



CONSUMER BEHAVIOR TOWARDS SUSTAINABLE FOOD CONSUMPTION IN EUROPE

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Abstract

Private consumption is shaped by an array of complex and interrelated factors, including demographics; income and prices; trade, as well as social and psychological factors such as habits, culture and taste.

Reducing the environmental impacts related to the consumption of food is a major challenge that requires efforts at all phases of the food value chain. The majority of environmental impacts related to consumption of food are from agricultural activities, including in particular cattle farming; therefore the main focus of the study is directed to meat consumption.

The objective of this paper is to analyze the main influencing factors of consumer behavior and their impact on sustainable food choices in Europe.

The research is based on Principle Component Analysis (PCA) and Robust correlation analyses. To study the problem elements also are used methods of analysis, synthesis and logical construction.

The research results show, that one of the strongest factors influencing meat consumption is income; however there are found other latent factors. Excessive meat consumption is unsustainable also in terms of health and in some countries has a correlation with obesity.

Key words: sustainable food consumption, consumer behavior, environment.

Introduction

Consumer behaviour is key to the impact that society has on the environment. The actions that people take and choices they make – to consume certain products and services or to live in certain ways rather than others – all have direct and indirect impacts on the environment, as well as on personal (and collective) well-being (Jackson, 2005).

Sustainability covers economic, ecologic and social aspects and therefore, sustainable food refers to fair trade food, organic food, local food and seasonal food (Avermaete, Mathijs, 2008).

Food and drink cause 20–30% of the various environmental impacts of private consumption. Meat and meat products, in different degrees of processing, are the most important sources of impact, followed by dairy products (CSP, 2008).

According to a study by the European Commission's Joint Research Centre, meat consumption contributes 24% of the overall environmental impacts caused by total consumption in the EU-27, but accounts for only 6% of total expenditure. The same study shows that in the EU-27 meat and dairy products contribute about 30–40% of aquatic and terrestrial eutrophication, 14% of Glasshouse gas (GHG) emissions, and 35% of nature occupation caused by total European consumption.

The impacts on environment include impacts from: energy, water use and waste generation in agriculture and the processing industry; the use of fertilizers and pesticides; emissions from livestock; land use and transport; and biodiversity loss from clearance of ecosystems to make way for food and feed cultivation, and pollution of water courses. (EEA, 2010).

Unsustainable consumption patterns are characterized by too much fat, overdoses of sugar and a lack of fruits and vegetables. Unhealthy dietary habits influence the development of metabolic syndrome, type II diabetes, cardiovascular diseases, osteoporosis, and postural deformities like scoliosis, effects related in part to excessive weight gain (Ahrens et al, 2006). Changing behaviours – and in particular motivating more sustainable behaviours – is far from straightforward. Individual behaviours are deeply embedded in social and institutional contexts. We are guided as much by what others around us say and do, and by the 'rules of the

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game' as we are by personal choice. We often find ourselves 'locked in' to unsustainable behaviours in spite of our own best intentions (Jackson, 2005).

The aim of this paper is to analyze the main influencing factors of consumer behavior and their impact on sustainable food choices in Europe.

To attain the aim the following tasks are set:

1. to describe the challenge of behavioural change towards sustainable food consumption;
2. to analyze the influencing factors of consumers food choice and define the barriers for sustainable food consumption;
3. to explore general trends in consumer food consumption;
4. the main focus of the study is directed to meat and vegetable consumption. Because of lack of statistic data for all EU member states, there are analyzed 24 European countries.

Materials and Methods

For assessing the European countries' attitudes towards the issue of sustainable consumption, some classification maps were used which are based on the robust correlation matrix (MCD) and robust principal components analysis (ROBPCA) (Hubert et al, 2005).

Principal components analysis (PCA) is a common technique for finding patterns in data of high dimension. This techniques includes covariance, eigenvectors, eigenvalues and standard deviation but outliers can have deleterious effects on covariance matrix and standard deviation. Thus, it is essential to use robust alternative of PCA which is called as ROBPCA. Outliers can be caused by Economical Crisis, inflation and other economical and social processes; outliers appear to deviate from the rest of the data and they may cause inaccurate interpretations, therefore robust techniques are proposed in academic literature.

Results and Discussion

The terminology and the context of sustainable consumption are relatively recent. But the debate about sustainable consumption can only really be understood or evaluated in the context of much older and deeper debates about consumption, consumer behaviour and consumerism it self (Jackson, Michaelis, 2003). "Sustainable consumption is not about consuming less, it is about consuming differently, consuming efficiently, and having an improved quality of life" is stated by United Nations Environmental Program.

Shifting consumption patterns towards more sustainable behaviours relies on a robust understanding not just of what motivates consumers, but also on how behavioural change occurs, and how (if at all) it can be influenced by public sector interventions (Jackson, 2005). Food and drink is a regularly purchased group of products which consumers are familiar with and form a central and essential part of people's lives. The physiology and psychology of the consumption of food lends itself to particular consumer behavior (PSI, 2006).

The consumption of food is highly normative and is increasingly motivated by factors beyond necessity. Food relates to everything from our health, skin and life expectancy, to our personality, lifestyle and family. So much so that buying and eating food is no longer just an issue of sustenance, but one of status, personal self-modelling and identity: opening a refrigerator in front of strangers 'is like baring the soul' (Lonneker et al, 2008).In addition, attitudes towards food vary across countries, with some countries (for example, Italy) putting a strong emphasis on the role of food within the family, while in other countries food behaviour has been strongly affected by increasingly fragmented modern lifestyles, whereby food consumption patterns are characterized by heterogeneity.

Together, both these cultural differences and the psychological influences on behaviour relating to food present a challenge to efforts to encourage the consumption of environmentally-preferable food (such as organic produce) (PSI, 2006).

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Unlike other behaviours, food behaviour is much less likely to change (so long as people do not experience physical nutritional deficiencies or experience an adverse reaction to the food such as food poisoning) (Capaldi, 2006).

There are four main barriers for sustainable consumption.

1. Lack of an unsatisfied need with respect to sustainability leads to habitual purchase behaviour, which excludes new products such as sustainable products.
2. A negative attitude towards sustainable products will never lead to sustainable behaviour.
3. The lack of clear information about food products in general and specifically sustainable products could have a negative impact on the decision-making process due to uncertainty and social influences.
4. Availability of sustainable products is determining for the consumer's ability to purchase sustainable products (Kirwan et al, 2002).

Some general trends in European food consumption are:

Replacement of beef and lamb in diets by pork and, particularly, poultry across the EU as a whole (FAO, 2010), although beef consumption is growing in newer Member States. This is due to a combination of factors including price differences, a general trend towards healthier food and the ease by which poultry can be combined with pre-prepared foods (Danish EPA, 2004; Omann et al., 2007). This trend accelerated in 2008 due to increases in food prices, and total meat consumption even dropped by 2.2% in the EU-27 compared to 2007 (EEA, 2010). Increasing consumption of fruit by 11% in the EU-15 in 1990–2005 (FAO, 2010). This may be due to greater availability and reduced prices of (imported) fruit. Increasing expenditure and frequency of eating take-away food and in restaurants (Omann et al., 2007; Danish EPA, 2004). A dramatic increase in quantities of imported food. Meat imports to the EU-15 increased by 120% between 1990 and 2007. Cereal imports increased by 83%, frozen vegetables by 174%, and bananas by 92% over the same period (FAO, 2010).

Demand for local, sustainable and organic food production is increasing. Organic farming has become one of the fastest growing segments of agriculture in many parts of the world with 82 per cent growth between 2006 and 2008 (Willer et al., 2007).

These trends have differing consequences for the environmental impacts of eating and drinking. (EEA, 2010).

Consumers food choice is influenced by food products' prices and quality and consumers' income. But what consumers regard as 'quality' has undergone considerable change during the past decades. *Grunert* approximate today's consumer food quality perception by distinguishing four groups of quality attributes for food products: sensory attributes, health attributes, process attributes, and convenience attributes. Health has been of increasing importance for consumer food choice for the last 50 years or so, and today analyses of consumer food quality perception many times indicate that health and sensory considerations have about equal weight (Grunert, 2003).

In order to see the impact of income on the meat consumption, the correlation analyses between meat consumption and Gross Domestic Product (GDP) in time period from 1995 to 2007 has been done. GDP is considered an indicator of living standard and national income. The countries for their correlation values can be classified in 3 groups:

Positively correlated ones: United Kingdom(0.9712), Finland (0.9515), Sweden (0.9379), Portugal (0.8967), Lithuania (0.8776), Romania (0.8512), Poland (0.8424), Italy (0.7428), Latvia (0.7309), Ireland (0.6807), Czech Republic (0.4687), Spain (0.4087). Strong correlation is showing that meat consumption in these countries is dependent on income and could be also explained with different consumption cultures, where the meat is important, but in case of lower income can be easily replaced with other products.

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Negatively correlated ones: Bulgaria (-0.8922); Netherlands (-0.7702); France (-0.6454); Austria (-0.5465), Belgium (-0.4788), Slovakia (-0.3926). Negative correlation means that meat consumption decreases even the total income increases. And there could be found two explanations. In case of Bulgaria the strong correlation could be explained with high inflation and decrease of real income, so the price of product is having the impact on meat consumption. In case of other countries is presumed that the role of meat choice is playing the awareness of health issues, therefore total meat consumption decreases even the wealth of people is in increasing.

Weakly correlated ones: Cyprus (0.3318), Hungary (0.3001), Estonia (0.2620), Germany (0.1627), Denmark (-0.0613), Greece (-0.0531), where two last ones are uncorrelated. On these countries income has almost no impact and meat consumption is either a part of eating custom and considered as first necessity product, which is not elastic or there are other stronger indexes, which are shaping consumption behavior in these countries.

With the use of Principal Component Analysis (PCA) the map of meat consumption of 24 European countries is created. In the map outlying observations are labeled. In figure 1, Latvia is the most outlying country, it means, in Latvia more than in other countries meat consumption has increased in particular time period (time effect) (1995–2007). Also Bulgaria's meat consumption is affected by time, though it is showing the same strong, but decrease of consumption amount.

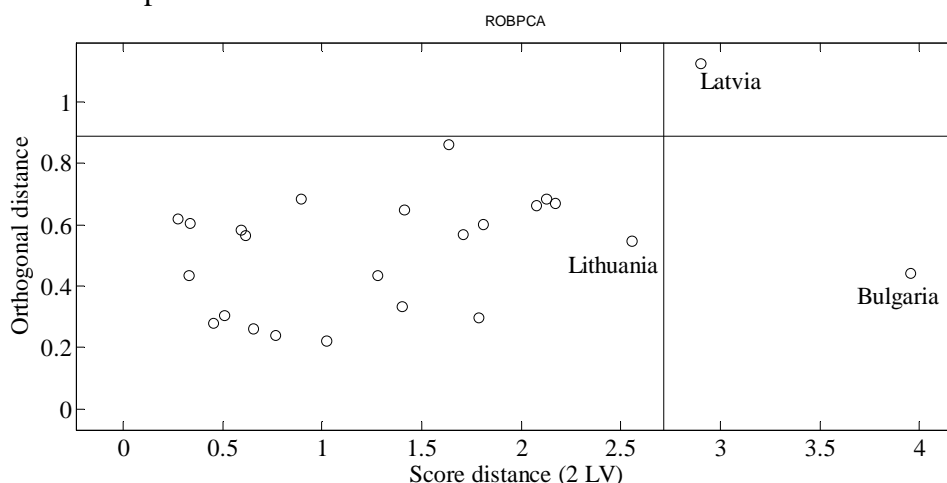


Figure 1. Outlying countries in ROBPCA map according to the meat consumption

Here, X axis indicates 'score distance' means – score distance is the ratio of weighted eigenvectors to eigenvalues. 2 LV means number of chosen principal components. In this analysis was decided to use two principal components according to the scree plot-decision rule and number of eigenvalues greater than 1. Y axis indicates 'orthogonal distance' means – it is the distance between an observation and its projection in the k-dimensional subspace.

In order to explore unsustainable nature of meat consumption in terms of health, correlation analyses has been done. Below, correlation values represent the relation between obesity and meat consumption. Since the obesity ratios of 24 countries for all years were not attainable, only 6 countries and Europe in average were chosen for correlation analysis.

In average in Europe the correlation value is negative and not strong, what shows, that meat consumption alone is not the cause of increasing obesity ratio in Europe. Even though in some countries as Latvia this value is positive and strong, but in France negative and strong, what can be explained with different eating patterns and diets, which has different (opposite) influence on health and weight gain. Since most literature asserts that increased consumption of vegetables is sustainable and has a positive impact on health, robust correlation value between the obesity ratio and vegetable consumption was obtained for the same countries.

Table 1

Correlation values between meat consumption and obesity (1995–2007)

Latvia	Lithuania	Estonia	Germany	Spain	France	Finland	Europe
0.7299	0.3823	0.0617	-0.3517	-0.0031	-0.7315	0.1847	-0.2211

In average in Europe the correlation value is not significant, what shows no direct impact of vegetable consumption on decrease of obesity level, however in Southern European countries as Spain and France, where vegetable consumption is a part of everyday eating culture, the correlation value is significant and negative, what means as more vegetables are consumed as lower obesity ratio and vice versa. Latvia has especially strong and positive correlation value, what could be considered as antagonist and not trustable outcome, if not to see the structure of consumed vegetables. Statistics show, that potatoes are the main vegetables in Latvian diet (at least 10 times more than any other vegetables). The dish of meat and potatoes by most of dieticians is not considered as a part of healthy diet. The same consumption patterns are sharing also neighbor countries Lithuania and Estonia with relevant and positive correlation.

Table2

Correlation values between vegetable consumption and obesity (1995-2007)

Latvia	Lithuania	Estonia	Germany	Spain	France	Finland	Europe
0.7070	0.4411	0.4501	0.0861	-0.4347	-0.5067	0.1459	0.0259

In order to see the groups of countries with similar correlation patterns between vegetable consumption and obesity a tolerance ellipse, which is based on MCD (robust covariance matrix), has been drawn. Firstly, for 24 European countries the median values of yearly obesity ratio and yearly vegetable consumption (1995–2007) per capita have been obtained. In figure 2, Southern European countries are outliers and take place outside of the ellipse, what can be explained with similar food consumption patterns (the amount of vegetable consumption is higher as in other European countries). These countries also have conjunctive geographical placement.

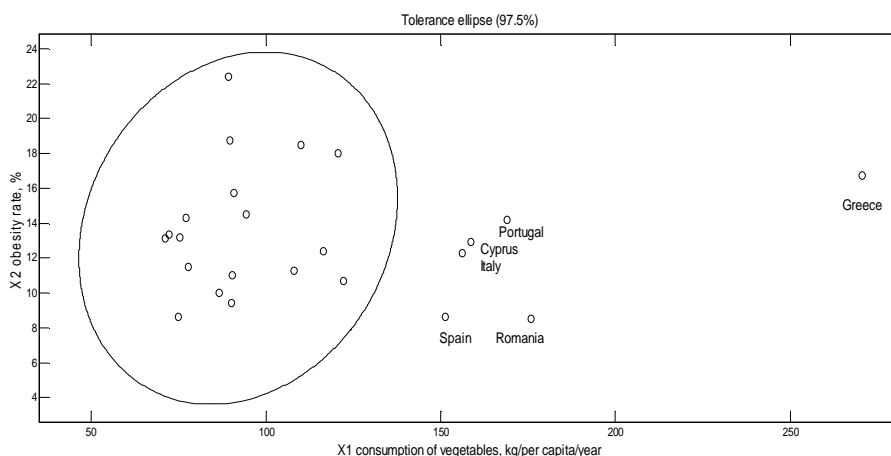


Figure2. Outlying countries in MCD tolerance ellipse plot according to vegetable consumption.

Conclusions

1. To change consumer behavior towards sustainable food choices is slow and life long process, what is only achievable with strong involvement of government, civil society organizations and consumers themselves.

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2. The growth of demand of organic products, decrease of meat consumption in old Member states are heralds of increased consumer awareness and education about positive impacts of sustainable food consumption on health and environment.
3. Meat consumption in Europe is positively or negatively correlated with GDP, it means the income and indirectly also the price of the product have an effect on meat consumption.
4. Meat consumption in average in Europe has weak correlation with obesity. Latvia is an outlier in terms of meat and vegetable consumption and its positive correlation with obesity. It can be explained with national dietary patterns – high consumption of meat and potatoes in the same time. Latvia's meat consumption is also affected by income and has one of the highest increase of total meat consumption in time period from 1995–2007.
5. Southern European countries in average are consuming more vegetables, but it is not a factor, which is reducing obesity rate.

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