# ESTIMATING THE IMPACT OF SOCIO-DEMOGRAPHIC FACTORS IN WILLINGNESS TO PAY FOR FOOD SAFETY - THE CASE OF KOSOVO

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**Abstract**

The aim of this paper is to determine whether the dairy customers in Kosovo are ready to pay a higher price for certified products on food safety and which is the impact of socio-demographic factors in WTP. An observation of 303 Viva Fresh markets' customers was conducted for this purpose between 1 April and 5 May 2015, who were asked during shopping, inside supermarkets in the cities of Pristina, Gjilan and Vitia.

Logit Binary model was applied to analyse the results and test the hypothesis, which showed that the level of education, the level of incomes and the families with preschool children have a significant impact ($p<0.05$) in WTP. Other tested factors such as: the age, gender, residence (city-village), the number of family members, pensioners and the number of children in schools (6-17 years) in the families didn't show a significant impact ($p>0.05$).

**Keywords**: Willingness to Pay, food safety, socio-demographic factors, logistic regression

**Topic Groups**: Marketing and consumer behavior, Social sciences and business

## INTRODUCTION

Food safety, is each day posing a concern for customers, because of the problems and incidents coming out, such as the cases of avian influenza, "crazy" cows, or melamine in baby milk in China, etc. Consequently, consumers also express their willingness to pay extra prices in exchange for additional security of the products they consume. Numerous researchers, have paid and continue to pay a special attention on the willingness to pay a premium price for the additional food safety attributes (Grunert, 2005; Fox et al., 1995; Loureiro & Umberger, 2003; Piggott & Marsh, 2004; Baker & Crosbie, 1993; Xu & Wu, 2010; Lončarić et al., 2011).

Though there are few studies of this kind in Kosovo, there is a considerable degree of concern in terms of food safety (Canavari et al., 2014). According to this study, 2/3 of the interviewed customers claim to be quite concerned about food safety.

On the other hand, imported products continue to dominate Kosovo agro-food market, a situation which is still present 15 years after the liberation. Within the overall structure of imports, food products have the central place with over 24.2% (ASK, Jun 2015) while Kosovo has an extremely high deficit in the trade balance. According to the Statistics Agency of Kosovo, the deficit in 2015 was over €21.2 billion in total with degree coverage of 12.8%.

In this unfavourable trade balance, in terms of agro-food market, the dairy processing industry is considered as a sector that witnessed the fastest growth (Haas et al., 2015). However, even in this sector the level of food safety remains at a low level, at least in terms of food safety standards certification. A very small number of companies in this sector have their products certified with food safety standards such as ISO 22000 or food safety system HACCP.

Although a strong patriotism among Kosovo consumers is evident, which show confidence that local dairy milk is safer than the one imported (Haas et al., 2015), in relation to products coming from European Union (in regard to food safety), consumers show more trust compared to local products (Canavari et al. 2014). Products from EU countries represent the largest part of the total imports value with a trend that ranges between 40-45% in the last six years (ASK, June 2015).

As stated above, it can be said that food safety represents an important factor for the market in Kosovo that should be studied through specific dimensions. This is important also for political decision-makers in order to focus domestic policies towards the development of agro-food sector in Kosovo, namely the dairy industry but also the entire value chain, because, in order to increase consumer confidence to local products and therefore improvement trade balance, the investment in food safety should represent a priority alternative.

## PROBLEM STATEMENT

As stressed above, it is necessary to understand consumers' willingness to focus on domestic products as a reflection toward the increase of food safety, since this dimension of the market in Kosovo so far is little studied. In many papers (Verbeke,

2005; Shi & Price, 1998; Baker G. A., 1999; Boccaletti & Nardella, 2000; Loureiro & Hine, 2002; Huang et al., 2000) there is a conclusion that costumers express WTP when it comes to improving attributes related to food safety. Incomes, level of education, gender, age, residence, etc., are also important factors that determine costumers' behaviour and their WTP.

In this regard, the reaserch problem can be formulated as: a need to better understand WTP additional price for food safety attributes for dairy products and the impact of socio-economic, demographic factors (SEDF) to this willingness.

## OBJECTIVE AND HYPOTHESES

So, the goal of this paper is to measure the impact of above mentioned factors on WTP of dairy consumer in Kosovo, which serves as the basis for the research hypotheses such as:

1. *The income level of consumers has a positive report with the willingness to pay more for food safety.*
2. *The level of education has a positive report with the willingness to pay more for food safety.*
3. *Demographic factors (age, gender, number and the structure of the family (the presence of children and pensioners), type of residence (urban-rural)) affect the willingness to pay more for product safety.*

## PROCEDURES AND METHODS

### Methods

For studying or assessing consumers' behaviour, WTP respectively, there are generally two methodological approaches: Revealed Preference and Stated Preference. The first approach focuses the observation on the consumer's behaviour in the market to measure its ex-post WTP, while the second approach is based on hypothetical data to measure ex-ante WTP for attributes that are not present in the market yet (Berges & Casellas, 2009). Out of two basic methods derive other sub-divisions depending on the source of data and the way of collection. Sub-divisions are shown schematically in Figure 1.

**Figure 1**: Classification framework of the methods to measure WTP
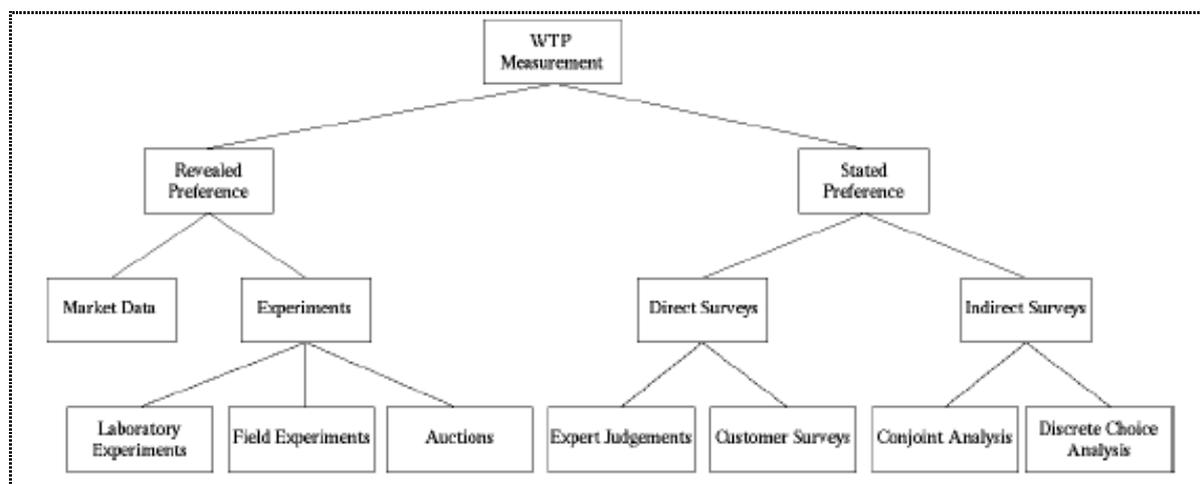


Source: From "A Review of Methods for Measuring Willingness-To-Pay", by Ch. Breidert, M. Hahsler, Th. Reutterer, 2006, Innovative Marketing, 2(4), 8-32.

In case of our research, SEDF involvement in current conditions in Kosovo, is possible by carrying out a direct observation through customer surveys. So, quantitative methods in this research will be used since it belongs to stated preferences, which is the one of "face-to-face" questioning of the costumers during the shopping. In this way the data is taken directly from the decision-maker and thus the real preferences of the customers will be better understood (Loureiro & Umberger, 2003).

**The model**

Econometric model for testing hypotheses is the one of regression where the "willingness to pay for additional safety - WTP" will be a dependent variable, while the others involved in hypotheses 1, 2 and 3 will be independent variables (explanatory) . Since the dependent variable is dichotomous in this case, then dependent dummy model variable will be binary logit model (Osmani, 2010).

$$P_i = \frac{1}{1 + e^{-a - b_i X_i}} \qquad (1)$$

As shown above, this model is not linear in parameters therefore the Ordinary Last Squares (OLS) can not be directly used. It can be transformed into linear and behave as such in the following form::

$$L_i = ln \frac{P_i}{1 - P_i} = a + b_i X_i + e_i \qquad (2)$$

To simplify the understanding of the model and interpretation, in our case, if the customer reacts positively in paying extra price we define it as a success and will mark 1, while the opposite is non-success and marked with 0. The quotient between the probability for success and non-success of an independent variable

model (when the independent variable is categorical) is the expression in equation

(2): $\dfrac{P_i}{1-P_i}$  which is **odds**.  From here on we have the equation of the logistic regression:

$$\log(odds) = a + b_i X_i + e_i \quad (3)$$

As shown above the coefficient *a* has no significance in interpretation, it represents log value (odds) when X=0. While $b_i$ - is the coefficient which shows the existing relationship between independent variable and log (odds) for the occurrence of the event that we have interests of, namely on the changes that occurs with odds for the event that interests us to happen when variable X changes for one unit.

When: **$b_i$>0** – the relationship is positive;
  **$b_i$<0** – the relationship is negative;
  **$b_i$=0** – there is no relationship between dependent and independent variables.

In fact $b_i$ represents the change between two categories of variable X (in cases when it is categorical variable) which can also be presented as: $b_i = log(odds\ ratio)$ . When we do an anti-logarithm and odds radio is written as OR we win the expression: $OR = e^{b_i}$

**Data**

Data are obtained from the survey. A questionnaire that provides answers to the research hypotheses and the model used for their testing is prepared and tested in advance. The survey was conducted within the premises of Viva Fresh Store supermarket network, in the dairy products sector, namely white cheese, milk and yogurt. This is because: (i) the customer was interviewed immediately after the shopping; (ii) during the survey the customer had also present other products which helps in providing more accurate answer about his decision by taking into account the alternatives; (iii) consumers were in a position to express more realistic in terms of the questionings about their decisions, since they have the product in front of them and there is an opportunity to analyse whether they check the content in the label or not.

In the observation conducted between 1 April and 15 May 2015, were involved a total number of 303 consumers, above 18 years old. Customers' selection was random.  After conducting an interview, the next one was conducted with the first customer who bought dairy products and agreed to be interviewed.

Based on the data from quantity sold dairy, in Viva Fresh Store markets, and based on socio-economic and demographic data of the Republic of Kosovo census (ASK, 2013a; ASK, 2013b; ASK, 2013c), and with the aim the sample to be as representative as possible, the studding centres were selected in three different localities with different size and a diverse population.

In capital Pristina, as a representative of the group of cities with over 100 thousand inhabitants, 153 surveys were conducted, in one of the biggest markets located in the vicinity of the city (called Veternik) and at another point inside the city, in the road B, which according to Viva Fresh Store officials has the biggest sale after the one in Veternik. The other selected locality was Gjilan, from the group of towns with 50-100 thousand inhabitants. 110 surveys were carried out in two different markets there. 40 interviews were conducted in a Viva Fresh Store market, in the small town of Vitia (which has less than 50 thousand inhabitants).

**Table 1**: Aspects of operationalization the data from the surveys with dairy customers

| Hypothesis | Concept | Variable | Measuring options-implementation | Symbols |
|---|---|---|---|---|
| | | | **Dependent variable** | |
| | Willingness to pay | *GPP* | Dummy variable 1= willingness to pay 0=lack of willingness | **GPP** |
| | | | **Independent variables** | |
| **1`** | Level of family incomes | *Incomes* | Ordinal/interval variable, width 100€ Clas 1: - up to 100; K2 -100-200;...; 9 - 900+ | **Incomes** |
| **2** | Level of education of the interviewed | *Education* | Dummy variable: high: middle: elementary. *A1) 1-high; 0 -other* | **HighEdu** |
| | | | *A2) 1 - middle; 0 other* | **MidleEdu** |
| **3** | Demographic factors | *The age of the interviewed* | Report variable *Number of years* | **Age** |
| | | *Gender of the interviewed* | Variabël dummy 1=Male, 0=Female | **Gender** |
| | | *Under 5 years old children presence in the family* | Dummy variable 1=there are under 6 years old kids; 0=there is not | **NoSchKids** |
| | | *Presence of kids between 6-18 years* | Dummy variable 1=there are kids over 5 years old; 0=there is not | **SchKids** |
| | | *Presence of pensioners* | Dummy variable 1=there are pensioners; 0=there are no pensioners | **PensionNr** |
| | Respondent's residence | *Residence* | Dummy variable 1 – city; 2 - village | **Residence** |

**RESULTS**

**Summary of socio-demographic characteristics of the sample**

Table 2. shows a discrepancy with census data, but there is a logical explanation if taken into account the fact that in the sample are included only customers of a network of supermarkets, although hypermarkets and groceries are most preferred shopping centres for dairy products' customers (Haas et al., 2015). Thus compared to 2011 census data, it shows that 65% of the customers in the sample are from the city while 62% of the total population lives in rural areas (ASK, 2013b). We also keep in mind the fact that the interviewing places were in urban areas.

The gender balance in the sample is 65% to 35% in favour of male, while the report in the population is 50:50. As much as we can take for granted the fact that the gender of buyers is dominated by male, also referring to the interviewed is proved that in most cases, female buyers generally rejected being interviewed, while in cases when a couple bought products, it was the men willing to be interviewed.

**Table 2**: Socio-demographic characteristics of the sample - Descriptive statistics

| Socio-demographic characteristics | Fi | Percentage | Average | Stand. deviaton | Mode | Mediana |
|---|---|---|---|---|---|---|
| **Residence:** | n=302 | 100 | | | | |
| - City | 197 | 65.2 **(38)** | | | | |
| - Village | 105 | 34.8 **(62)** | | | | |
| **Gender** | n=303 | 100 | | | | |
| - Male | 197 | 65 **(50.34)** | | | | |
| - Female | 106 | 35 **(49.66)** | | | | |
| **Nr. of members in a family** | n=303 | 100 | 4.89 **(5.9)** | 1.834 | 4 | 5 |
| **Age** | n=303 | 100 | 38.27 | 11.995 | 30 | 37(26.3) |
| **Structure of the family:** | n=303 | 100 | | | | |
| - Nr. of pensioners: 0 | 215 | 71 | | | | |
| 1 | 55 | 18.2 | | | | |
| 2 | 33 | 10.9 | | | | |
| - Nr. of children: 0 | 90 | 29.7 | | | | |
| 1 | 64 | 21.1 | | | | |
| 2 | 95 | 31.4 | | | | |
| 3 | 35 | 11.6 | | | | |
| 4 | 14 | 4.6 | | | | |
| 5-8 | 5 | 1.6 | | | | |
| **Incomes** | n=300 | | | | 900+ | 400-500 |
| **Education level:** | n=302 | 100 | | | High | High |
| - Without education | 3 | 1.0 **(6.22)** | | | | |
| - Elementary | 37 | 12.3 **(50.27)** | | | | |
| - Secondary | 110 | 36.4 **(34.17)** | | | | |
| - High | 152 | 50.3 **(9.34)** | | | | |

*- data in brackets were taken from 2011 census

Even in regard to the level of education, there are differences with 2011 census education which shows that buyers generally have high level of education, with over 50%, a data equal with the research from Haas et al. (2015). Whereas the average age in the case of this study was 38.27 which is also corresponding to Haas et al (2015) in which is 38.4 with a standard deviation of 12.3. As regard to data from 2011 census, the median age is 26.3, while in our research was 37. The family structure is dominated by families without pensioners 71%, and most families have at least one child[1] while 29.7% are families have no child.

On the family incomes the question was submitted through ordinal alternatives divided into 9 classes starting with the first one limited to €200, followed by €100 intervals for the next groups until the last alternative which was €900 and over. Distribution in this case is asymmetrical which is also influenced by the income differences between cities where the interviews were conducted. Consequently, the most representative average in this case is in the median interval alternatives of 400-500 €.

**Consumption of dairy product**

Dairy products settle an important place in the daily meal of Kosovo families. Milk is a traditional product in Kosovo and elsewhere in the Balkans in terms of consumption and production (USAID, 2008). It is estimated that the consumption of milk per capita amounts to about 160 litters[2]/annually (Nushi & Selimi, 2009). But based on various studies there are available different data on consumption, depending on the surveys' specifics. On table 3 are presented the field results of a survey compared with two other researches (Haas et al., 2015; Miftari et al., 2011).

**Table 3**: Monthly average consumption of dairy products and comparisons with other researches

| Product | N | Mean | Std. Deviation | (Miftari et al., 2011) | | (Haas et al., 2015) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | Mean | Std.Dev | Mean | Std. Dev. |
| **Milk (l/month)** | 294 | 31,81 | 21,792 | 26.30 | 14.53 | 7.07(l/week) | 4.923 |
| **Cheese (kg/month)** | 300 | 3,13 | 1,966 | 4.67 | 2.53 | 3.31(kg/week) | 3.122 |
| **Yogurt (l/month)** | 287 | 25,14 | 18,668 | 10.51 | 7.53 | 3.73(kg/week) | 3.058 |

Source: Field survey and Miftari et al., 2011 & Haas et al., 2015

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[1] Children are considered those between 0-17 years old
[2] This amount reflects the equivalence on the amount of milk for all milk products consumed in a year. For instance, a litter of pasteurized milk is equivalent to one litter of raw milk, while a kilo of yellow cheese requires an average of seven litters of raw milk.

From the dairy products bought by our respondents we got the insight presented in Figure 1 which shows that out of 303 buyers most of them bough only milk (26.7%), followed by those who have bought milk and cheese also (20.5%) followed by those who bought only cheese (18.5%).

**Graphic 1**: Purchases by type of dairy products executed by respondents
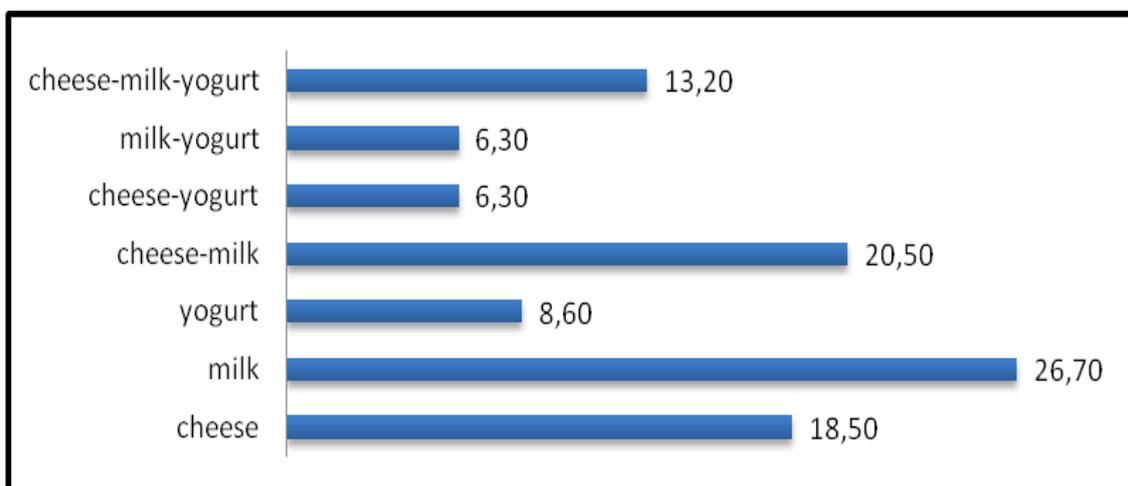


Source: Field survey

**Logit binary model (logistic regression) and the impact of SEDF in WTP**

Logit model helps in explaining the impact of SEDF in the WTP expression. Dependent variables in the model (WTP) separates respondents in two categories: those who are willing to pay and those who are not (Latvala, 2010). Table 4 shows that most of interviewed buyers (74.8%) are willing to pay extra price for the products certified with food safety standards. Let stress that before asking this question which was the last in the questionnaire (on the willingness to pay a higher price compared to the current price of the product), a sufficient explanation was provided to them on food safety concept, in cases when it's apparent that for the customer it was not clear the food safety concept and it was a confusion with the quality concept.

**Table 4**: Willingness to pay – discriptive statistics

| | | Frequency | Percentage | Valid percentage |
|---|---|---|---|---|
| **Are you WTP for certified products?** | No | 76 | 25,1 | 25,2 |
| | Yes | 226 | 74,6 | 74,8 |
| | Total | 302 | 99,7 | 100,0 |

Source: Field survey

After inserting in the model statistically important factors only, SPSS in assessing an accurate forecast of observed and predicted values (Table 5) shows that the model has managed to have a successful forecast at 75.2% degree, which indicates a good model.

**Table 5**: Observed and predicted values produced by logit binary model

| Observed values | Predicted values | | |
| :---: | :---: | :---: | :---: |
| | No GPP | Yes GPP | Correct percentage |
| **No GPP** | 0 | 74 | 0,0 |
| **Yes GPP** | 0 | 224 | 100,0 |
| **Total percentage** | | | 75,2 |

Source: Field survey

Results of logistic model, presented in Table 6 indicate which of SEDF have a significant statistical impact in explaining variations in the willingness of buyers to pay extra cost for certification of dairy products with safety standards. Variables that have been tested but have not been statistically significant are not included in the table.

**Table 6**: Logit binary model (n=303)

| Variables | $b$ | Standard error | Sig. | Odds ratio ($e^b$) |
| :--- | :---: | :---: | :---: | :---: |
| **HighEdu ($X_1$)** | ,621 | ,312 | ,046 | 1,860 |
| **NoSchKids ($X_2$)** | ,424 | ,199 | ,033 | 1,529 |
| **Incomes ($X_3$)** | ,128 | ,059 | ,030 | 1,137 |
| **Constant** | -,110 | ,349 | ,752 | ,896 |

Source: Field survey –SPSS processing

From this model the probabilitety can be calcluated with the following equation:

when $Z = -0.11 + 0.621X_1 + 0.424X_2 + 0.128X_3$     (4)

Consequently we have also testing hypotheses:

**Hypothesis 1**: *The level of consumer's income has positive correlation with the willingness to pay more for food safety*. In our research the family income is a variable interval divided into 9 classes with a range of € 100, starting from the first grade of 0-100 € to continue to the last 900 Euros or more. As shown in Table 7, the incomes have positive impact on WTP (p = 12:03 <12:05) since coefficient b has a positive value (0.128). By moving from a category to another category with higher incomes, odds ratio increases to 1,137. It also shows that the higher the incomes are the probability that consumers express willingness to pay extra price for dairy products safety certainly increases. Consequently we find that hypothesis 1 is correct.

**Hypothesis 2**: *The level of education shows positive relationship with the willingness to pay more for food safety*. In our research, we divided education in three categories, elementary (up to grade 8-9 years), secondary (12 years) and high (postgraduate). Elementary level was the basis for comparing two other levels. The results showed a significant positive relationship between the category of high

education compared to the group of elementary education (p = 0.046 <0.05 level). But when comparing the secondary education category with the elementary one it shows to be no statistically significant (p <0.05). Even here, we can say that the level of education is significant in terms of WTP, so we find hypothesis 2 also correct.

**Hypothesis 3:** *Demographic factors (age, gender, number and members and the family structure (the presence of children and pensioners), type of residence (rural-urban) affect the willingness to pay more for product's safety.* Most of the variables tested and which represented counted demographic factors in this hypothesis did not result statistically significant (p <0.05). The only variable statistically significant (p = 0.033 <0.05 level) showed to be the group of buyers who have pre-school children (b = 0424). Therefore we can conclude that demographic factors such as age, gender, number of members in the family, the presence of pensioners, residence, presence of children of school age have no statistically significant impact in respondents WTP.

## CONCLUSIONS

The study shows that most of respondents involved in the survey expressed willingness to pay premium price if dairy products (milk, cheese and yogurt) are certified with food safety standards such is ISO 22000 or certified for applying HACCP system. Most of these respondents are young, mainly coming from cities, and with higher education and incomes.

The study found that precisely the last two factors (income and higher education), as expected, resulted to have a positive impact on consumers' WTP. This willingness is evident also among the consumers with pre-school children, which can be concluded that it comes as a result of concern about the vulnerability of young children from food. Therefore, based on the findings from logistic regression model we can conclude clearly that this category of customers who buy in supermarkets (notably in Viva Fresh Store) is ready to respond positively in favour of products that are certified for food safety.

However, the study also found that demographic factors have no significant impact in increasing the probability that could be positively express in regard to GPP. Age, gender, number of family members, the presence or not of pensioners in the family or the differences between respondents from towns or villages, tested with logistic regression model, showed no significance in explaining WTP variations.

From these findings, we come to a conclusion that other factors that could have an impact on WTP should be tested, including consumer knowledge on food safety aspects, the level of information about food safety problems, their confidence to the manufacturers and institutions responsible for food safety control, namely confidence in the agencies that deal with food safety certification. Also an extension of the research in terms of involvement of customer from smaller markets, would be with interest  in order to fulfil the limitations of this study.

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