public institutions in charge of food safety, and gaps of awareness for food safety standards among farmers. The development of food safety standards in Albania is essential for its effective integration into the European and global agricultural markets (Zhllima et al., 2015; Imami et al., 2020).

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In in order to improve the food safety standards situation, National Food Authority (NFA) was established in 2009, with the support of the EU. NFA is the competent authority for managing inspection functions in the field of food safety, consumer protection, plant protection and animal health at the national level. Despite the shortcomings in resources and capacities, during the following years after its establishment, NFA capacities have enhanced, resulting in improved performance, although much remains to be done to achieve the standards required by the EU (Imami and Zhllima, 2019).

Most Albanian farmers across agrifood sectors lack information or awareness related to food safety standards. The situation is more critical in the case of livestock. The lack of formalization is associated with the high food-safety challenge - being informal means being out of the control of state authorities (FAO, 2020). Most farmers lack information about which institutions are in charge of food safety standards control - lack of awareness about standards results in standards non-compliance (FAO, 2020; Gjeci et al., 2016). The problems related to food safety and their perception by consumers for livestock products have been identified by several studies - as a result, food safety has been becoming a factor of increasing importance for consumers (Grunert et al., 2020).

As food safety is a credence attribute, use of cues for inferring safety (and other aspects of quality) is linked to trust in the source of the information. In developed countries with consolidated institutions, consumers tend to trust public institutions and/or supermarket chains to guarantee food safety (Grunert et al., 2020). In the case of countries with a weak institutional framework, such as Albania, the level of trust in public institutions to guarantee food safety may be lower. Imami et al. (2011) have found that consumers in Albania trust more in the butcher (retailer) than in public institutions for guaranteeing food safety. Similar results are also explored at a recent study on goat meat (Cela et al., 2019). In addition to developing trust in the retailer, when possible, consumers prefer to buy food directly from producers as a strategy to ensure safety and quality, which is common in the case of some products such as olive oil (Imami et al., 2013). Furthermore, origin (domestic and local origin) and brand reputation are important attributes to guarantee food safety for Albanian (Haas et al., 2019). In other studies price is emerging as a signal for safety (Cela et al., 2020).

Considering the situation in Albania, internationally recognized certification that ensures the buyer of the food safety (and other relevant) standards, are essential to target the demanding EU market. This way, the Albanian producers also demonstrate they can meet safety standards requirements posed by supermarket chains, especially in EU countries, to achieve a better market access and prices for the supplying farmers (Imami et al., 2020).

The objective of this paper is to analyze consumer awareness for food safety based on clustering analysis. More specially, the paper highlights consumer awareness about NFA, about main certifications or standards (related to food safety), and their attitude toward food label information. The following section consists of the

literature review. Section 3 describes the methods; Section 4 provides the results while Section 5 the conclusions.

2. Literature review

The last decades have brought major behavioral changes to consumers in developed and developing countries. Lack of compliance with food safety standards result in lost production, medical care, ill-health of other members of society (Henson and Traill, 1993). Some argue that 'market failure' is endemic and intervention justified (Swinbank, 1993). Public agencies are responsible for ensuring food safety enforcement, however, their capacity in the context of developing or transition countries is limited, conditioned by the weak institutional framework and corruption (Imami et al., 2020).

In developed countries, consumers typically view that the public institutions are responsible for guaranteeing safety (Van Wezemael et al., 2011; Pauselli et al., 2010). However, some studies in developed countries, question the role of government in guaranteeing food safety (Corcoran et al., 2001; Popova et al., 2010). Certification strategies have been developed to improve consumer perception of food safety, with the main objective to transform food safety from a credence attribute to a search attribute. These interventions in assuring a more controlled food safety system through certification have not achieved the necessary food safety perception for some products (Corcoran et al., 2001; Young et al., 2009). There are a number of factors which consumers in developed countries suffer from, being misconception and ignorance regarding general food safety topics (Schroeder et al., 2001).

Food safety has become an important concern also in transition and developing countries. Various authors such as Schillhorn van Veen (2005) find that in these countries there is confusion, or lack of proper understanding or awareness about food safety standards, a lack of integration of food laws and other regulations in the overall legislative system and a multiplicity of responsible agencies. Trienekens & Zuurbier (2008) show that there are problems created from the disability of producers in developing countries to comply with safety standards.

The food distribution systems have been adjusting to the change of consumer preferences in conjunction to evolving lifestyle, higher incomes, urbanisation and trade liberalization, which have affected many transition and developing countries. The emerging supply chains are requiring new institutional systems of safety (Mergenthaler et al., 2009; Hammoudi et al., 2009) in order to respond to consumer food safety expectations. Despite the concerns about food safety, there is limited research on consumer perceptions and awareness about food safety, when compared to developed countries. Several studies highlight consumers concerns about food safety in developing countries, similarly to developed countries (Jabbar et al., 2010; Kealesitse and Kabama, 2012).

Zheng et al. (2012), Adesope et al. (2010), Posri et al. (2006), Zhang (2005), and Nganje and Katibie (2003), found that in developing countries socio-demographic indicators, including education and gender, may significantly affect the safety risk perception of consumers and their following purchase and consumption decisions. Nganje and Katibie (2003) show that safety risk perceptions are strongly affected by personal health factors; socio-cultural, demographic, and economic factors. The most important socio-cultural and demographic factors are age, gender, education, place of residence and income. Similar with developed countries, higher levels of education and the influence of technology to access food information are enabling consumers to be better informed about food safety (Rodríguez et al., 2006; Birol et al., 2010; Jabbar et al., 2010).

This paper analyzes consumer awareness and perceptions related to food safety based on clustering taking into consideration various demographic and social variables in the context of weak food safety monitoring and enforcement system. Our hypothesis is that consumer perceptions are affected, amongst others, by socio-demographic factors, especially education and gender, expecting higher awareness among female and educated consumers in line with previous research findings.

3. Methode and procedures

There were carried out 300 interviews with randomly selected consumers during summer 2012 (Table 1). Interviews took place in different market sites in Tirana (the largest urban areas in Albania – Tirana is the capital of Albania, consisting of 30% of Albania's population (INSTAT, 2012). The capital's population is diverse in terms of culture, religion and income (Vercuni et al., 2016). The interviews were carried out by trained student(s) and academic staff, at various sites, as suggested by the focus group and previous experience of similar research.

Table 1: Socio-demographic profile of interviewees

Indicator	*Frequency*	**Percent**
Gender		
1 Male	142	47.3
2 Female	158	52.7
Education		
1 No Education	1	.3
2 Basic (4)	2	.7

3 Complete primary	25	8.3
4 Secondary (high)	148	49.3
5 University	124	41.3
Total	300	100.0

Source: Authors analysis based on structured survey

Interviews were structured containing nominal and Likert scale questions, whereby some questions with ordinal scales to measure preferences. Data has been entered into CPRo based database, which was transformed into SPSS file and was analyzed based on descriptive statistics.

In this study the analysis is performed using cluster analysis. The consumer sample was classified through a two-step clustering technique based on key socio-demographic variables that were used as input factors. The two-step cluster analysis (SPSS 19 statistical package) is an exploratory multivariate data analysis technique that allows clustering large data sets with both continuous and categorical attributes. The method is based on a probabilistic approach, in which the clustering algorithm uses a likelihood distance measure as the similarity criterion and the best number of clusters is chosen on the basis of Schwarz's Bayesian inference criterion (BIC). The main advantage of this unsupervised clustering procedure is essentially reducing the influence of researcher's subjective judgement and avoiding the arbitrariness of traditional clustering techniques (Norusis, 2003). This approach has been applied to previous research work on consumer behaviour in Albania (Zhllima et al., 2015; Imami et al., 2017).

SPSS (19) automatically calculates the clustering (number of groups) that fits best abovementioned BIC and assigns silhouette coefficient. The silhouette coefficient is a measure for the clustering quality that is rather independent from the number of clusters k and it can be used to evaluate cluster validity. The value of the silhouette coefficient can vary and take values up to 1. The higher the average silhouette coefficient (or the closer to 1), the "better" is the clustering (Al-Zoubi and Al Rawai, 2008). Kaufman and Rousseeuw (1990), suggest that values of Silhouette Coefficient above 0.5 indicate good separation between clusters. SPSS 19 also ranks inputs factors (based on which clustering is done) according to their "importance" and calculates automatically the level of importance (the closer to 1, the more important).

The literature review (see the previous section) shows that safety risk perceptions are strongly affected by socio- demographic factors. Therefore, in this study two-step clustering was applied based on key socio-demographic variables, namely gender, education, and age which were used as input/predictor factors. Five clusters were obtained by SPSS (best clustering with highest Silhouette

coefficient), whose structure is summarized in Table 2. The most important determinant factors are gender and education (categorical variables).

4. Results

Five clusters have been formed based on respondents' demographics similarity (Table 2). Cluster 1, which can be named *basic education-older people cluster*, consists of older people, gender balanced, with basic education (up to 8 or 9 years). Cluster 2, named *university-young male cluster*, consists entirely of male, with university degree, relatively young, whereas Cluster 3 (the largest cluster), which can be named *high school-older male* cluster, consists of older males with high school education (normally up to 12 years). Cluster 4, *high school-older females cluster*, consists of older female consumers, with high school education whereas Cluster 5, *university-younger female cluster*, consists of younger female with university degree.

Table 2: Cluster analysis results, BIC 15, Silhouette Coefficient = 0.6

	Clusters					**Level of importance**
	Basic education-older people	*University-younger male*	*High school-older male*	*High school-older females*	*University-younger female*	
Sample Size	9.3% (28)	16.7% (50)	26.3% (79)	23% (69)	24.7% (74)	100%
Input factors						
Education	Up to 8 classes 100%	University 100%	High school 100%	High school 100%	University 100%	53%
Gender	Female 53.6%	Male 100%	Male 100%	Female 100%	Female 100%	13%
Age	56.1	38.1	47.3	48.1	35.2	

Source: Authors analysis based on structured survey

Most consumer (80% of them) state that they are not aware about HACCP. Also, within each of the identified consumer clusters, most consumers are not aware about HACCP. In the case of Cluster 2 "University-younger male" and Cluster 5 "University-younger female" there is higher presence of those who are aware about HACCP – namely 46% and 31% percent respectively. In all other clusters, about 90% of consumers state that they do are not aware about HACCP (Table 3).

Table 3: Answer to the questions "Do you know/are you aware about HACCP?"

Answer	Cluster										Total	
	Basic education -older people		University-younger male		High school-older male		High school-older females		University-younger female			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Yes	1	4%	23	46 %	9	11 %	4	6%	23	31 %	60	20 %
No	27	96 %	27	54 %	70	89 %	65	94 %	51	69 %	240	80 %
Total	28	100 %	50	100 %	79	100 %	69	100 %	74	100 %	300	100 %

Source: Authors analysis based on structured survey

Consumers tend to be more familiar with ISO than HACCP however still, most interviewees are not aware of ISO (namely 56%). Most consumers in Cluster 2 and Cluster 5 (university educated consumer clusters), are aware about ISO, whereas most consumers in the other (less educated) clusters are not aware about ISO (Table 4).

Table 4: Answer to the questions "Do you know/are you aware about ISO?"

Answers	Cluster										Total	
	Basic education -older people		University-younger male		High school-older male		High school-older females		University-younger female			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Yeas	3	11 %	37	74 %	30	38 %	15	22 %	46	62 %	131	44 %
No	25	89 %	13	26 %	49	62 %	54	78 %	28	38 %	169	56 %

Total	28	100 %	50	100 %	79	100 %	69	100 %	74	100 %	300	100 %

Source: Authors analysis based on structured survey

Most consumers in Cluster 2 (University-younger male) and Cluster 5 (University-younger female), namely 76% and 68% respectively, are aware about National Food Authority, whereas most consumers in the other (less educated) clusters are not aware about National Food Authority (Table 5). In all, there is more awareness for Food Authority than about ISO or HACCP.

Table 5: Answer to the questions "Do you know/are you aware about National Food Authority?"

Answers	Cluster										Total	
	Basic education -older people		University-younger male		High school-older male		High school-older females		University-younger female			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Yeas	6	21 %	38	76 %	30	38 %	20	29 %	50	68 %	144	48 %
No	22	79 %	12	24 %	49	62 %	49	71 %	24	32 %	156	52 %
Total	28	100 %	50	100 %	79	100 %	69	100 %	74	100 %	300	100 %

Source: Authors analysis based on structured survey

Most consumers (62%) state that they check regularly the expiring date, before buying food products, while about 24% state that they check often – about 14% of respondents never or rarely check the expiring data before buying (Table 6). Situation differs between clusters. 76% of consumers in Cluster 2 (University-younger male) and 86% of consumers in Cluster 5 (University-younger female) state that they always check the expiring data before buying a product – within these two educated clusters, Cluster 5 (University-younger female) pay more attention to expiring date information, compared to the educated male Cluster 2 (University-younger male). Also, in the case of Cluster 3 and 4 (high school educated clusters) there is a regular check of expiring date though less frequent compared to Clusters 2 and 5 (University educated clusters)

Table 6: Answer to the questions "Do you check expiring date before buying food?"

Answ	*Clusters*	*Total*

er	*Basic education -older people*		*University -younger male*		*High school-older male*		*High school-older females*		*University -younger female*			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Never	2	7%	2	4%	0	0%	1	1%	0	0%	5	2%
Rarely	11	39 %	1	2%	11	14 %	11	16 %	2	3%	36	12 %
Often	9	32 %	9	18 %	25	32 %	22	32 %	8	11 %	73	24 %
Always	6	21 %	38	76 %	43	54 %	35	51 %	64	86 %	186	62 %
Total	28	100 %	50	100 %	79	100 %	69	100 %	74	100 %	300	100 %

Source: Authors analysis based on structured survey

Most consumers in Cluster 5 (*University-younger female*) state that they always read label information before buying food, while only 12% state that they never or rarely read label information. Whereas only 46% of the Cluster 2 consumers (*University-younger male*) do read always labeling before buying, while 26% of the consumers in this cluster state that they never or rarely read label information. More than 4/5 consumers of Cluster 1 (*Basic education-older people*) do never or rarely read label information. About 38% and 45% of consumers in Cluster 3 (*High school-older male*) and Cluster 4 (*High school-older females*) respectively do never or rarely read label information.

Table 7: Answer to the questions "Do you read food label information before buying food?"

Answer	Clusters					Total
	Basic education-older people	University-younger male	High school-older male	High school-older females	University-younger female	

	Freq	%	Freq	%	Freq	Freq	%	Freq	%	Freq	Freq	%
Never	5	18%	3	6%	3	4%	4	6%	1	1%	16	5%
Rarely	18	64%	10	20%	27	34%	27	39%	11	15%	93	31%
Often	5	18%	14	28%	29	37%	25	36%	22	30%	95	32%
Always	0	0%	23	46%	20	25%	13	19%	40	54%	96	32%
Total	28	100 %	50	100 %	79	100 %	69	100 %	74	100 %	300	100 %

Source: Authors analysis based on structured survey

The main source of information about safety for 36% of respondents consists of retailers. More than 1/5 use internet to obtain information about food safety while only 5% consult experts (Table 8). Cluster 5 (*University-younger female*) rely largely on internet (almost half of the respondents have chosen). The less educated consumer clusters rely largely on retailers to inform them.

Table 8: Answer to the questions "Which is the (main) source of information about food safety?"

Cluster	Clusters										Total	
	Basic education-older people		University-younger male		High school-older male		High school-ol-der females		University-younger female			
	Freq	%	Freq	%	Freq	Freq	%	Freq	%	Freq	Freq	%
Collegues/ friends	1	4%	10	20%	12	15%	13	19%	9	12%	45	15%
Internet	0	0%	11	22%	11	14%	5	7%	35	47%	62	21%
Experts	2	7%	7	14%	2	3%	3	4%	2	3%	16	5%
Retailer	18	64%	9	18%	33	42%	32	46%	16	22%	108	36%
News papers	0	0%	0	0%	5	6%	6	9%	1	1%	12	4%
TV	2	7%	8	16%	11	14%	6	9%	5	7%	32	11%
No info	5	18%	3	6%	3	4%	3	4%	4	5%	18	6%

Source: Authors analysis based on structured survey

5. Conclusions

Most consumer state that they are not aware about HACCP, ISO or Food Authority. However, in the case of Cluster 2 "University-younger male" and Cluster 5 (University-younger female) there is higher presence of those who are aware about ISO and HACCP – namely 46% and 31% percent respectively. In all other clusters, about 90% of consumers state that they do are not aware about HACCP. In all, there is more awareness for Food Authority than about ISO or HACCP. Most consumers in Cluster 2 (University-younger male) and Cluster 5 (University-younger female), are aware about Food Authority, whereas most consumers in the other (less educated) clusters are not aware about Food Authority.

Most consumers state that they check regularly the expiring date, before buying food products. Situation differs between clusters – both educated clusters, especially Cluster 5 (University-younger female) pay more attention to expiring date information and label information, compared to other consumer clusters. Also, Drichoutis et al. (2006) has found that education and gender (that is being female) positively affecting label use.

Overall, there are serious gaps in consumer awareness about food safety in Albania, although awareness varies by consumer groups according to socio-demographic factors which. Female and higher (university) educated clusters result to have a higher awareness about food safety as expected and also in line with findings of studies on other countries such as Zheng et al. (2012), Adesope et al. (2010), Posri et al. (2006), Zhang (2005), and Nganje and Katibie (2003).

Communication and advertising strategies about domestic food safety from policymakers and companies, can focus on female consumers, and better educated consumers. On the other hand, stakeholders could focus especially on lower educated consumers to reduce their information gaps about food safety and quality related information (Haas et al., 2019; Meixner et al., 2020).

An important finding relates to attention paid to label information (food safety and nutritional information): young university educated people both male and female pay more attention to label information while the less educated older cluster of consumers pay the least attention. Young educated people are more aware what "they consume" and about the impact of food in their health while less educated-older people are not. Actually, while the there is a need to educate consumers on food intake because this is related to people health, there is an imperative to improve the content of information label and design a tailored education campaign targeting older people as a matter of priority.

Policy makers and food companies should improve the level of trust in public/private institutions to guarantee food safety, and to increase the awareness and knowledge of consumers about it. An important institutional measure could be the establishment of a national food quality and quality organization. For example, in the case of Austria, during EU accession, the government decided to establish an agricultural organization, independent from the Ministry of Agriculture, to be focused on food safety, quality and food marketing, the so-called AMA

(Agricultural Market Austria). AMA was responsible to harmonize the legal framework for food production, food safety and marketing. It developed a nationwide quality and origin certificate, the AMA quality seal, which is one of the best-known food certificates in Austria nowadays. It would be highly advisable for Albania to follow the same pattern also in the context EU accession plans (Haas et al., 2019; Meixner et al., 2020). Thus, NFA can redimensionate its role and mandate following AMA example, or a separate institution can be established.

The paper has several limitations. First, the survey data are rather old (dating back to 2012). However, the study findings are relevant, since the problems related to food safety remain persistent (FAO, 2020; Imami et al., 2020). On the other hand, the findings of this study, can serve as "base line" to assess evolution of consumer awareness and perceptions for food safety over time.

Second, the paper relies on descriptive statistical and clustering analysis. While clustering provides interesting insight into consumer perceptions by type of socio-demographic variables based on which the clusters are built, there is a limit through this approach to explain the rationales and causality. Future research, combining quantitative with qualitative research is necessary to highlight that.

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