CUSTOMER SATISFACTION WITH TOMATO SUPPLY IN RETAIL.

An application of the multidimensional measurement method

Masterarbeit

zur Erlangung des akademischen Grades Diplom-Ingenieurin

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“I’d rather attempt to do something great and fail, than to attempt nothing and succeed.”
(Robert H. Schuller)

Acknowledgments

I want to express my greatest thanks to my family for everything that they have done for me. I never saw any doubt in their eyes, and they were my greatest support and motivation. I also want to thank my husband for believing in me and for always being there. It is an honor to be surrounded with this respectful and self-conscious personalities. Special thanks go to Ao.Univ.Prof. Dipl.-Ing. Dr.nat.techn. Rainer Haas for all the inputs he gave by mentoring my master thesis, as well as for those inputs during my master studies.

Đurđica Markić (née Gašparović), 17.07.2019

Kurzfassung

Diese Masterarbeit untersuchte die Zufriedenheit der KundInnen mit konventionellen und biologischen Tomaten im österreichischen Lebensmitteleinzelhandel, bezüglich folgender Aspekte: Preis, Geschmack, Aussehen, Geruch, Frische, Verpackung, Herkunft (regional und international), Nachhaltigkeit und Gesundheitsnutzen. Die angewendete Methode ist die mehrdimensionale Kundenzufriedenheitsmessung, in welcher die obengenannten Aspekte zusammengenommen die Gesamtzufriedenheit mit konventionellen und biologischen Tomaten bilden. Die Daten wurden mittels offener Web-Umfrage erhoben. Die Umfrage umfasste 219 Befragte, von welchen 153 die Umfrage vollkommen abschlossen. Zudem wurden Experteninterviews mit drei Gemüseproduzenten durchgeführt. Multivariate Regression wurde für die Datenanalyse benutzt, um die Wichtigkeiten der Produktmerkmale (i.e. Teilzufriedenheiten) erkennen zu lassen. Gemäß dem Regressionsmodell sind die wichtigsten Produktmerkmale für konventionelle Tomaten Geschmack, Nachhaltigkeit und Gesundheitsnutzen. Nachhaltigkeit, Geschmack, Preis und Aussehen sind am wichtigsten für biologische Tomaten. Allgemein liegt die Gesamtzufriedenheit mit konventionellen Tomaten bei 50,78 (0 keine Zufriedenheit, 100 volle Zufriedenheit) und mit biologischen Tomaten bei 59,78, was bedeutet, dass die Kunden weder zufrieden noch unzufrieden mit Tomaten im österreichischen Lebensmitteleinzelhandel sind. Diese Daten zeigen, dass noch einiges Potential zur Verbesserung der Kundenzufriedenheit punkto Tomaten im Einzelhandel vorhanden ist. Über neue Züchtungen könnte an der Verbesserung des Geschmacks gearbeitet werden.

Schlagwörter: Kundenzufriedenheit, Tomaten, mehrdimensionale Messung, multiple Regressionsanalyse, Produktmerkmale

Abstract

This study examines how satisfied Austrian customers are with conventional and organic tomatoes that are available in Austrian retail, based on satisfaction with following product attributes of tomatoes: price, appearance, odor, freshness, taste, packaging, origin (regional and international), sustainability and health benefits. The used method is multidimensional measurement, where those product attributes create an overall satisfaction with conventional and organic tomatoes. The data is collected using an unrestricted web survey, which included 219 respondents from which 153 fully completed the survey. Besides the survey, expert interviews were conducted with three vegetable producers. Multiple regression was the used method for the data analysis in order to reveal the importance of product attributes. According to this model, most important product attributes for conventional tomatoes are taste, sustainability and health benefits. Sustainability, taste, price and appearance are most important for organic tomatoes. Following this model, customer satisfaction with conventional tomatoes is 50,78 (0 total dissatisfaction, 100 total satisfaction) and with organic tomatoes 59,78, which means that customers are neither satisfied nor unsatisfied with tomatoes in Austrian retail. This data show that there is still a room for improvements of customer satisfaction regarding Tomatoes in retail. Taste is an important factor on which producers and retail can have an influence through introduction of new tasteful varieties.

Keywords: customer satisfaction, tomatoes, multidimensional measurement, multiple regression analysis, product attributes

Table of contents

List of figures

List of tables

Theoretical part

1. Introduction

Tomatoes are the most produced and consumed vegetables in the world. Consequently, one can say that they are the most important vegetable to humans. There are many varieties of tomatoes, which differ in color, size and taste. Besides that, tomatoes are being sold in different packaging types, with different prices and grown within different production systems. Customers of tomatoes make purchase decisions every time when buying them, but are they aware of their decisions? How satisfied are they with tomato supply? Customers may know and feel more than they say.

In order to see the tomato supply in Austria through the eyes of customers, customer satisfaction measurement is required. Kaiser (2005) and Homburg (2016, 2018) give a theoretical overview of customer satisfaction and ISO (2018b) defines it as customer's perception of the degree to which the customer's expectations have been fulfilled. Although there are studies that deal with importance of certain tomato or vegetable attributes to German speaking customers (Agrarmarkt Austria, 2017a; BEUC, 2013; Cembalo, Cicia, Giudice, Scarpa, & Tagliafierro, 2007; Jiménez-Guerrero, Gázquez-Abad, Huertas-García, & Mondéjar-Jiménez, 2012; ZBG, 2014), none of them deals with customer satisfaction. This master thesis aims to measure customer satisfaction with tomato supply in Austrian retail with the purpose of better understanding customer perceptions.

This topic is interesting for scientific research because tomatoes play an important role in everyday life for the majority of Austrians and the world population which buys tomatoes on a daily basis, without being asked how satisfied they are. This master thesis could also have a practical relevance because it could give an insight in customer expectations, as well as in the advantages and disadvantages of tomatoes in retail, and with it, in possibilities for improvement in order to make customers more satisfied.

1.1. Problem description

Customer satisfaction can be explained as a degree in which products and services supplied to customers meet or surpass customer expectations. Let us assume that customers are satisfied with tomato supply in Austrian retail. They get a product of an expected quality for an expected price. Satisfaction with all important product attributes of tomatoes leads to overall satisfaction. Is it the case?

At this moment, it is not possible to say. Current studies among German speaking customers do not address this topic. There are studies that deal with importance of product attributes of tomatoes (conventional and organic), but none of them addresses customer satisfaction with those attributes. Therefore, one cannot make statements about customer satisfaction with tomato supply in Austrian retail.

In response to this problem, this study will offer customer satisfaction measurement of tomato supply in Austria, through the implementation of multidimensional measurement. In contrast to one-dimensional measurement, that measures only overall customer satisfaction, multidimensional measurement takes account of all the variables that characterize customer satisfaction. Regarding product attributes, some researchers place the attribute "organic" together with other product attributes, as price, quality, origin etc. Because Austrian market has much broader supply with organic tomatoes then other countries, they can be seen as another category and therefore "organic" attribute will be considered and measured as separate product – organic tomatoes. In order to get results, online survey will be conducted, and the results will be analyzed with application of multiple regression analysis, which will enable determination of importance of product attributes which compose overall satisfaction. Through separation of organic and conventional tomatoes, the results will give a clearer picture of customer satisfaction and one will be able to compare the importance and satisfaction of (the same) product attributes in those two categories (conventional and organic tomatoes).

1.2. Research objective

A goal of this master thesis is to test customer satisfaction with tomato supply in Austrian retail.

1.3. Research question

The research question of this master thesis is: How satisfied are costumers with tomato supply in Austrian retail?

2. Market analysis

Tomatoes are the most produced and consumed vegetable in the World. According to (FAOSTAT, 2019), the world production of tomatoes amounted 182.301.395 tonnes in 2017. They are also the most produced and consumed vegetable in Europe, while in Austria, they take fourth place in production, but first in consumption.

Tomatoes belong to the *Solanaceae* (nightshade family), genus *Solanum*, section *Lycopersicon.* They can be grown in open fields, with yield range between 40 and 100 t/ha, and in greenhouses, where they are grown year-round and reach yields over 500 t/ha (Huevelink et al., 2018).

There are over 3.800 tomato varieties registered in the world and many of them are sold in retail. They can vary in size, shape, usage and habit (Anonymus, s.a.-b).

Grant (2018) describes the differences between determinate (bush) and indeterminate (vine) tomatoes. Determinate tomato varieties ripen earlier. They are grown in cages or without support and they develop their fruits on the terminal ends of plants. Indeterminate tomato varieties have a longer growth period and a longer stem growth. They must be supported by staking or tying to help them keep the fruit standing. Indeterminate tomatoes set fruit along the stem (Grant, 2018).

Costa and Heuvelink (2018, 4) give an overview of major types of tomato landraces and varieties. They describe following types:

1. **Classic round**

   Characteristics of this type are round shape, 2-3 locules, average fruit weight 70-100 g and diameter 4,7-6,7 cm. It is most popular and has a wide range of usage: in salads, grilling, baking or frying, but also for soups and sauces.

2. **Plum and baby plum**

   Plum and baby plum tomatoes have an oval shape. The flesh is firm and less juicy in the center of the fruit. They are used for barbecue and processing (pizzas, pasta dishes).

3. **Beefsteak**

   Beefsteak tomatoes have flattened shape, with five or more locules. Fruit can reach weight from 180 to 250 g. They have large variability in shape, color (red, pink), texture and flavor. They are used for stuffing and baking whole, but also for salads and sandwiches.

4. **Cherry and cocktail**

   This type of tomatoes is smaller than classic tomatoes, with weight from 10 to 20 g and diameter from 1,6 to 2,5 cm. Cherry tomatoes are smaller than cocktail tomatoes, but both are very sweet. Cherry tomatoes are generally red, but they can also vary in color (golden, orange, yellow). Cocktail varieties are usually sold attached to the stem ('on-the-vine'). They can be eaten whole and raw or cooked, while cocktail tomatoes are used in salads or skewered whole for grilling.

5. **Vine or truss (cluster)**

   This type of tomatoes is marketed when still attached to the fruiting stem. The stem preserves the distinctive tomato aroma. They ripen uniformly within the cluster and the stem keeps a fresh green calyx and the vine after harvest.

6. **Regional varieties, landraces and non-hybrids**

   Examples of regional varieties are Coeur de Boeuf (France), Raf (Almeria, Spain), Tomàtiga de Ramellet (Baleares, Spain), Marmande (France), Mezzo tempo (Abruzzo, Italy), Spagnoletta (Latium, Italy)

To understand the tomato market, in following chapters will be given thorough analysis of production, consumption and trade of tomatoes.

2.1. Production of tomatoes in Europe and Austria

2.1.1. Production of tomatoes in Europe

According to (FAOSTAT, 2019), Europe produced 24.601.360 tonnes of tomatoes in 2017, which is about 14% of world production. The most of European tomatoes are produced in Italy (6.015.868 t), Spain (5.163.466 t) an in Russian Federation (3.230.718 t).

Since most tomatoes are produced in EU, a closer insight in the EU production will be given in further text. According to (FAOSTAT, 2019), the countries of European Union produced 18.058.379 tonnes of tomatoes in 2017, what gives a slight decrease of about 2% in comparison with 2016. Despite this decrease, European tomato production has a growing tendency, which is shown in the Figure 1.

This figure also shows that in the time period from 2010 to 2016, the minimum was reached in 2013, where 15.372.174 tonnes of tomatoes were produced. One cause for it is that harvested area also reached a minimum.

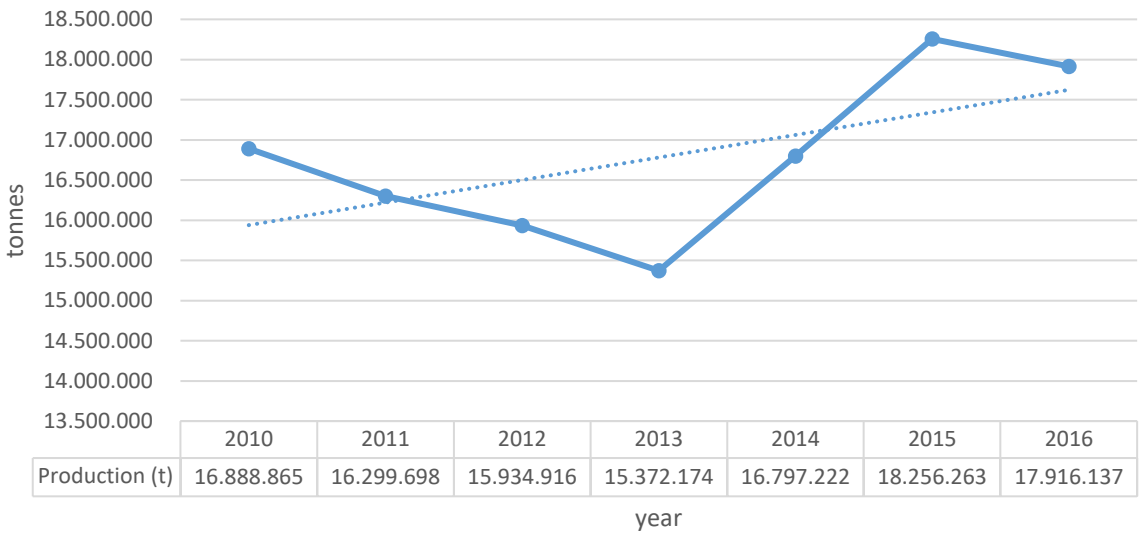


Figure 1 Annual tomato production in tonnes in EU from 2010 to 2016
Source: modified from FAOSTAT (2019)

European Union has a production area of 251,79 thousand hectares of tomatoes (EUROSTAT, 2018). Most of the production is located in Italy, Spain and Romania, while Italy dominated with 103,94 thousand hectares planted with tomatoes in 2017. Table 1 shows the closer insight in production area of tomatoes in EU-28.

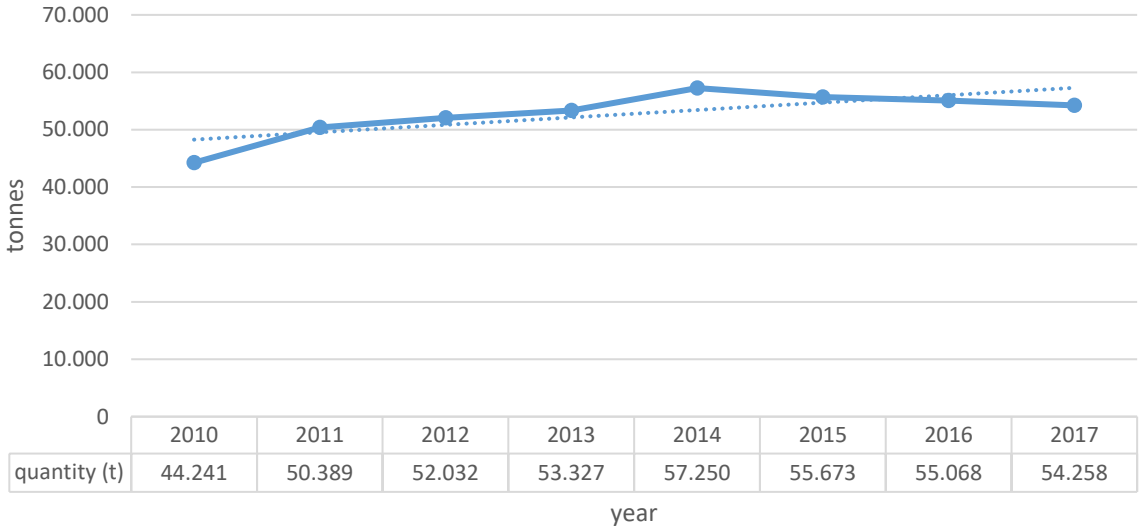
Table 1 Production area of tomatoes in EU-28 (thousand ha)
Source: modified from EUROSTAT (2018)

geo\time	2011	2012	2013	2014	2015	2016	2017
EU (28 countries)	254,58	229,83	230,58	248,09	254,43	246,43	251,79
Italy	103,78	91,85	95,19	103,11	107,18	96,78	103,94
Spain	51,2	48,61	46,62	54,75	58,13	62,72	60,85
Romania	31,64	29,75	28,07	24,43	24,84	22,71	22,23
Portugal	16,75	15,41	15,63	18,46	18,66	20,85	20,87
Poland	13,5	13,1	11,8	13,5	13,8	12,42	12,64
Greece	19,73	15,98	16,66	17,26	15,25	13,59	12,61
Austria	0,19	0,18	0,18	0,19	0,19	0,18	0,18

Another important point is that tomatoes are the most produced vegetables in the EU, followed by onions, orange, carrots and turnips, and cabbages and other brassicas (FAOSTAT, 2019). Tomatoes have the majority of 28% of produced vegetable quantity.

2.1.2. Production of tomatoes in Austria

In 2018, tomato production amounted 58.154 tonnes (Statistik Austria, 2018c). From 2010 to 2017, tomato production had a growing tendency. In these seven years, the production had an increase of 10.017 tonnes, which can be seen on Figure 2.



	2010	2011	2012	2013	2014	2015	2016	2017
quantity (t)	44.241	50.389	52.032	53.327	57.250	55.673	55.068	54.258

Figure 2 Annual production quantity of tomatoes in Austria from 2010 to 2017 in tonnes
Source: modified from Statistik Austria (2017a)

Most of tomatoes in Austria are produced in Vienna, but most of the area used for tomato cultivation is placed in Burgenland (Statistik Austria, 2018c). The details are shown in Figure 3. Statistik Austria (2018c) states that in 2018, 35% of all tomatoes were produced in Vienna, 27% in Burgenland, and 24% in Lower Austria. This means that most tomatoes (86%) are being produced in eastern Austria.

Because in Vienna tomatoes are cultivated in glasshouses, they are being grown year-round, which makes high yields possible (Anonymus, s.a.-c). According to Statistik Austria (2018c), yields of tomatoes grown in glasshouses are much bigger than of those grown in fields. In 2018, the average yield of tomatoes in glasshouses was 3.963 dt/ha, while the average yield of field tomatoes was 340 dt/ha (Statistik Austria, 2018c). This gives a difference of 3.623 dt/ha. It is important to say that glasshouses require large initial investments, that can reach up to 150 Euro per square meter (Anonymus, s.a.-c).

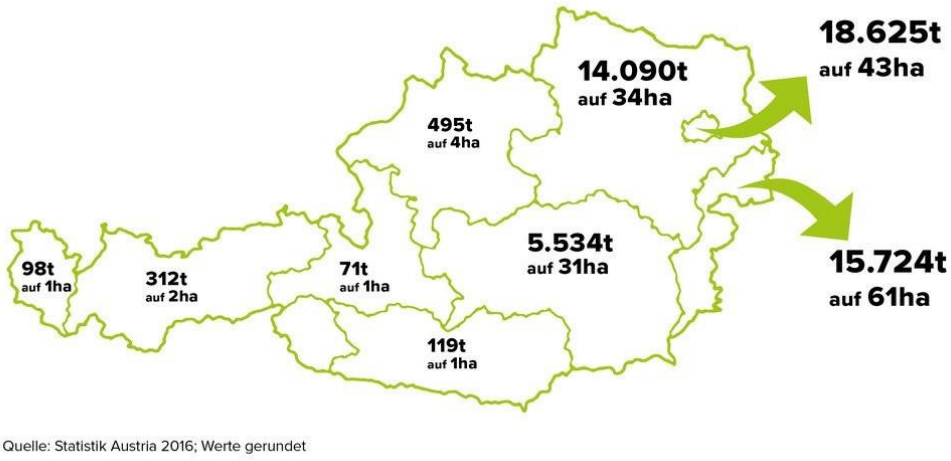


Figure 3 Austrian tomato production by states in tonnes and ha in 2016
Source: modified from Anonymus (s.a.-c)

2.2. Tomato consumption in Europe and Austria

2.2.1. Tomato consumption in Europe

According to a survey conducted by Dutch IT company Roamler, the most preferable vegetable in Europe is tomato and it was on top of the preferences in every European country (Anonymus, 2018). After tomatoes, most preferable were potatoes, carrots, mushrooms and bell peppers (Anonymus, 2018).

Total consumption in Europe in 2017 was 17.486.711 tonnes, which shows a decrease for 4,67% from a year before (European Commission, 2018). European Commission (2017b) made an estimation for tomato consumption until 2030, which is shown in following Figure 4.

Figure 4 shows that consumption of processed tomatoes dominates. About 40% of tomatoes is consumed fresh and 60% is used in the processing industry (European Commission, 2017a). According to European Commission (2017b), the estimated difference between consumption of processed tomatoes in 2030 and in 2016 amounts 457.000 tonnes. For fresh tomatoes, his difference in the same period amounts -184.000 tonnes. In the same period, the annual growth of processed tomatoes is estimated on 0,3% and of fresh tomatoes -0,2%. This data shows that tomato consumption will grow in total, but that the consumption of fresh tomatoes will be slightly falling.

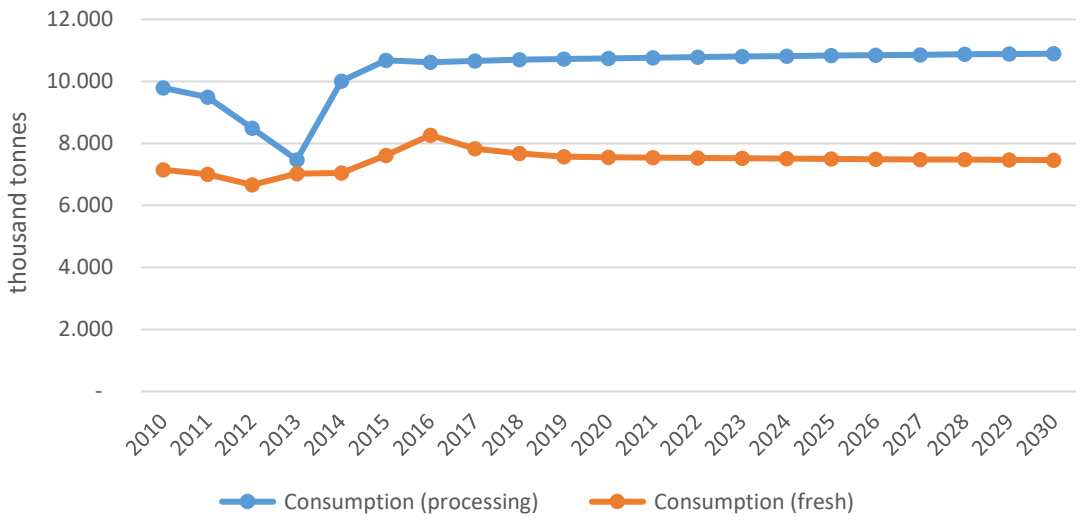


Figure 4 EU tomato consumption from 2010 to 2030 (thousand tonnes)
Source: modified from European Commission (2017b)

Consumption per capita in 2018 is estimated by European Commission (2017b) on 36 kg. Figure 5 shows it in more detail. Until 2030, consumption per capita is approximated to be stable (0,2% increase for processed tomatoes and 0,3% decrease for fresh tomatoes).

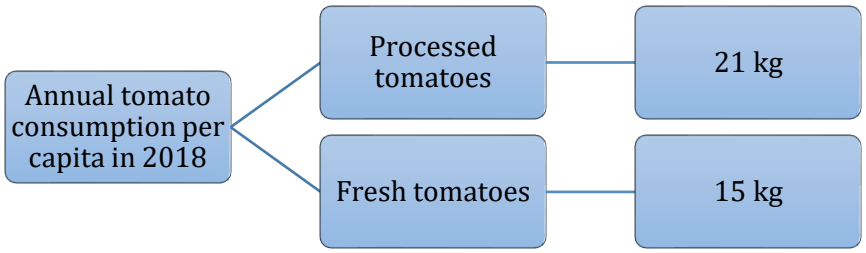


Figure 5 Annual tomato consumption per capita in 2018
Source: made by author, based on the data from European Commission (2017b)

European Commission (2017a, 62) states that "Consumption of fresh tomatoes is expected to go down slightly. By contrast, consumption of processed tomatoes is expected to marginally grow". They explain this growth by "increasing demand for convenience foods such as prepared meals … and products that are evocative of a Mediterranean lifestyle" (European Commission, 2017a, 63).

2.2.2. Tomato consumption in Austria

Tomatoes take the first place in Austrian vegetable consumption. The data from Statistik Austria (2018h) shows that the total consumed quantity of tomatoes in 2016/2017 was 255.966 tonnes. In the same period, average tomato consumption per capita per year was 29,2 kg. To highlight the importance of tomatoes to consumers, it is important to say that the second most

consumed vegetables are onions, with average annual consumption of 9,6 kg, which gives a significant difference of 19,6 kg (Statistik Austria, 2018h).

Consumed quantity of tomatoes in Austria shows a growing tendency. The data pulled from Statistik Austria (2018h) shows total consumption growth of 1,84% in 2016/2017 compared to 2015/2016. In the same period, annual consumption per capita has grown for 0,3 kg (1,04%).

2.3. Trade of tomatoes in European Union and Austria

Trade of tomatoes in European Union

European Union is a net importer of tomatoes (European Commission, 2017a). From 2004 to 2017, imports have grown from 291.249 tonnes to 568.061 tonnes. On the other side, exports had much significant fluctuations, but they have returned on approximately the same level from 2004. In 2017, exports amounted 131.667 tonnes (European Commission, 2018). This can be seen on following Figure 6. Another thing is that the trade with processing tomatoes is significantly larger than the trade with fresh tomatoes (European Commission, 2017b).

Most important import countries are Morocco, Turkey, Albania, Tunisia and Senegal, while most important export countries are Belarus, Switzerland, Norway, Russia and United Arab Emirates (European Commission, 2018).

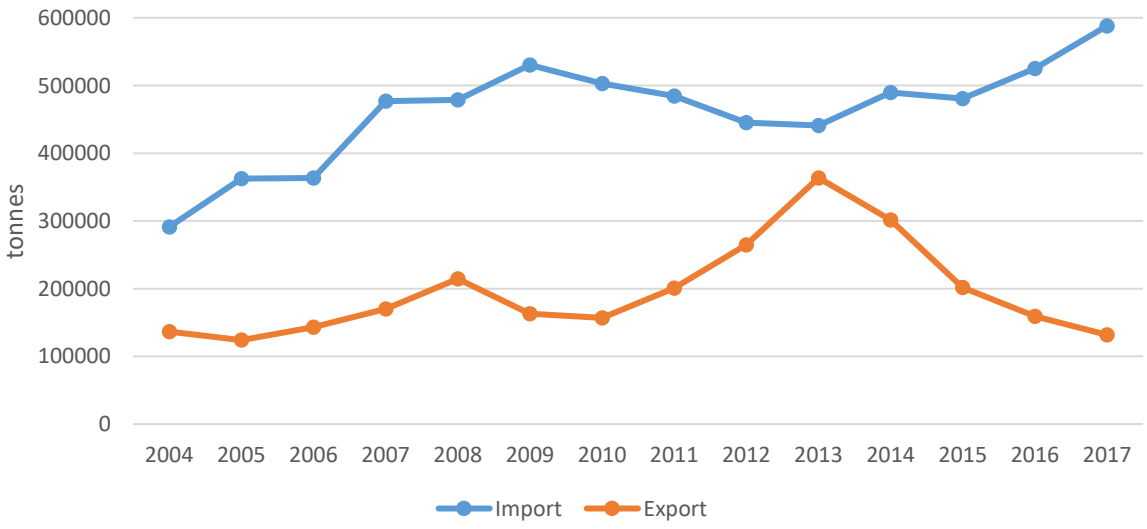


Figure 6 Extra-EU trade for tomatoes from 2004 to 2017
Source: modified from European Commission (2018)

Trade of tomatoes in Austria

Austria is a net importer of tomatoes. Self-sufficiency degree for tomatoes is 20%, and other 80% is being imported (Statistik Austria, 2018h). Austrian foreign trade has a growing tendency, which can be seen in Figure 7. In 2016/2017, 256.842 tonnes of tomatoes was imported, which is an increase of 5,41% from a year before. Austrian exports have increased by 14% from 2015/2016 and in 2016/2017 they amounted 36.690 tonnes.

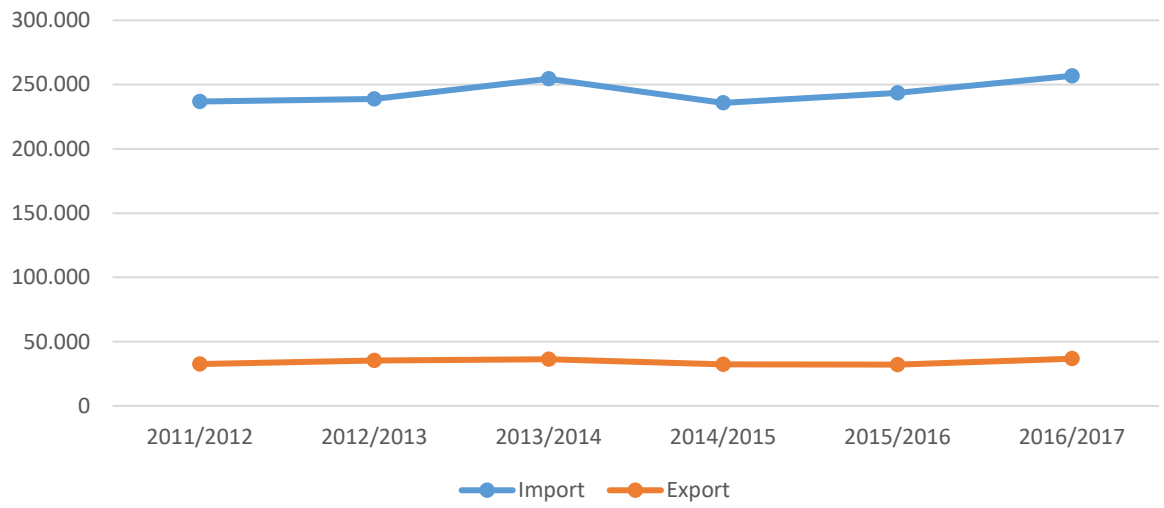


Figure 7 Imports and exports of tomatoes in Austria in tonnes
Source: modified from Statistik Austria (2018h)

2.4. Consumers of tomatoes

In 2017, Austria had a population of 8.795.073 residents (Statistik Austria, 2018a). Statistik Austria (2018i) predicts that Austrian population will grow and in 2030 it will reach 9.311.401 resident. With population growth, the age structure will also change. This change will be manifested through a growth of younger and older population, while the middle-aged population will be decreasing. Detailed prognosis is shown in Figure 8.

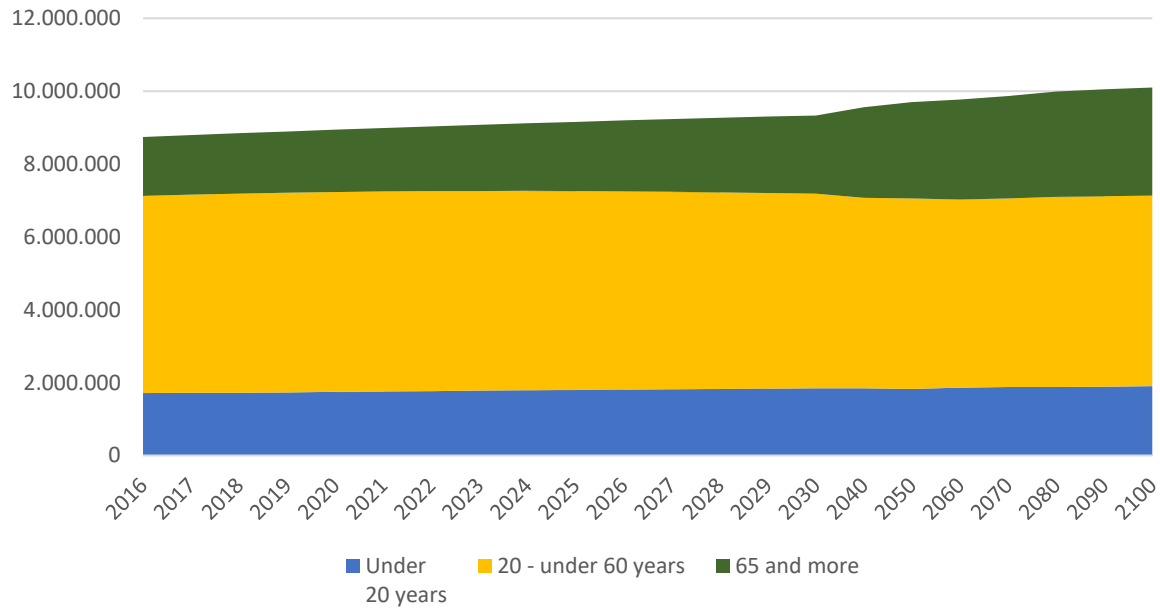


Figure 8 Structure of Austrian population from 2016 to 2100 – prognosis
Source: modified from Statistik Austria (2018i)

Migrations play a significant role in population growth of Austria. In 2017, migration balance amounted 44.630 persons (Statistik Austria, 2018j). On the other side, Austria records an excess of births over deaths by 4.363 in 2017 (Statistik Austria, 2018b, 2018d). Although there are more persons being born then died, this data shows the domination of migrations in population growth.

Austrian population records a growth in high education and in employment. Regarding education in 2015, Statistik Austria (2016) states that most of the Austrian population has apprenticeship level (34,3%). 30% of population has middle and higher education, while 16,7% is highly or academically educated. 19% of population has only elementary education. In comparison with years before, high and academical education shows a growing tendency. According to WKO (2018a, 2018b), there was 4.149.802 employed persons in Austria in 2017

and 11,9% was self-employed. Unemployment rate was in 2017 8,5%, which is a 0,6% decrease compared with 2016.

As Austrian population grows, the number of households also grows, but its structure changes. There was 3.890.000 households in Austria in 2017 and average household had 2,22 persons. (Statistik Austria, 2018f). Same data shows the changes in past years. In last ten years, the number of households increased by 349.000, but the average size decreased by 0,09 (2,31 person per household in 2007).

According to the consumption survey 2014/15, average Austrian household has monthly budget expenditures of 2.990 Euro (Statistik Austria, s.a.-b). Expenditures for food and alcohol-free drinks amounts to 353 Euro per month. Only for vegetables, households give 30,3 Euro in average and most of this amount is being spent on fresh vegetables (23,6 Euro). This means that Austrian households spend 0,8% of their budget on fresh vegetables, which includes tomatoes as well (Statistik Austria, s.a.-b). Austrian consumption survey 2014/15 also shows consumption per capita. Monthly budget expenditures per capita amount 1.970 Euro, and 225 Euro, or 11,4% is being spent on food and alcohol-free drinks (Statistik Austria, s.a.-a). 19,3 Euro is being spent on vegetables and most of it on fresh vegetables (15,0 Euro or 0,8%).

When comparing this consumption survey with the one done in 2009/10, a nominal growth of 3,1% in monthly expenditures of households is recorded (Statistik Austria, 2017b). In 2009/2010, household expenditures for vegetables were 31,5 Euro, which is 1,2 Euro more than in 2014/2015 (Statistik Austria, 2011). In conclusion, while total household expenditures grew, expenditures for vegetables decreased.

Segmentation of food consumers

KDM P.O.P. Solutions Group (2014) divides grocery consumers in three types:

1. The Millennial Consumer

   The Millennial Consumers try to buy healthy food for a “good” price. They buy their groceries in multiple channels and they tend to make more frequent trips to shops. Another characteristic is that they buy needed ingredients for a meal at daily basis.
2. The Health Conscious Consumer

   Nutrition strongly influences this type of consumers. They look for more variety and place more emphasis on locally-sourced items. They search for better quality, more

organic food, gluten-free and less processed food. This group mostly cooks their meals at home.

3. The Budget Conscious Consumer

   The Budget Conscious Consumers use opportunities from retailers to buy at lower price through sales, coupon and loyalty campaigns. They are buyers of private label brands, because this type believes that such brands offer similar quality at lower price than this offered by major brands.

Poschacher (1999) cites another study from Institute for Gardening Economics in University of Hannover that divides fruit and vegetable customers using cluster analysis in following segments:

1. Informed customers (40%) have a big interest in growing method and land of origin. They consider contamination by chemical residues as very dangerous. Most of customers in this segment are under 35 years old.
2. The sovereign fruit and vegetable customers (24%) want only partial information about growing methods, although they consider contamination by chemical residues when buying food. They do not demand perfect external quality. Taste is more important to them. Quality labels do not play important role. They want to have appropriate shopping atmosphere. Most of the customers in this group are from 26 to 35 years old.
3. The ecologically oriented customers (15%) are interested in growing methods and land of origin of products. This segment gives less importance to outer quality of fruits and vegetables than average. Further, shopping atmosphere and product presentation is less important to them.
4. The conservative fruit and vegetable customers (12%) consider external quality and wide assortment all year round as very important. They do not see the importance of land of origin or growing methods and they are not concerned about contamination by chemical residues.
5. Price conscious fruit and vegetable customers (9%) consider price as the most important factor for purchase decision.

3. Motives for purchasing and consuming tomatoes

Bown-Wilson (2017) defines that “Consumer motivation is an internal state that drives people to identify and buy products or services that fulfill conscious and unconscious needs or desires. The fulfillment of those needs can then motivate them to make a repeat purchase or to find

different goods and services to better fulfill those needs". Buying motives are "The combination of facts and the emotional state of a person that generates a feeling within them that they need to purchase an item, as well as the factors that influence their eventual choice of a particular product" (Anonymus, s.a.-a).

3.1. Importance of motives

This chapter describes the importance of purchasing and consuming motives for food, vegetables, tomatoes in general and organic tomatoes, based on studies in four European countries.

The NutriNet-Santé study reveals food choice motives associated with various organic and conventional dietary patterns (Baudry et al., 2017). This study was conducted in France among 22.366 participants. According to Baudry et al. (2017), most important food choice motive is taste, followed by health, absence of contaminants, local and traditional production, price, ethics and environment and others.

A study conducted by FiBL shows an overview of purchasing motives for vegetables, which is shown in Figure 10. According to FiBL and Bio Suisse (2016), most important purchasing motives are natural and healthy nutrition. They also mention that motives are different for different product groups. Most important motives for fresh products are freshness, closeness and health. For import products, most important motives are accessibility, fairness and raw materials.

Helo and Luomala (2011) conducted survey in Finland where consumers were asked to evaluate their willingness to pay more or less for and their buying interest in tomatoes, minced meat and lager beer with varying levels of freshness. The results of this research showed the importance of different purchasing motives. Most important motive was freshness (31,6%), followed by origin (26,6%), taste (18,3%), price (31,1%) and health (10,4%).

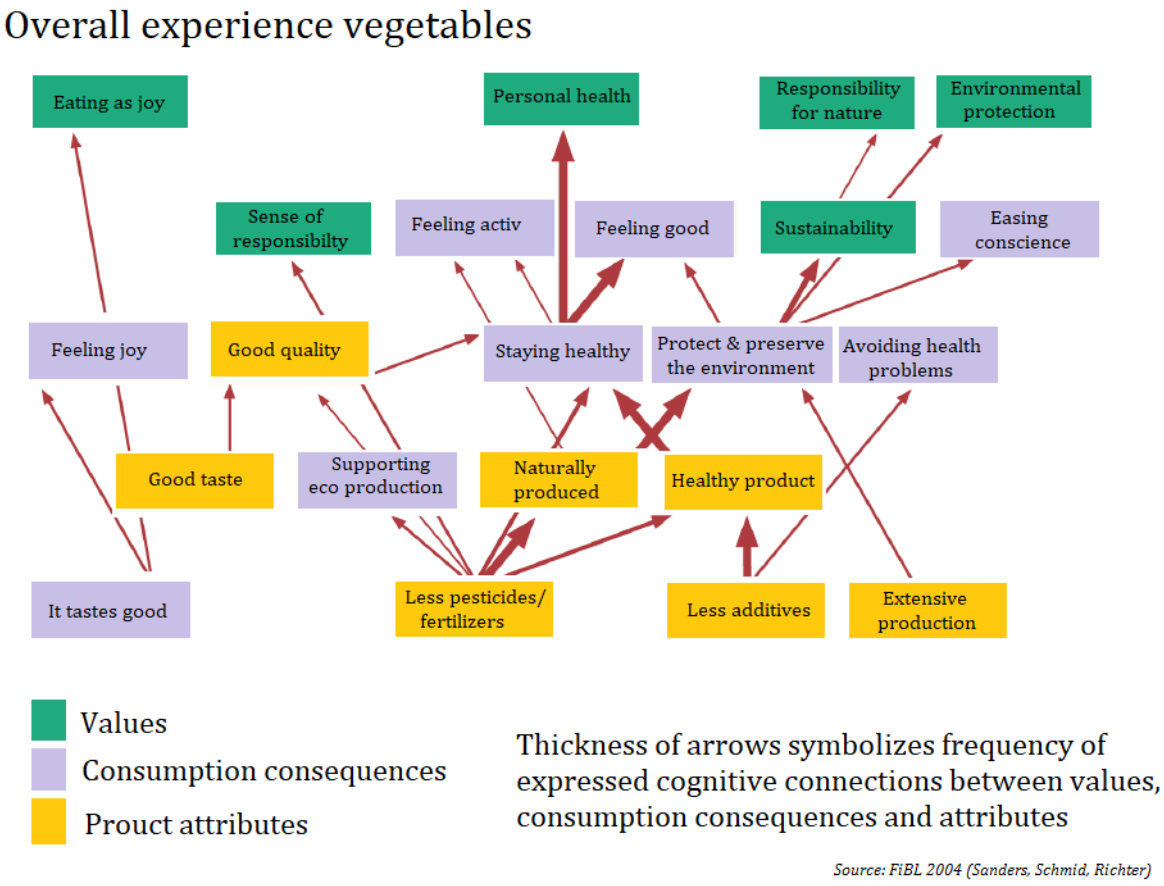


Figure 9 An overview of purchasing motives for vegetables
Source: made by author based on FiBL and Bio Suisse (2016)

In a study "Consumer driven supply chains: the case of Dutch organic tomato", Anastasiadis and Dam (2014) test what are the most important motives for buying organic tomatoes. Their key findings are that organic food purchases are mainly driven by generic sustainability concerns such as naturalness and environmental friendliness. Other conclusions are that health is an important motive for purchasing organic products, while hedonic motivation and taste are less important.

From all these studies can be concluded that freshness, health, taste are very important motives for buying tomatoes. They affect perceived quality and values and lead to purchase, which will be explained in the next chapter about means-end-model.

3.2. Means-End-Model

In order to purchase a product, consumers examine and evaluate it. A Means-End Model Relating Price, Quality and Value showed in Figure 10 examines the relationship between product attributes and purchase. Zanoli and Naspetti (2002) explain this model and claim that a means-end chain is a knowledge structure that links consumers' knowledge about the product attributes with their personal knowledge about consequences and values. Consumers consider purchasing process as problem solving. They see most product attributes as means to some end. In example of tomatoes, they would buy organic tomatoes in order to reach a goal (healthy diet). Zanoli and Naspetti (2002) also explain three stages of measuring the means-end chain. First of them is the elicitation of product attributes that are most relevant to consumer, second is laddering, an in-depth interview process that reveals how consumer links product attributes to consequences and values. The last stage is the derivation of hierarchical value maps that depict the aggregate consumer means-end-chains (Zanoli and Naspetti, 2002).

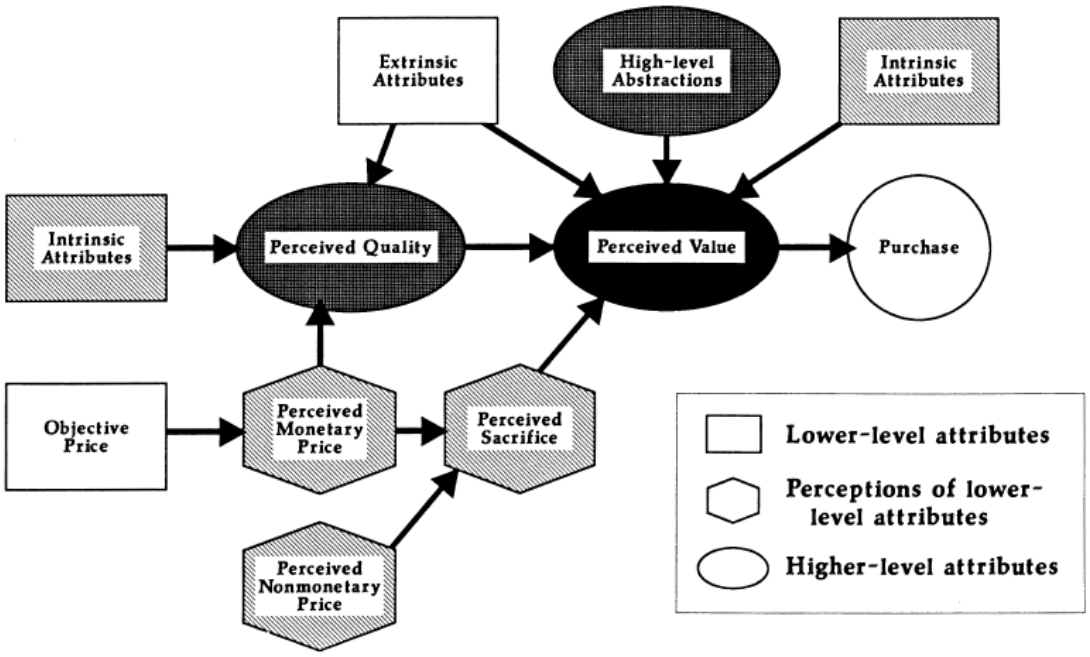


Figure 10 Means-End Model Relating Price, Quality and Value
Source: (Zeithaml, 1988)

4. Important product attributes to buy tomatoes

Cognitions from literature research have led to the selection of following ten product attributes: price, appearance, odor, freshness, taste, packaging material, regional and international origin, sustainability and health benefits, that are shown in Figure 11. Following Table 2 is created after a literature research of papers that deal with importance of product attributes of tomatoes or vegetables to customers. Some papers (Carroll et al., 2013; Cembal et al., 2007; Moser et al., 2011) place "organic" into the attributes that should be considered. In this master thesis, "organic" will be another category, along with "conventional". This will give an insight into possible differences in the importance of product attributes between organic and conventional tomatoes, as well as differences of overall satisfaction with these two production systems.

Following chapters give the description of chosen tomato attributes in more detail.

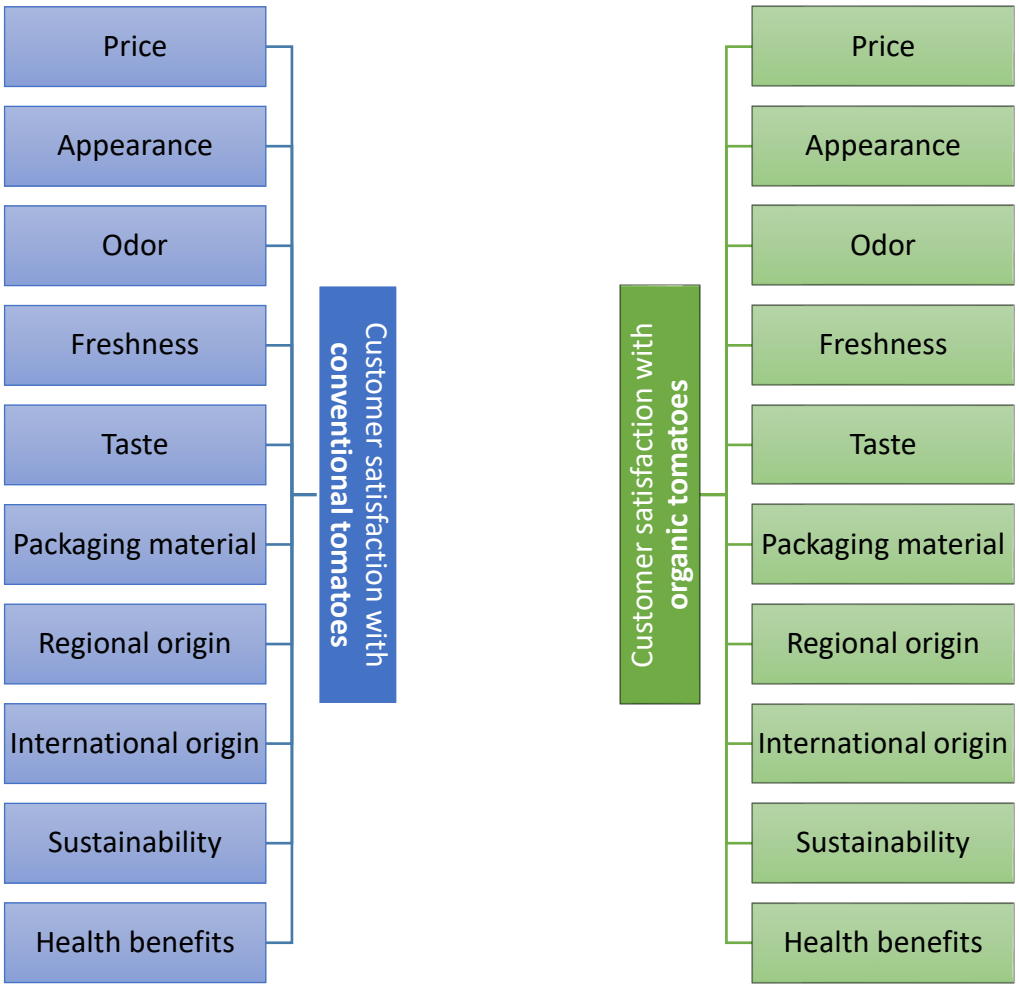


Figure 11: Product attributes to be investigated. Source: Made by author

Table 2 Literature overview about product attributes. Source: Made by author

Source	Product attributes
Agrarmarkt Austria (2017a)	Price; freshness; appearance; origin; eco-product; good labeling; wide choice; controlled quality; regionality; sustainability; traceability; fair trade
Amman (2009)	Quality cues: intrinsic (appearance, odor), extrinsic (packaging, image, price, brand); quality attributes: experience (taste, freshness, convenience), credence (health benefits, naturality, exclusiveness)
BEUC (2013)	Appearance, price, Brand, Origin, Taste, Convenience, Low fat/healthy eating, Best-before/Use-by dates, Organic, Quality labels, Free from
Brumfield (1994)	Freshness, taste, color, appearance, nutrition, uniformity, price, storage life, lack of blemishes, shelf life, size
Carroll et al. (2013)	Locally grown, state marketing program promoted, organic
Cembalo et al. (2007)	Taste, appearance, degree of maturity, price, ready to use, origin, organic, protected geographic indication, distance from production and packaging
Helo and Luomala (2011)	Freshness; origin; taste; price; health
Hussin et al. (2010)	Quality attributes (size, weight, shape, color, gloss, absence of defect, absence of blemishes, succulence, juiciness, freshness, ripeness, sweetness, sourness, bitterness, aroma, flavors, nutritional value, absence of pesticides, absence of preservative, cleanness, naturally ripened)
Jiménez-Guerrero et al. (2012)	Price, country of origin, production method, freshness
Moser et al. (2011)	Visual, smell and taste; Quality; Credence attributes (health, pesticide free, organic, environment, support to farmers, job creation, origin, local, certification); price; brand; packaging
Ragaert et al. (2004)	Freshness; labelled shelf life date; taste; labelled content; transparency packaging; product general; health; odor; labelled information; texture; color; nutritional value; appearance; packaging general; feeling product; shape packaging; labelled suggestions for use; feeling packaging; shape product

Zanoli and Naspetti (2002)	Taste, texture and odor; Natural product; expensive; aspect of packaging; not easily available
(ZBG, 2014)	Origin; price; food labels

4.1. Price

Price is one of the most studied product attributes. From thirteen chosen studies shown in Table 2, ten of them include price in their study, based on previous literature researches. Jiménez-Guerrero et al. (2012) mention that price is an attribute that might be in correlation with other attributes, but that it is necessary to include price in studies that analyze consumer preferences.

Price is an extrinsic quality cue. Jiménez-Guerrero et al. (2012) explain that extrinsic cues are product-related attributes but not part of the physical product itself. They exist outside the product and those are brand, price, country of origin, warranties or services.

To consumers, price is one of the most important product attributes. Zentrum für Betriebswirtschaft im Gartenbau e.V. presents the study in which the results of conjoint analysis shows that the most important partial utility when buying cherry tomatoes for consumers in Germany is low price. In this study, authors had also asked directly about the importance of some attributes. When asked directly, consumers answered differently. One can see social desirability on the act, while for example, conjoint-analysis places price as first, but direct answers as twelfth most important attribute (ZBG, 2014). Austrian consumers place low price as third most important factor for purchase decision when buying vegetables (Agrarmarkt Austria, 2017a). On the other side, BEUC (2013) claims that price takes a second place in importance for Austrian consumers, after taste.

4.2. Appearance and odor

Appearance and odor are intrinsic quality cues (Amman, 2009), and they signal the quality of the product. Northen (2000) explains that quality cues affect consumers' perceptions of quality prior to purchase and that they can be detected by senses. Oude Ophuis and Van Trijp (1995) also emphasize the role of intrinsic quality cues. They claim that intrinsic quality cues have a relevance for fresh foods and that the appearance of fresh vegetables, among others, is undoubtedly an indicator of the expected perceived quality.

A study from Hussin et al. (2010) presents the importance of specific intrinsic quality cues. Regarding chosen cues, results are following: most important is absence of defects, followed

by cleanness, color, size and weight. These cues can all be integrated in the attribute "appearance". According to Saba et al. (2018), vivid color and odor mostly effect mental construct describing freshness, most relevant quality attribute. Moser et al. (2011) describe "visual and smell" attributes as relevant and strongly determinant attributes in Europe, USA, Canada, Argentina and Australia, while in East Asia and Pacific Rim, their relevance is moderate.

Consumers perceive appearance and odor of conventional and sustainable foods differently. Moser et al. (2011, 126) claim that visual, smell and aroma components, together with health-related attributes, are perceived as the most significant reasons to buy sustainable food.

4.3. Freshness and Taste

Since freshness and taste are two most relevant experience quality attributes within the context of food products (Oude Ophuis & Van Trijp, 1995), they will be in focus of this study.

Freshness and taste are very important to Austrian consumers. Agrarmarkt Austria (2017a) lists purchase decision criteria by purchasing products of daily need. Freshness takes first place (82% consider it as generally important), followed by quality (67%). Regarding purchase decision criteria for fruits and vegetables, the most important is freshness. When considering quality criteria of fruits and vegetables, good taste takes the first place, followed by production without GMO and outstanding freshness (Agrarmarkt Austria, 2017b).

In 2015, GfK Austria and AMA-Marketing conducted another survey with 1.000 interviewees about three most important reasons for buying some specific groceries. Regarding purchase decision criteria for fruits and vegetables, the most important was freshness (82%), followed by appearance (57%) and price (47%) (Agrarmarkt Austria, 2017a).

In the study made by Jiménez-Guerrero et al. (2012) the results have shown that freshness is the most important attribute to consumers, followed by origin, production method and price.

Taste plays an important role in purchase decision of consumers when buying tomatoes. Knauer (2017) claims that modern tomato varieties seldom have a good taste. The reason is that producers and supermarkets have different expectations from tomatoes than consumers. They want to grow tomatoes that can survive long transports, while consumers want tomatoes to be fresh and tasty. Scientists have identified the molecules that are present in old varieties of tomatoes that are responsible for flavor and that are not present in modern tomato varieties

(Knauer, 2017). Knauer (2017) says that with this information producers can restore flavors from old varieties.

4.4. Packaging material

Packaging is the final process step in the food production. According to European Parliament and Council Directive 94/62/EC on packaging and packaging waste, packaging is defined as **"**all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer" (European Parliament and Council, 1994).

Fruit and vegetable packaging can be differed by material (Istel, 2017):

1. Packed in paper, carton, paperboard
2. Packed in plastic
3. Packed in other materials (wood, cotton)

And by the time of packing (Istel, 2017):

1. Industrial packaging
2. Service packaging
3. No packaging

The "Naturschutzbund Deutschland" (NABU) has made a research in 2016, with the title "Vorverpackungen bei Obst und Gemüse" (Prepackaging of fruits and vegetables). In their research, they give results about prepackaging of fruits and vegetables being sold in Germany. Over the time, the use of packaging has grown and prepackaged fruit and vegetable became most used form of fruits and vegetables being sold in Germany (Istel, 2017). Istel (2017) explains that 63,5% of all fruit and vegetable being sold in Germany is prepacked by the industry. Figure 12 shows the structure of vegetable packaging in Germany.

More than two thirds of all vegetables being sold in retail in Germany are being prepacked by the industry. Most prepacked vegetables in Germany are tomatoes, salad and carrots (Istel, 2017). Istel (2017) indicates that most common material is plastic (72%), followed by paper, paperboard and carton (25%). Packaging from other materials, such as wood and cotton involve 3% of the sold vegetables.

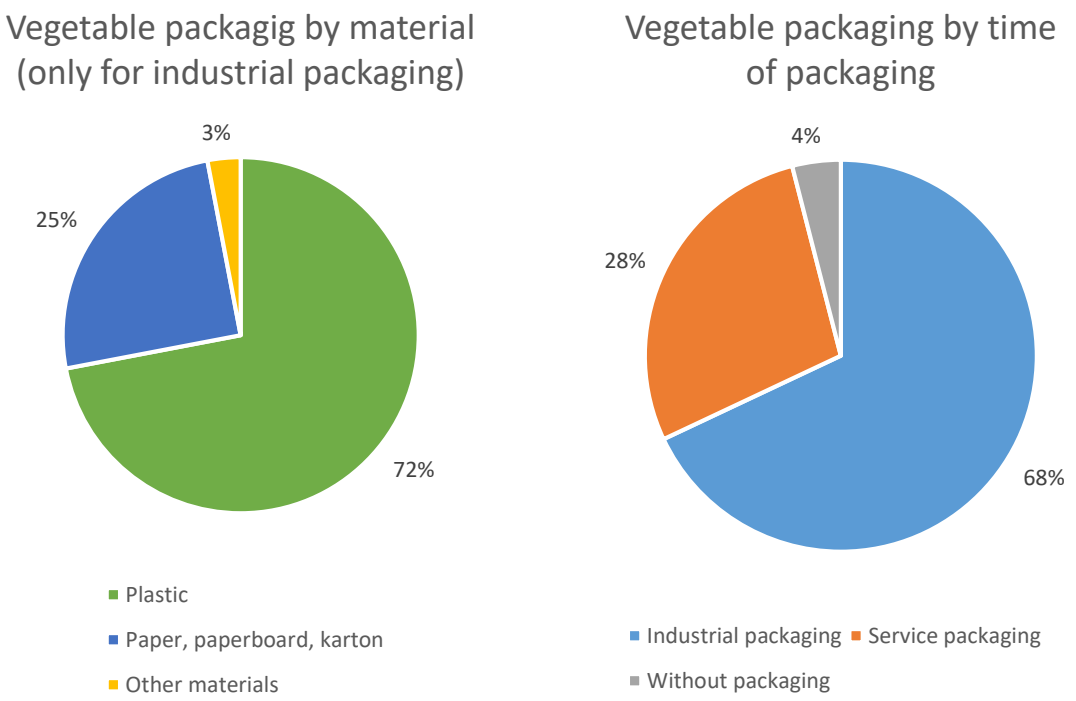


Figure 12 Vegetable packaging by material and by time of packaging in Germany, 2016
Soruce: Istel, 2017

Istel (2017) also examines changes in tomato packaging from 2010 to 2016. In six years, the filling portion has grown for 17%. Further, the usage of paper, paperboard and carton in tomato packaging has grown for 28% and the usage of plastic packaging has grown for 42%.

But what are the reasons that plastic is more used than paper, paperboard or carton? Firstly, plastic is lighter, which means that more kilograms of goods can be packed in one kilogram plastic than in one kg paper, paperboard or carton (Istel, 2017). Secondly, plastic is transparent. (Sabo et al., 2017) explain that transparency has an important role in product attractiveness. These two attributes make plastic superior and therefore more common.

4.5. Origin

Origin is considered as very important by Austrian consumers. AMA made a research in 2016, where respondents were asked how important some issues are, when buying groceries. Most important was Austrian origin, followed by controlled quality, regionality, organic production, sustainability, trackability and fair trade (Jetzinger, 2018). According to the consumer survey made by The European Consumer Organization in January 2013 about the food origin, majority of Austrian consumers (56,1%) believes that origin helps them assess the quality of the food

they buy (BEUC, 2013). According to this survey, half of Austrian consumers uses origin as a way of assessing the environmental impact of the food. The following two chapters describe the meaning of regional and international origin to vegetable consumers.

4.5.1. Regional origin

Meaning of regional products to consumers

Food regionality has an important role for consumers. Lorenz et al. (2016) discuss that regionality is seen as a quality indicator and that consumers perceive regional product to have better taste or freshness. Regional products have an additional value, not only because of quality, but also because of sympathy and are perceived of moral superiority (Lorenz et al., 2016). Consumers consider regionality as very important because of following reasons (Jetzinger, 2018; Zierler, 2013, 11):

- Preservation of jobs, care for domestic economy
- Quality and freshness of regional products
- Expectation of health benefits
- Short transports and climate protection
- Transparency of production
- Support of environmentally friendly production methods
- Tradition of products
- Preservation of domestic cultural landscape
- Donation to regional identity

Austrian retail and regionality

Austrian retailers have recognized the high importance of regionality to their consumers. Because of this, they have created diverse brands, programs and strategies to highlight the regionality of the products they sell.

REWE International AG claims that the reasons for having a wide pallet of regional products are the short transportation routes, outstanding freshness and supporting of domestic agriculture. REWE established brands “Da komm’ ich her!” (BILLA) “Ich bin Österreich” (PENNY) and an organic brand “Ja! Natürlich!” that promote regionality. Moreover, REWE International AG has introduced A+A label in 2009, to make Austrian products transparent. This label is given to products that are grown and processed in Austria and contain only

Austrian ingredients. Besides that, BILLA shops have so-called “Regional Regal”, where regional producers have a chance to place their products. Through the initiative “Marktplatz Österreich”, MERKUR has about 7000 products from about 500 local deliverers in their shops (REWE International AG, s.a., 2017).

As second biggest retailer in Austria, SPAR emphasizes regionality as well. They emphasise that they sell as many products as they can with Austrian origin, that they promote local small businesses, regional producers and agricultural projects. They also want to revivify old varieties and bring crop growing back to Austria. At least, they emphasize their cooperation with domestic specialists. In their shops, they have about 40.000 domestic products from about 2500 Austrian producers (SPAR, s.a.).

Third biggest retailer in Austria HOFER also promotes regionality. With their philosophy “aus der Region-für die Region” (“from the region for the region”) they offer certain products from regional producers for this region. An example is that they have “Kärtner Nudeln” only in stores in Carinthia. They try to supply their stores with regional products as much as possible. HOFER has its own brand “Zurück zum Uhrsprung“, which stands for organic farming and regional character. The products with this brand are made from organic products that come only from Austrian regions (HOFER, s.a.-a, s.a.-b).

4.5.2. International origin

The country of origin has a significant effect on consumer product evaluation and consumer purchase decisions (Aichner, 2014). It acts as a signal of product quality. Cembal et al. (2007) give an example in their study where they examine the effect of origin on consumer perception of cherry tomatoes. The study was conducted in Germany and it was concluded that cherry tomatoes from Germany and Italy are considered as ones with better quality, as those produced in Turkey, Holland, France and Spain.

Austrian retail manages to have year-round availability of tomatoes through imports, but also through year-round production. Because Austrian consumers highly pay attention to domestic fruit and vegetable, REWE International AG supports year-round production of tomatoes in glasshouses. This makes domestic tomatoes available in their stores (Billa, Merkur and Adeg) through whole year (Dusek, 2016).

4.6. Sustainability

The production system and country of origin (i.e. the length of transport way) have an influence of sustainability of tomatoes. Sustainability of different tomatoes that are available in retail can be expressed with carbon footprint. ISO (2018c) defines carbon footprint of a product as "sum of GHG emissions and GHG removals in a product system expressed as CO_2 equivalents and based on a life cycle assessment using the single impact category of climate change". CO_2 equivalents of different types of tomatoes are shown in following Figure 13.

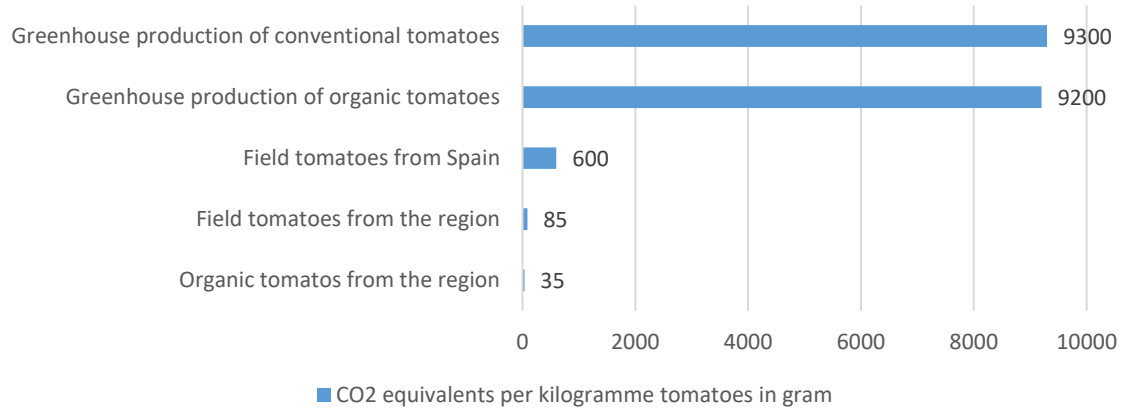


Figure 13 CO_2 equivalents per kg tomatoes in gram.
Source: Modified from Vorsamer (2016)

This figure shows that the most impact on the carbon footprint has the production location, i.e. field production vs. greenhouse production. There is not much difference in carbon footprint of conventional and organic tomatoes grown in greenhouses. The most preferable option regarding carbon footprint are organic tomatoes from the region, because there is a short way from a field to a table, and because organic products are less demanding in sense of production inputs. Vorsamer (2016) mentions that the customers in supermarkets do not have the information which tomatoes are produced in a field and which in a greenhouse. On the other side, Koch and Reese (2017) consider bio certification of organic greenhouse tomatoes questionable. In their case study, they discuss the sustainability of tomatoes from Almeria, Spain. This region is known for greenhouse tomato production, but it has problem with water resources. Consumers seek for more organic products, that are available year-round, but the question about the sustainability of such production should be brought to discussion (Koch and Reese, 2017).

4.7. Health benefits

The consumption of tomatoes benefits human health. Tomatoes are rich with lycopene, potassium, and contain three antioxidants: beta-carotene, vitamin C and vitamin E (Bhowmik, 2012). Most of the studies, highlight the role of lycopene in human body. Lycopene is a carotenoid pigment that is principally responsible for the characteristic deep-red color of ripe tomato fruits and tomato products (Burton-Freeman and Reimers, 2011, 184). Costa-Rodriguesa, et al (2018, 1148) define lycopene as a bioactive component mainly found in tomato. They explain that lycopene has a high antioxidant potential, the highest among carotenoids. Bhowmik (2012, 40-42) gives an overview of health benefits that come with tomato consumption. Some of them are:

1. Lowering cholesterol
2. Reduction of hearth diseases
3. Lowering blood pressure
4. Protection from cell damage
5. Regulation of blood sugar
6. Counteraction of acidosis
7. Reduction of migraines
8. Boosting immunity
9. Straightening of bones
10. Cures eye disorder
11. Cures diabetes
12. Cancer prevention
13. Wound repair

5. The role of Customer Satisfaction Measurement in Quality Management

Customer satisfaction is very important for implementing quality management. Goetsch and Davis (2010) mention that customer satisfaction is one of four objectives of quality management, together with cost leadership, effective HR and integration with the supplier base. Through their standards, the International Organization for Standardization also emphasizes the importance of customer satisfaction in quality management. ISO 9000:2015 is an international standard that describes the fundamental concepts and principles of quality management (ISO, 2015). This standard states that the primary focus of quality management is to meet customer requirements and strive to exceed customer expectations (ISO, 2015). ISO (2015) also describes that this focus should ensure the realization of many benefits, such as increase in customer value, customer satisfaction, customer loyalty, revenue and market share and enhancing repeat business, reputation and customer base. As mentioned, customer satisfaction has a significant importance in quality management and there are also some standards of quality management that put focus on customer satisfaction. According to ISO (2018), those are:

- ISO 10001, Quality management – Customer satisfaction – Guidelines for codes of conduct for organizations
- ISO 10002, Quality management – Customer satisfaction – Guidelines for complaints handling in organizations
- ISO 10003, Quality management – Customer satisfaction – Guidelines for dispute resolution external to organizations
- ISO 10004, Quality management – Customer satisfaction – Guidelines for monitoring and measuring

Customer satisfaction is treated as one of the measures of quality management system performance and its measurements examine customer expectations concerning the characteristics of certain product or service (Kobylanski et al., 2011). “The information obtained from monitoring and measuring customer satisfaction can help identify opportunities for improvement of the organization’s strategies, products, processes and characteristics that are valued by customers, and serve the organization’s objectives. Such improvements can straighten customer confidence and result in commercial and other benefits” (ISO, 2012, 5). ISO (2012) also describes relationship between ISO 10004 standard and ISO 9001 (Quality Management systems – Requirements). This relationship includes:

- Customer focus

- Resource management
- Customer satisfaction
    - Communication with customers
    - Monitoring customer perception
- Analysis of data

6. Customer Satisfaction Analysis

6.1. Definition of Customer Satisfaction

The term "Customer Satisfaction" has gained many definitions and explanations over the years. Some of them will be cited in further text.

Handy defines Customer Satisfaction "as the gap of distance between consumer's ideal attribute combination for a particular product or service and the attribute combination of the product or service offered in the marketplace which comes closest to this ideal" (Handy, 1977, cit.n. Kaiser, 2005, 43).

Another definition comes from *Day*, who says that "Satisfaction we understand as post consumption evaluation of a product/service in terms of positive/neutral/negative attitudes toward the product" (Day, 1977, cit.n. Kaiser, 2005, 44).

The International Organization for Standardization defines customer satisfaction as "customer's perception of the degree to which the customer's expectations have been fulfilled" (ISO, 2018b).

6.2. Confirmation/Disconfirmation Paradigm

The theory of consumer satisfaction has many modeling frameworks, but the most common is the Confirmation / Disconfirmation Paradigm (C/D Paradigm). The main statement of this theory is that customer satisfaction results from the comparison between the usage of one product or service (actual performance) with a certain standard to be compared with (expected performance). When the actual performance equates to the comparison standard, the "Confirmation" occurs (Homburg, 2016).

Expectations, experiences and ideals are comparison standards, and customers can also combine them. The type and intensity of perception of comparison standards can vary in different situations, such as purchasing or usage (Homburg, 2018).

Actual performance can be subjective or objective. Subjective performance varies among customers, due to different perception effects, while objective performance is the same for all the customers. Because of this, there are more perceived actual performance levels for the same product (Homburg, 2018).

According to Homburg (2016), the confirmation level of satisfaction is determined by the exact correspondence with the comparison standard:

a) Positive disconfirmation (actual performance outgoes the expected performance)
b) Confirmation (actual performance is equal to the expected performance)
c) Negative disconfirmation (expected performance outgoes the actual performance)

Satisfaction is the last variable in the comparison process and it is the outcome of cognitive comparison. In the case of positive disconfirmation, satisfaction is over confirmation level, while in the case of negative disconfirmation, satisfaction is under confirmation level (Homburg, 2018).

6.3. Other modeling frameworks

Furthermore, the literature mentions some other modelling frameworks, such as assimilation, contrast, assimilation-contrast theory, the typology of forms of satisfaction, attribution and prospect theory and the multifactor model of consumer satisfaction (Homburg, 2016). They will be shortly explained in further text.

The Assimilation Theory claims that persons strive to achieve a cognitive balance. It means that, when disconfirmation occurs, customers make ex post adjustments of their expectations or perceptions of a product or service, so that the satisfaction reaches the conformation level (Homburg, 2016).

In the Contrast Theory, by disconfirmation, customers strive to the ex post exaggeration of their expectations or perceptions of a product or service, so it leads to the enlargement of disconfirmation (Homburg, 2016).

The Assimilation-Contrast Theory explains that customers tend to react differently to the discrepancy between actual and expected performance of one product or service. The extent of this discrepancy plays an important role, so there are three latitudes: latitude of acceptance, latitude of neutrality, and latitude of rejection (Homburg, 2016).

The typology of forms of satisfaction says that the relationship between the level of satisfaction and temporal changes of an expected performance level leads to different forms of customer satisfaction (Homburg, 2016).

In the Attribution Theory it is explained that customers search for causes of a success or a failure of purchase. The satisfaction depends on the cause, which is attributed by customers (Homburg, 2016).

Homburg (2016) explains that, by the Prospect Theory, consumers are risk-averse. It means that the nonfulfillment of the customer expectations leads to stronger dissatisfaction, but that the over-fulfillment of the consumer expectations brings the satisfaction in the same amount.

The Multifactor Model of Customer Satisfaction explains that all performances do not contribute to the satisfaction. Fulfillment of basic factors prevents customer dissatisfaction, while the fulfillment of enthusiasm factors leads to customer satisfaction. The satisfaction by efficiency factors depend on the level of their fulfillment (Homburg, 2016).

6.4. Effects of customer satisfaction for future customer behavior

Customer satisfaction or dissatisfaction with a product can have different effects or consequences for future customer behavior. According to Simon and Homburg (1998), customer satisfaction can lead to loyalty and word-of-mouth propaganda, while customer dissatisfaction can lead to abandonment, no reaction, complaint and word-of-mouth propaganda as well. This is shown in following Figure 14. Effects of customer satisfaction will be explained in more detail in further text.

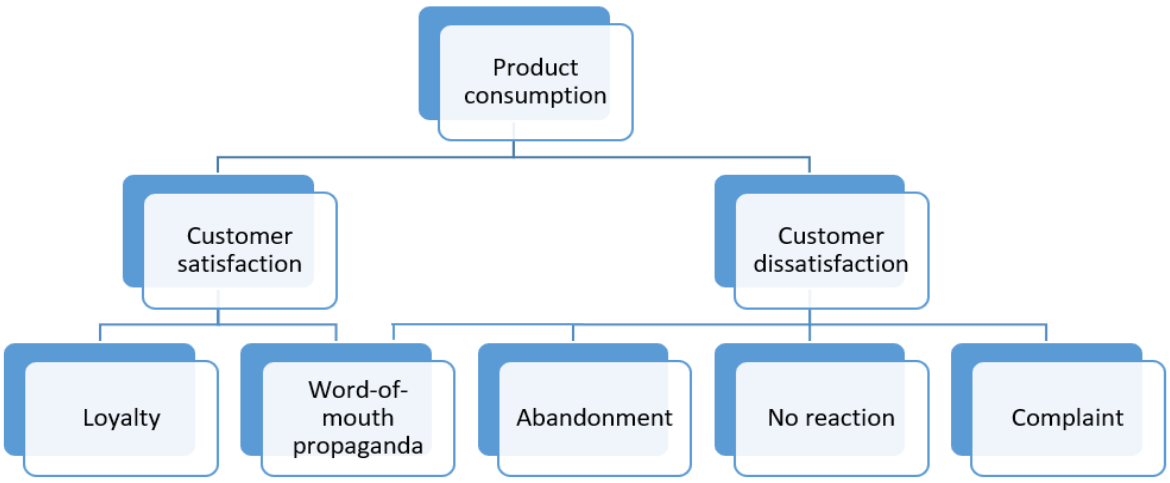


Figure 14 Individual reaction forms of consumers, dependent on the course of satisfaction judgement
Source: Simon and Homburg (1998, 51)

According to Kaiser (2005) the relationship between customer satisfaction and loyalty is explained in two approaches. First of them explains its relationship with saddle-shaped function, which means that changes of satisfaction levels in the middle have barely any consequences to degree of loyalty. Other approach describes the relationship between customer satisfaction and loyalty as progressive function, which means that average growth in customer satisfaction results with loyalty growth above average (Kaiser, 2005).

Word-of-mouth propaganda is a result of face-to-face communication and therefore it is more trustworthy as other marketing instruments (Kaiser, 2005). Kaiser (2005) mentions that customers share their satisfaction with a product with three persons in average, while dissatisfaction is shared with nine to ten persons. Nowadays we live in "internet" society, so the importance of "electronic-word-of-mouth (eWOM)" grows. The difference is that the information shared through eWOM is available to a multitude of people and institutions via the Internet (Jansen et al., 2009). Jansen et al. (2009) also state that although information is less personal then face-to-face, it is more powerful due to the significant reach, open access, credibility by being in print and immediate impact.

6.5. Measuring customer satisfaction

The ways of measuring the customer satisfaction are divided in two approaches: objective and subjective methods. Their systematization is shown in Figure 15.

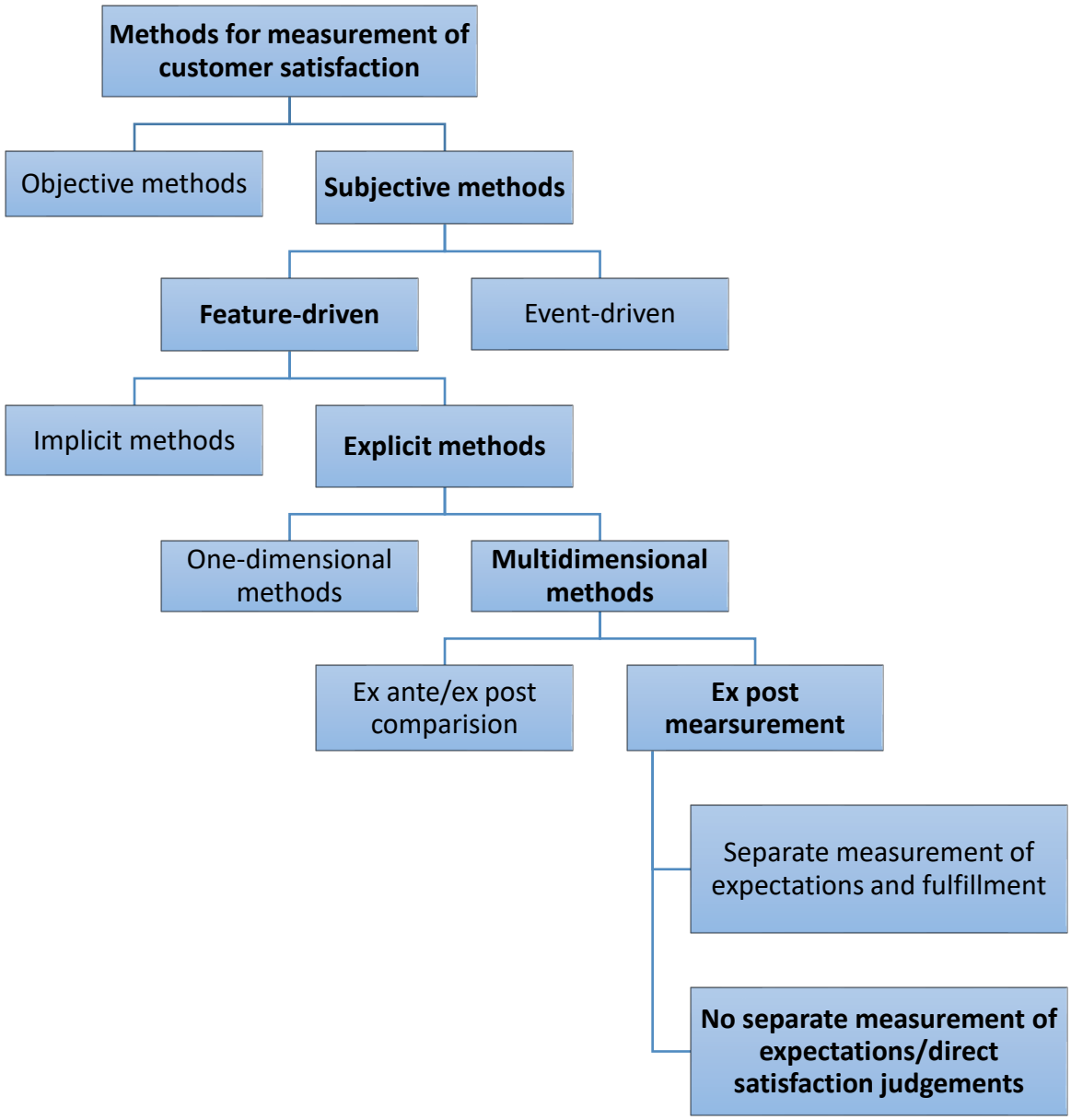


Figure 15 Systematization of methods for measurement of customer satisfaction.
Source: Homburg (2016, 129)

Homburg (2016) explains that objective methods are mostly related with the indicators such as sales development, market share or profit, while subjective methods include the subjectively perceived satisfaction. Further, Homburg (2016) clarifies that subjective methods can be divided in event-driven and feature-driven methods. Because in this master thesis a product (tomato) is in focus, feature-driven methods will be used. They are related with a bright spectrum of product characteristics, for which the customers create their opinion. Feature-driven methods can be divided into two sections. First of them are implicit methods, that are being made by analyzing the customer complaints. Second are explicit methods, that are based on the direct interviews of customers and they identify the customer satisfaction through adequate questioning instruments (Homburg, 2016). When talking about explicit methods, one can differ one-dimensional and multidimensional methods. One-dimensional methods measure customer satisfaction with only one dimension or with only one indicator, while multidimensional methods contain more dimensions or indicators in the measurement of consumer satisfaction (Homburg, 2016). Multidimensional methods can be divided in methods in which Ex ante/Ex post comparison occurs, and in methods which practice Ex post measurement. The second ones can be divided in separate measurement of expectations and their fulfillment, and in those methods without separate measurement of expectations. This last method is also called *the direct collection of satisfaction judgements*, and it is the most used one. It dominates in research and praxis. Because it is the most valid form of the measurement of customer satisfaction (Homburg, 2016), this method will be used in this master thesis.

6.6. Multidimensional measurement

This method is followed by the basic idea that overall customer satisfaction is a construct of an aggregation of partial satisfactions with specific product attributes, or performance parameters (Kaiser, 2005).

There is a function that explains this method:

$$GZ_{ij} = f(EZ_{ij1}, EZ_{ij2}, \dots, EZ_{ijk})$$

where,

GZ_{ij} = overall satisfaction of the j performance by the i customer

EZ_{ijk} = partial satisfaction of the j performance by the i customer with the k attribute

Multidimensional (multi-attribute) models can be explained by compensatory and non-compensatory models (Kaiser, 2005, 129). Pizam and Ellis (1999, 331) explain that "compensatory models presume that customers make trade-offs of one attribute for another in order to make a decision, i.e. a weakness in one attribute is compensated by strength in another". Compensatory models equalize the deviations between expected and actual performance of customer satisfaction criterions (Schöps, 2013). Kaiser (2005, 129) explains that, in non-compensatory models, there is no compensation between feature-specific partial satisfactions, based on a positive or negative disconfirmation between expected and actual performance. Schöps (2013) also says that due to the different weighing of criterions (or feature-specific partial satisfactions), every criterion participates in the overall satisfaction rating with different strength. Because of that, the aspect of weighting of partial satisfactions must be taken into consideration (Kaiser, 2005). This model has following function:

$$\boldsymbol{GZ_{ij} = \sum \left(W_{ijk} \cdot EZ_{ijk} \right) \qquad with\ k = 1, \ldots, n}$$

where:

$\mathbf{GZ_{ij}}$ = overall satisfaction of the j performance by the i customer

$\mathbf{EZ_{ijk}}$ = partial satisfaction of the j performance by the i customer with the k attribute

$\mathbf{W_{ijk}}$ = importance weighing of the attribute k for the customer i regarding the performance j

According to Kaiser (2005), non-compensatory models follow the two-component approach, which means that, besides measurement of the satisfaction judgements, there is a determination of weighing components using rating scales. Besides determination of importance using rating scales, it can be estimated using an analytical method, such as multiple regression (Grigoroudis and Siskos, 2010).

Non-compensatory models can have two forms: they can be conjunctive or disjunctive. Following the conjunctive model, "consumers establish a minimum acceptable level for each important product attribute and make a choice (or become satisfied) only if each attribute equals or exceeds the minimum level" (Pizam and Ellis, 1999). Pizam and Ellis (1999)also explain that in disjunctive model, consumers establish minimum levels only for one or few attributes.

7. Operationalization

Table 3 Operationalization. Source: Made by author

INDICATORS		SCALE	VALUE
Purchase habits			
Purchase intervals	1. How often do you buy tomatoes in Austrian retail?	nominal	more times per week
			weekly
			monthly
			once in 3 months
			less frequently than that
			never
Type of tomatoes	2. What type of tomatoes do you usually buy?	nominal	classic round/beefsteak
			cherry/plum/cocktail
			vine tomatoes
			all types
Percentage of organic purchases	3. How many percent of your tomato purchase is organic?	nominal	< 5%
			5-25 %
			25-50%
			50-75%
			75-100%
Importance of the origin	4. Do you pay attention to the origin of tomatoes?	nominal	always
			often
			sometimes
			never
Packaging	5. Do you prefer packed or unpacked tomatoes?	nominal	packed
			unpacked
	6. Does the packaging of tomatoes influence your purchase decision?	nominal	always
			often
			sometimes
			never
Partial satisfactions of conventional tomatoes			
Price	7. How satisfied are you with the price of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Appearance	8. How satisfied are you with the appearance of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Odor	9. How satisfied are you with the odor of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Freshness	10. How satisfied are you with freshness of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Taste	11. How satisfied are you with taste of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)

Packaging material	12. How satisfied are you with packaging material of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Origin (regional)	13. How satisfied are you with regionality of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Origin (international)	14. How satisfied are you with conventional tomatoes from Spain?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	15. How satisfied are you with conventional tomatoes from Italy?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	16. How satisfied are you with conventional tomatoes from Netherlands?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	17. How satisfied are you with conventional tomatoes from Morocco?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	18. How satisfied are you with conventional tomatoes from Austria?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
Sustainability	19. How satisfied are you with the sustainability of conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Health benefits	20. How satisfied are you with influence of conventional tomatoes on your health?	interval	1 (very unsatisfied) – 5 (very satisfied)
Overall satisfaction with conventional tomatoes	21. How satisfied are you overall with conventional tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Partial satisfactions of organic tomatoes			
Price	22. How satisfied are you with the price of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Appearance	23. How satisfied are you with the appearance of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Odor	24. How satisfied are you with the odor of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Freshness	25. How satisfied are you with freshness of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied))
Taste	26. How satisfied are you with taste of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Packaging material	27. How satisfied are you with packaging material of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Origin (regional)	28. How satisfied are you with regionality of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)

Origin (international)	29. How satisfied are you with organic tomatoes from Spain?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	30. How satisfied are you with organic tomatoes from Italy?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	31. How satisfied are you with organic tomatoes from Netherlands?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	32. How satisfied are you with organic tomatoes from Morocco?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
	33. How satisfied are you with organic tomatoes from Austria?	interval	1 (very unsatisfied) – 5 (very satisfied); 6 (I do not know)
Sustainability	34. How satisfied are you with the sustainability of organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Health benefits	35. How satisfied are you with influence of organic tomatoes on your health?	interval	1 (very unsatisfied) – 5 (very satisfied)
Overall satisfaction with organic tomatoes	36. How satisfied are you overall with organic tomatoes?	interval	1 (very unsatisfied) – 5 (very satisfied)
Sociodemographic characteristics			
Age	37. How old are you?	nominal	up to 18 years
			18 - 30
			30 - 45
			45 - 60
			older
Gender	38. What is your gender?	nominal	female
			male
Education	39. What is your highest education level?	nominal	elementary school
			apprenticeship
			BMS
			Matura
			university
Household income	40. What is your net household income?	nominal	under 1000 €
			1000 – 1500 €
			1500 – 2000 €
			2000 – 2500 €
			2500 – 3000 €
			3000 – 3500 €
			3500 – 4000 €
			more than 4000 €
Place of residence	41. Where do you live in?	nominal	city
			village

8. Materials and methods

8.1. Study design

This study is a combination of qualitative and quantitative research methods, including expert interviews and web survey. In order to get a better perspective into this topic, expert interviews will be done. Further, this study includes a web survey, conducted afterwards, which makes it possible to ask larger number of customers about their satisfaction.

Experts have a specific role as interview partners because they are the source of specific knowledge about the explored subject (Gläser & Laudel, 2009). Gläser & Laudel (2009) also say that expert interviews are one form of qualitative interviews. Qualitative interviewing is a method of qualitative research, which involves a researcher (author), a research participants (experts in field of vegetable production) and the theme (customer satisfaction with tomato supply in retail) (Moen & Middelthon, 2015). Moen and Middelthon (2015) explain that most of the qualitative interviews are only partially structured. They hold within the framework of one or more research questions. The style, content and syntax are flexible, and they are not predetermined but established during the interview itself. Moen and Middelthon (2015) also claim that qualitative interviews entail interpersonal interaction between epistemologically active subjects and aim at joint construction of knowledge through reflection and articulation. Three experts in field of vegetable production are questioned. Their opinion about current state of tomatoes in retail is of extreme importance because it represents a production side and gives some thoughts about the usability of this study.

Second part of this study are quantitative surveys. Perumal (2014) explains that survey research is one of the types of descriptive research, which includes quantitative research. Quantitative research methods deal "…with numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationship" (Perumal, 2014, 87). He also explains that those methods are used to answer questions on relationships within measurable variables in order to explain, predict or control a certain phenomenon. Quantitative survey gives data needed for conclusions about customer satisfaction with tomato supply in retail.

8.2. Quantitative data collection

The data will be collected using web survey. Web survey uses "computerized self-administered questionnaires, stored on a specific computer connected to the Internet (i.e. server), which respondents access via a web browser. Respondents predominantly use desktop or notebook computers…, read questions visually displayed on the screen, and provide their answers using a keyboard, a mouse…, or some other manual electronic device. No interviewer is present to guide the respondent… Responses to questions are automatically transmitted, usually page by page, to a database on a researcher´s server" (Callegaro et al., 2015, 5). Owens (2002) brings out some advantages and disadvantages of web surveys. As advantages, she lists lower costs, possibility of reaching international populations, reduction of time required for implementation, reaching greater sample size and the fact that complex skip patterns can be programmed. Disadvantages include, among others, representativeness issue and differences in capabilities of people's computers and software's accessing web surveys. The used survey application is Lime Survey.

Comparison of survey methods for data collection is shown in following Table 4.

Table 4 Comparison of survey methods for data collection. Source: Chakrabarti (2012)

Variable	Internet-based	Postal mail	Telephone	Face to Face interview
Cost	Cheapest	Cheap	Moderate	Costly
Speed	Fast	Moderate	Fast	Slow
Response rate	Low to Moderate	Low to moderate	Moderate	High
Length of Questionnaire	Short-moderate	Short	Moderate	Long
Open-ended responses	Poor	Poor	Moderate	Best
Possibility of interviewer bias	None	None	Moderate	Best

Table 4 compares internet-based surveys with other collection methods. The length of questionnaire plays an important role in response rate. Galesic and Bosnjak (2009) claim that the longer stated length of the web survey, the fewer respondents start and complete the questionnaire. Therefore, this web survey has a length between five and ten minutes. According to Reja et al. (2003), the form of a question is also very important for the response rates. They say that close-ended questions result with higher response rates than open-ended questions. Therefore, in order to achieve higher response rates, all questions are close-ended questions.

8.3. Web survey process

According to Callegaro et al. (2015), web survey process has three steps, showed in Figure 16.

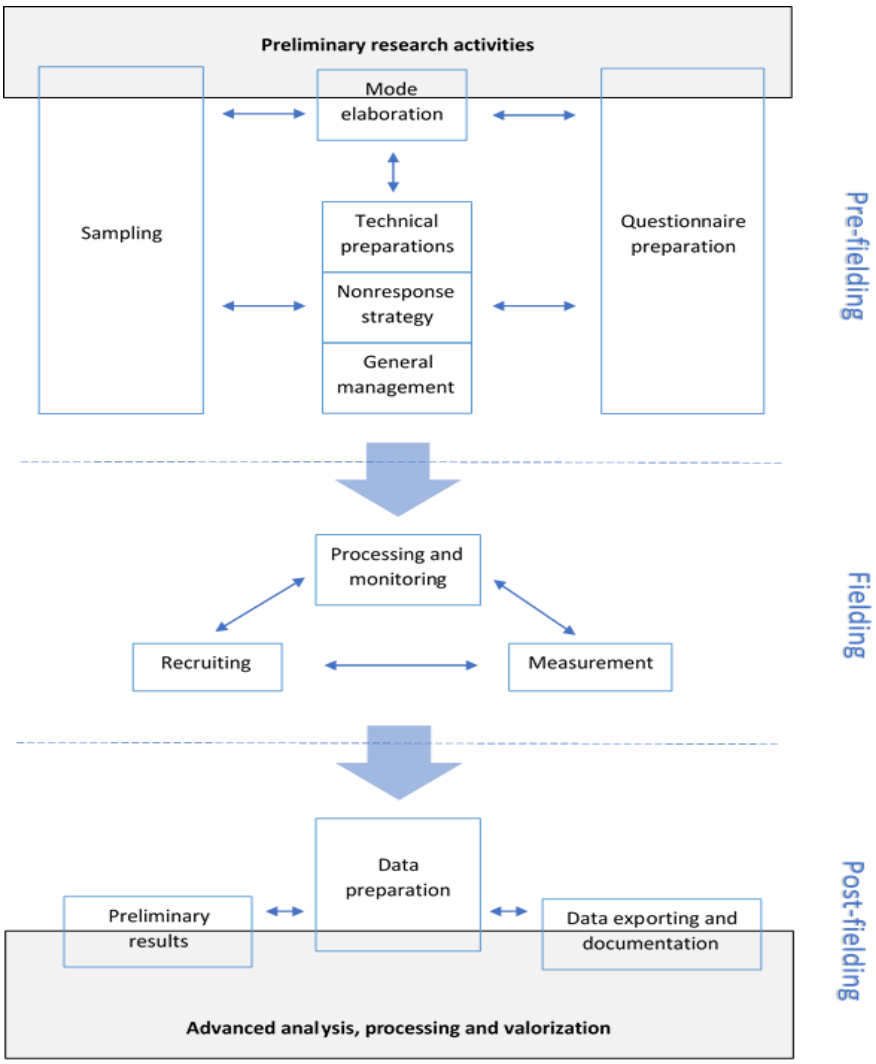


Figure 16 The steps and stages of the web survey process. Source: Callegaro et al. (2015, 11)

First of them is *pre-fielding*, dealing with decisions about the survey mode, mode of measurement, recruiting, sampling, defining population, sampling frame, sample size and sample design, selection of the sample, questionnaire preparation, technical preparations (database and case management, various privacy, security and email settings), nonresponse strategy (covers contacting and other means to achieve the desired cooperation) and general measurement (overall management, administration, communication etc.). The next step is *fielding*, which includes recruitment, measurement and related processing and monitoring. The last step is so-called *post-fielding*, which involves data preparation (editing, coding, imputation and weighing of data), preliminary results (summary statistics can be automatically generated) and data exporting and documentation (Callegaro et al., 2015).

8.4. Population and sampling

There are two types of population: target and survey population. OECD (2005) defines a target population as "the population outlined in the survey objects about which information is to be sought and a survey population as "the population from which information can be obtained in the survey". They also explain that target population may be considered as the scope of the survey and the survey population as the coverage of the survey (OECD, 2005). Callegaro et al. (2015) explain that, out of practical reasons, the focus is often on a narrower survey population which is more realistic for surveying than the theoretically defined target population. In case of this study, target population is the population of all people of interest for the survey. Survey population refers to Austrian Internet users, i.e. the sample, the people who answer the questionnaire.

Sample is "a subset of units from the target population, which is included in the survey with the aim of learning about the entire target population" (Callegaro et al., 2015, 40). In order to better understand the connections between sampling and surveys, Table 5 gives an overview.

Table 5 Web surveys according to key sampling characteristics. Source: Callegaro et al. (2015, 8)

	PROBABILITY SAMPLING	NON-PROBABILITY SAMPLING
LIST-BASED SURVEYS	Probability surveys of specific Internet populations	Web surveys with incomplete lists of the target population
	Probability-based web surveys of the general population	Web surveys based on list collected self-selection
	Probability-based online panels	Non-probability online panels
NON-LIST-BASED SURVEYS	Probability web intercept surveys	**Unrestricted web surveys (self-selection)**

In this master thesis, the unrestricted (self-selected) web survey is used. This means that the list of sample units is not available beforehand, so it is a non-list based survey and also a non-probability web survey (Callegaro et al., 2015). Fricker (2017) explains that non-probability, or convenience samples, occur when the probability that every respondent included in the sample cannot be determined or when each individual can choose whether to participate in the survey or not. Unrestricted web surveys can include everyone who sees an invitation or a link and respondents can decide on inclusion in the sample (Callegaro et al., 2015).

Population and sample size

As mentioned, the survey population refers to Austrian Internet users. Because the survey will be conducted online, and it is an unrestricted web survey, everyone has access to it. According to Statistik Austria (2018e), 87,5% of Austrian population uses Internet, which gives a number of approximately 7,7 million Internet users.

In order to determine sample size, rule-of-thumb formula for the partial correlation will be used. According to Green (1991), this following formula can be used to calculate a required number of subjects for multiple regression analysis:

$$\boldsymbol{N \geq 104 + m}$$

where:

N = the minimum number of subjects

m = the number of predictors

In case of this research, there are ten predictors (m) in multiple regression. According to this, the minimum number of subjects (respondents) or sample size is calculated:

$$N \geq 104 + m$$

$$N \geq 104 + 10$$

$$\boldsymbol{N \geq 114}$$

Following this formula, needed sample size is 114 people.

Sample error

The survey resulted with 153 fully completed questionnaires, which made multiple regression analysis possible. With this data, sample error can be calculated using following formula, modified from Haas (2001, 165):

$$\boldsymbol{W = p \pm 1,96 \cdot \sqrt{\frac{p \cdot q}{n}} \cdot \sqrt{\frac{N-n}{N-1}}}$$

Where:

W = real value

p = percentage in the sample

q = 1-p

n = sample size

N = population size

1,96 = factor 95% - significance level

If *p* is 0,5 (which means that 50% of a sample gave a certain answer) and by following the formula above, it can be calculated that the sample error amounts 7,92%.

$$W = p \pm 1{,}96 \cdot \sqrt{\frac{p \cdot q}{n}} \cdot \sqrt{\frac{N-n}{N-1}}$$

$$W = 0{,}5 \pm 1{,}96 \cdot \sqrt{\frac{0{,}5 \cdot 0{,}5}{153}} \cdot \sqrt{\frac{7700000-153}{7700000-1}}$$

$$W = 0{,}5 \pm 1{,}96 \cdot 0{,}04042260417 \cdot 0{,}9999901298$$

$$W = 0{,}5 \pm \mathbf{0{,}07922752218}$$

8.5. Recruitment

Online recruitment methods include the use of invitation texts, which are embedded on a web page together with the URL of the web questionnaire, as well as online social media recruitment and network sampling, more precisely respondent-driven sampling (Callegaro et al., 2015).

Callegaro et al. (2015, 50) define network sampling as an approach which uses social links between networked individuals in order to locate and add additional units to the sample. As a form of network sampling, respondent-driven sampling is also used in web surveys (Callegaro et al., 2015). Goel (2011) explains that in respondent-driven sampling, researcher sends questionnaire to small number of initial participants from the target population. They are asked to recruit their contacts in the population. This process continues until the desired sample size is reached (Goel, 2011).

Online recruitment has also some weaknesses. Two most significant weaknesses of online recruitment are under-coverage and self-selection (Bethlehem, 2010). A phenomenon of not being able to select some elements of the target population is called under-coverage. The data collected online can only refer to respondents with Internet access, and target population is usually wider than that. A part of population without Internet is not able to participate in a web survey, so it only refers to the sub-population of Internet users. Another problem connected with coverage is the difference of Internet access by age and education. Bethlehem (2010) explains that Internet access decreases with age and that people with higher education level have an Internet access in higher percentage than people with lower education level. This can cause a problem, because some specific groups are under-represented. Furthermore, Bethlehem (2010) explains a phenomenon of self-selection, which means that it is left to individuals to select themselves for the survey. Respondents must have an Internet access, visit the website and decide to take a part in a survey, so that researcher does not have any control over the selection process. These two phenomena of web survey may result with biased estimates, so web surveys should not be used for official statistics (Bethlehem, 2010).

The data collection lasted fourteen days, from 10. June to 23 June 2019. Respondents were recruited through Facebook, using author's own page and by posting it in following groups or pages:

1) Agrar- und Ernährungswirtschaft, BOKU
2) Senioren in Wien

3) Obst/Gemüse verkaufen-tauschen-verschenken Wien/WU
4) Hrvati u Austriji (Croatians in Austria)
5) EX YU STUDENTI U BECU (Ex Yu students in Vienna)
6) Gemüse Wissen
7) Landwirtschaft

Besides posting on this Facebook pages, a survey was sent to people that live in different parts of Austria, and they were asked to forward the survey among their circle of friends. Because first five pages refer to Austrian area and because persons from Austria are used in recruitment, it can be assumed that the majority of respondents comes from Austria.

8.6. Questionnaire

Questionnaire consists of four parts. First part includes questions about purchase habits of respondents, including purchase intervals, types of tomatoes that customers buy, percentage of organic purchases, importance of origin and packaging.

The second and the third parts of questionnaire deal with customer satisfaction with conventional i.e. organic tomatoes, including partial satisfactions with price, appearance, odor, freshness, taste, packaging material, origin, sustainability, health benefits as well as overall satisfaction with conventional i.e. organic tomatoes. Detailed explanation about the selection of these attributes is given in Chapter 4.

The last part of the questionnaire deals with sociodemographic characteristics of interviewees, and it includes age, gender, education level, household income and place of residence. These characteristics are necessary for in-depth analysis of customer satisfaction.

8.7. Pretest

Before the actual data collection, a pretest was done. Callegaro et al. (2015, 104) define questionnaire testing as "a set of explicit and formal evaluation methods applied through preplanned phases of the questionnaire preparation". They also mention the informal feedback as the method that relates to the internal crafting, drafting and commenting of interim versions at various phases. Informal feedback is done during the questionnaire preparation by researcher itself and the mentor.

According to Callegaro et al. (2015, 104), web survey testing includes following issues:

a) Substantive issues related to content and validity;
b) Methodological and cognitive aspects of questions (understanding, wording format, design, etc.) and of the questionnaire (layout, structure, interactivity, length, etc.);
c) Technical issues (appearance, programming, branching, randomization and skips, etc. across devices, browsers, operating systems, Internet speed);
d) The overall usability of the questionnaire

Pretest included six people that did the survey on android smartphone. They had to fill a protocol after doing the survey, in order to point out the weaknesses of the survey and give some ideas for improvements. The results can be seen in Appendix 13.1.

Pretest gave following conclusions: the term "konventionell (eng. conventional)" should be replaced with "herkömmlich (Nicht-Bio) (eng. usual (non-organic))", because some people do not know the meaning of this term. Further, the term "Nachhaltigkeit (eng. sustainability)" should be explained. Another thing is that a category "weiß nicht (eng. I do not know)" should be added as a possibility in answering questions about the satisfaction with tomatoes that originate from different countries, because some people simply do not know about the country of origin and because this question could influence a response rate.

8.8. Data Analysis

When analyzing customer satisfaction in detailed level, satisfaction with separate performance parameters (product attributes) is observed. They do not have the same importance for all customers. Therefore, it is necessary to determine their importance. It can be collected through the customer statements (direct questioning) or with application of methods of indirect measurement (Homburg, 2016, 140-144).

The planned method for analysis of customer satisfaction is multiple regression analysis. This method is needed in order to determine the importance of partial satisfactions with separate performance parameters (independent variables, or product attributes), which compose overall satisfaction (dependent variable). The higher standardized regression coefficient (Beta-coefficient) for independent variable, the more important is this variable for creating overall satisfaction (Homburg, 2016). Backhaus et al. (2016) explain the multiple regression through the following function:

$$\hat{Y} = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_j x_j + \cdots + b_j x_j$$

where $\hat{Y}$ represents dependent variable (overall satisfaction), x_1, x_2, …, x_j represent independent variables (partial satisfactions with separate performance parameters) and b_0, b_1, b_2, …, b_j represent regression parameters, which are calculated in IBM SPSS software.

A first step in analyzing results is a transformation of scale values, which is done following an example of Haas (2001,156) and it is depicted on following Figure 17. The value 1 became 0, the value 2 becomes 25 etc., which is done in IBM SPSS. This is done in order to depict results clearer.

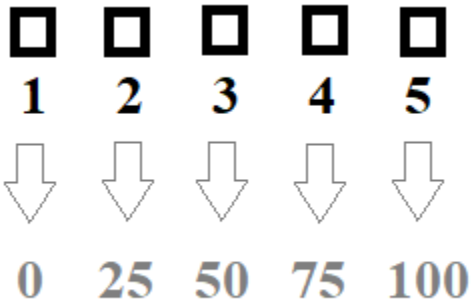


Figure 17 Transformation of scale values
Source: made by author, according to Haas (2001)

Backhaus et al. (2016, 104-106) and Laerd Statistics (s.a.) explain interpretation of regression analysis in IBM SPSS, including following tables:

a) Model Summary

   Model Summary table provides R and R Square values. R value is a multiple correlation coefficient and R Square shows how much of the total variation in the dependent variable can be explained through regressors (independent variables).

b) ANOVA (Analysis of Variance)

   This table shows how well the regression equation fits the data. It shows statistical significance ("Sig."). The value "Sig." lower than 0,05 indicates that the regression model is statistically significant.

c) Coefficients

   This table gives an information about b_0 (constant), b_1, b_2…, b_n (regression parameters), that build regression equation, in the column "B" under "Unstandardized Coefficients".

Further, multicollinearity test is done. In this way the dependencies of regressors (independent variables) are be tested. This test is done in IBM SPSS and there are two values, tolerance and VIF (variance inflation factor), that should be taken into consideration. Very low values of tolerance (≤ 0,1) and very high values of VIF (≥ 10) indicate a problem. (Backhaus et al., 2016, 107; Wuensch, 2016, 8). Besides it, other assumptions of multiple regression are also tested, including non-linearity between dependent and independent variables, heteroscedasticity, autocorrelation, not normal distribution of variables in the population (Backhaus et al., 2016, 103). Autocorrelation and heteroscedasticity give an information when non-linearity is present. Autocorrelation is inspected with Durbin-Watson test, which must give a value near two in order to confirm that there is no autocorrelation present. The test of heteroscedasticity must show a linear relation between the residua in order to confirm this multiple regression assumption. If distribution of residua is normal, this can be observed by using a histogram of standardized residua, comparing it to normal distribution curve (Haas, 2001, 191-193).

Mathematically, overall satisfaction (OS) will be calculated as following:

$$\boldsymbol{OS} = \sum (\boldsymbol{b_{price}} \cdot \boldsymbol{x_{price}} + \boldsymbol{b_{appearance}} \cdot \boldsymbol{x_{appearance}} + \boldsymbol{b_{odor}} \cdot \boldsymbol{x_{odor}} + \boldsymbol{b_{freshness}} \cdot \boldsymbol{x_{freshness}} + \boldsymbol{b_{taste}} \cdot \boldsymbol{x_{taste}} + \boldsymbol{b_{packaging}} \cdot \boldsymbol{x_{packaging}} + \boldsymbol{b_{reg.origin}} \cdot \boldsymbol{x_{reg.origin}} + \boldsymbol{b_{int.origin}} \cdot \boldsymbol{x_{int.origin}})$$

Another part of analysis is customer satisfaction profile, which explains a connection between customer satisfaction (with certain product attributes) with regression coefficient (or simplified, importance) of it. Product attributes with high importance and low levels of satisfaction represent strategic disadvantages and management activities should focus especially on them (Haas, 2001, 158-159).

9. Results of expert interviews

As mentioned in chapter 8.1, expert interviews were conducted among three vegetable producers, that wanted to stay anonymous. During the interviews, following topics were discussed: farm production, sales, regionality, domestic production, organic production, sustainability, packaging and communication with customers. Expert interviews were documented with audio recorder, to be able to replay some key parts of discussions.

9.1. Production and sales

From three interviewed experts, one produces mostly salad and onions (1), other asparagus (2) and third tomatoes (3), including vine, cocktail and cherry tomatoes. All of them are conventional vegetable producers. Two of them (expert 1 and 3) sell most of their vegetables to retail, while the expert 2 mostly sells directly to customers and to gastronomy. Expert 1 also sells 25% of his vegetables also to gastronomy.

Experts were asked about advantages and disadvantages of their sales method. Since expert 1 and 3 sell to retail, they had following opinion: the biggest advantage of selling to retail are efficiency of sales, good organized system and long-year business partnerships. One can sell big quantities very fast, which is important in fresh vegetable production.

Disadvantages of selling to retail are demanding guidelines that vary between different retail chains and, according to experts, it is hard to supply all of them. Expert 1 supplies only one retail chain, while expert 3 manages to supply more. Another difficulty pointed out from an expert 1 is to supply consistently the same quantity with an equal quality, so there are problems with too big or too small deliveries.

Expert 2, that sells directly to customers pointed out following advantages of his method: independency, freshness of produce and direct contact with customers. As the biggest disadvantage, he mentioned big efforts that producers must make in order to satisfy customers, in sense of communicating with them.

When talking about high production standards that retail demands, experts' opinion differs. Expert 1 points out some of his problems. Too high standards might sometimes create difficulties to producers, as for example the appearance of products. Retail pays attention to it very much and sometimes producers get reclamations, in his case because of soil remains on products. Expert 2 thinks that standards are not well written. Producers must follow them to sell their products and that if standards are not "obeyed", producers are characterized as bad.

Vegetables that are not produced according to their standards can also have a good quality. On the other side, expert 3 thinks that high standards are good because that is why Austria has high quality food.

9.2. Regionality

All experts have a similar opinion when talking about regionality. They think that customers appreciate regional products because of food safety. High standards and "AMA Gütesiegel" give a guarantee of quality and because of these high standards, there were no scandals with Austrian products, which was the case with some import products (for example pesticide residues were found in some vegetables from abroad). Another thing is that regional products are considered as trustworthy. Value added stays in the country, regionality benefits self-sufficiency and there is less environmental damage in regional products, because transportation is not long. Further, regional products have an image and they give a guaranty to the consumers.

9.3. Domestic production

When asked about the quality of domestic and import products, experts answered that domestic products have a good quality. It does not mean that all import products have a bad one. There are import products that also have a good quality, but there are some common problems. They emphasize a transportation problem. Because of long transportation, vegetable must be harvested sooner, which leads to loses in quality. Another thing is that it is hard to establish a reliable supply from abroad. Further, as mentioned above, domestic products have no pesticide residues, while there were some cases where they were found in import products.

When asked about a possibility of production growth of tomatoes, expert 3 said that it might grow for 10-20%. He explains that imports are mostly seasonal, because of an expensive production in winter. It may be that imports reduce only to winter time, so there is a possibility of production growth. Expert 1 emphasizes the differences in production costs and climate. Some countries have a climate with less oscillations as Austria, which benefits tomato production and lowers costs. These differences in production costs make it hard to compete with import prices, which creates a barrier for some significant production growth.

9.4. Organic production and sustainability

According to expert opinion, there is no big difference in quality of organic and conventional tomatoes. Experts 2 and 3 think that conventional tomatoes can be as good as organic ones, and it is because of high standards that producers must fulfill to be able to sell their products to

retail. Expert 2 emphasizes that customers decide about product quality according to their values and personality.

When asked about the sustainability of organic tomatoes produced in greenhouses, experts observed this issue from more angles. Expert 1 said that production is more sustainable in summer time, because of energy savings. It is also sustainable because organic tomatoes must be grown in soil. Expert 3 says that one must use renewable energy sources in Austria when producing organic tomatoes, and in some other import countries it is not so. Further, expert 2 thinks that costs of greenhouse organic production are too high to be sustainable.

9.5. Packaging

Experts 1 and 2 pack their vegetable alone, while expert 3 does it in farm cooperative. Experts' opinion differs considering packaging. Expert 2 thinks that packaging is mostly conditioned by the retail and that it is not important to customers. Unlike him, others think that everyone has a benefit. Packed tomatoes are more hygienic and there are no damages made by customers. It is also better because of less water loses. Expert 1 claims that packed vegetables are sold faster. Expert 3 says that it must be a new system of presenting tomatoes in retail, if tomatoes would be presented as unpacked.

9.6. Communication with customers

Experts were asked if and how do they communicate with their customers and if they ask them about their expectations and improvement possibilities. Expert 1 communicates with retail. He has annual conversations with them. Additionally, he becomes reclamations on the products when there are some problems. Expert 2 sells his products directly, so he communicates with customers very often. Further, expert 3 does variety experiments and tastings with staff and offers it to the retail. Sometimes retail approves new varieties, so they go to stores.

All experts think that product requirements are good for customers, as well as for the industry. New varieties must be beneficial for producers, retail and customers.

One question was if experts know how satisfied customers with their products are. They believe that customers are satisfied. Expert 3 said that he does not have any reclamations and that his tomatoes have a good taste, so he assumes that customers are satisfied, but they do not do any analysis by themselves.

All experts say that it would be beneficial for them if they knew with which product attributes are customer satisfied and with which they are not. Expert 1 gets some feedback from retail and says that he knows that his customers want fresh products and reliable supply. Expert 2 suspects about cost-efficiency of customer satisfaction analysis and if there would be any effect on sales, but he thinks it would be good to know it. Lastly, expert 3 thinks that it would be very helpful to know more about customer satisfaction with product attributes.

10.Results of quantitative survey

10.1. Sociodemographic characteristics

A web survey had 219 respondents from which 153, or 69,86% respondents completed the survey. The respondents were asked about following sociodemographic characteristics: age, gender, educational level, net household income and place of residence. It is important to highlight that the results of this survey are not representative and that they differ from average Austrian sociodemographic statistics.

10.1.1. Age

Age of the respondents varies from up to 18 years to 60 years. Most of them are in the age from 19 to 30 years (54,90%). Second group (31-45 years) contains 31,37% respondents. Third group (46-60 years) contains 12,42% respondents and fourth group (up to 18 years) contains 1,31% of respondents. Although the question involved the age group older than 60 years, no one from this age group participated in the survey. The age structure of survey respondents considerably differs from the age structure of Austrian population, retrieved from Statistik Austria (2019), which can be seen in the following Figure 18.

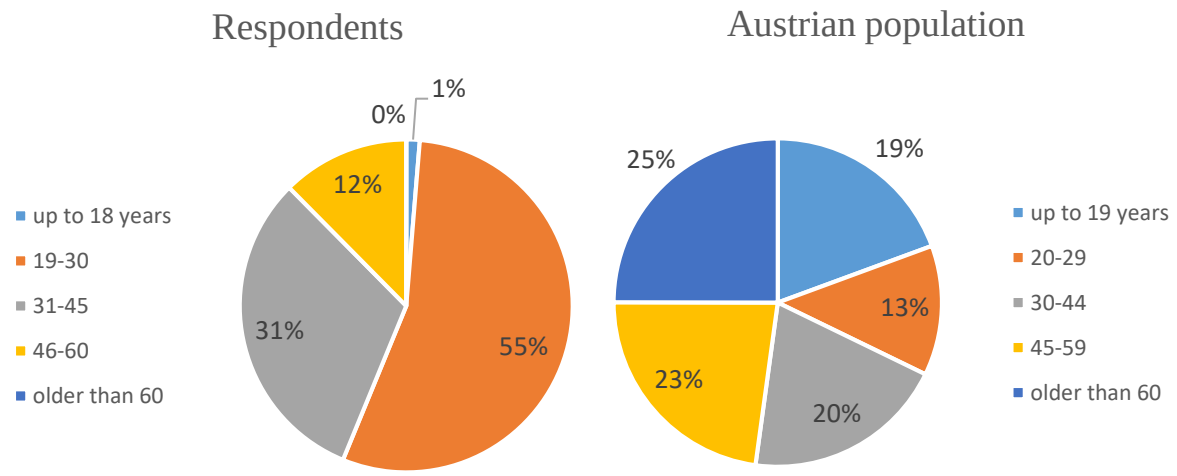


Figure 18 Figure 18 Age distribution of respondents and Austrian population
Source: made by author based on Statistik Austria (2019a)

10.1.2. Gender

From 153 respondents, there was 122 women and 31 men. The percentage of female respondents amounts 79,7%. Compared with a gender distribution of Austrian population, there are more women among respondents than there are in Austrian population (Statistik Austria, 2019a). This data is given in following Table 6.

Table 6 A comparison of gender distribution of respondents and Austrian population. Source: made by author, based on Statistik Austria (2019a)

	Respondents		Austrian population	
	Number	Percent	Number	Percent
Female	122	79,7	4.501.742	50,8
Male	31	20,3	4.357.033	49,2
Total	153	100,0	8.858.775	100,0

10.1.3. Educational level

Figure 19 shows educational levels of respondents, compared with Austrian population. It can be seen that most of the respondents have a university degree and it can be concluded that educational level of respondents is higher than Austrian average (Statistik Austria, 2019b). 49,67% of respondents have a university degree, 23,53% have Matura, 3,92 have BMS (Berufsbildende Mittlere Schule), 13,07% have apprenticeship and 9,80% have elementary school.

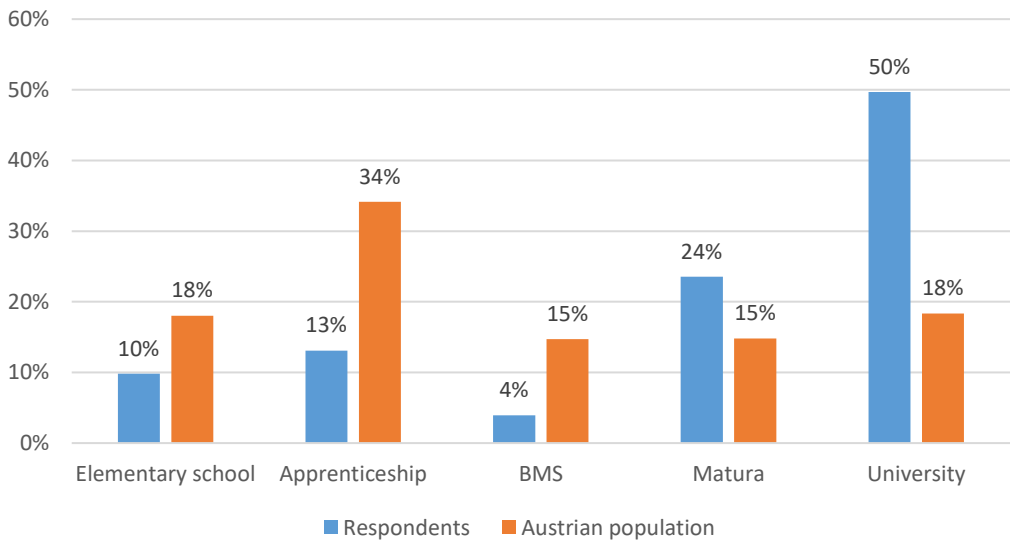


Figure 19 Educational level of respondents and Austrian population
Source: made by author based on Statistik Austria, (2019b)

10.1.4. Net household income

Figure 20 shows monthly net household income of the respondents in comparison with an Austrian average, which amounts 36.322 Euros yearly, or 3.026 € monthly (Statistik Austria, 2019c). Y-axis represents the number of answers. Most of the respondents (23,53%) has an income of 1000-1500 Euros. Average household income of respondents amounts from 1500 to 2000 Euros, which lies below Austrian average.

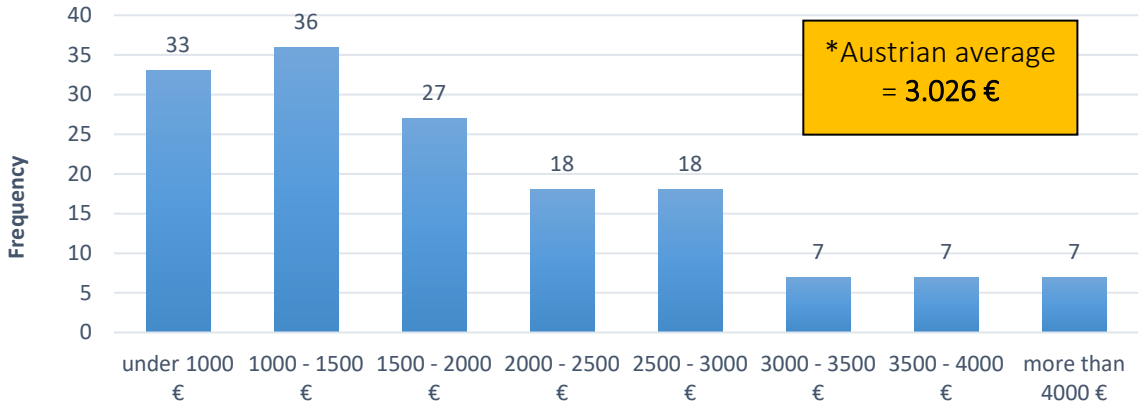


Figure 20 Monthly net household income of respondents compared with an Austrian average
Source: made by author

10.1.5. Place of residence

The last of sociodemographic characteristics is a place of residence. Most of the respondents lives in cities (79,08%). 20,92% respondents live in villages. Most of the Austrian population also lives in cities (Statistik Austria, 2018g). The analysis shows that there is a bigger difference between urban and rural residents among respondents than among Austrian population, which can be seen in Figure 21.

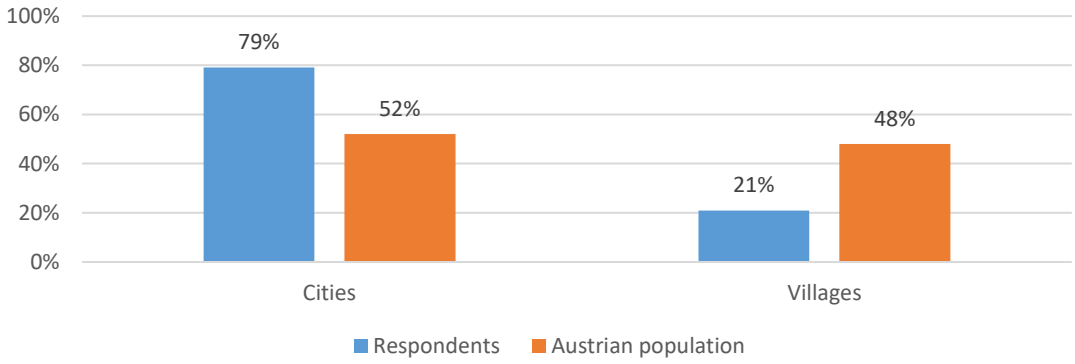


Figure 21 Place of residence of respondents in comparison with Austrian population
Source: made by author based on Statistik Austria (2018g)

10.2. Purchase habits

One part of the survey deals with purchase habits of customers regarding tomatoes. In this part, following characteristics are considered: purchase intervals, type of tomatoes, organic purchases, importance of origin and packaging. Some of the results are in between the sample error of 7,92% so they have to be interpreted with caution.

10.2.1. Purchase intervals

The frequency of tomato purchases is high. Most of respondents (48,38%) buy tomatoes at weekly basis. 77,04% of all respondents buys tomatoes at least once per week. The results can be seen in more detail in Figure 22.

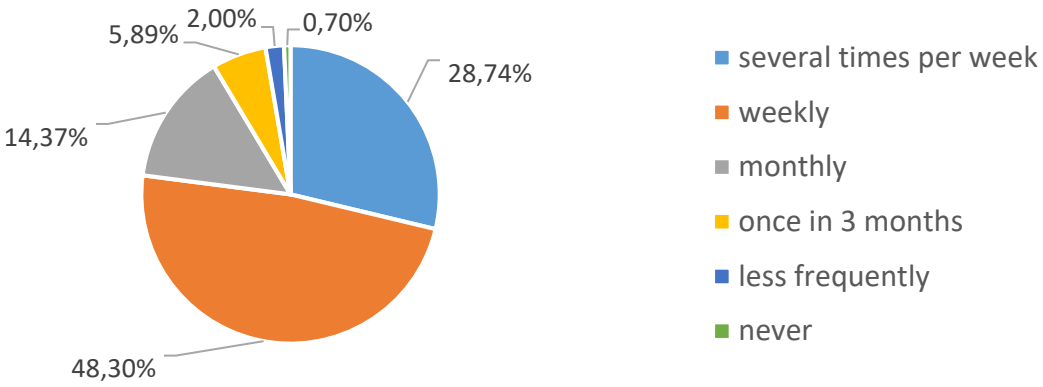


Figure 22 Purchase intervals of respondents
Source: made by author

10.2.2. Type of tomatoes

Customers tend to buy smaller tomatoes. The results given in Figure 23 show that 39,22% of all respondents usually buys cherry, plum or cocktail tomatoes. 27,45% respondents have no preference when buying tomatoes. Further, 20,92% respondents prefer classic round or beefsteak tomatoes, while 12,42% prefers vine tomatoes.

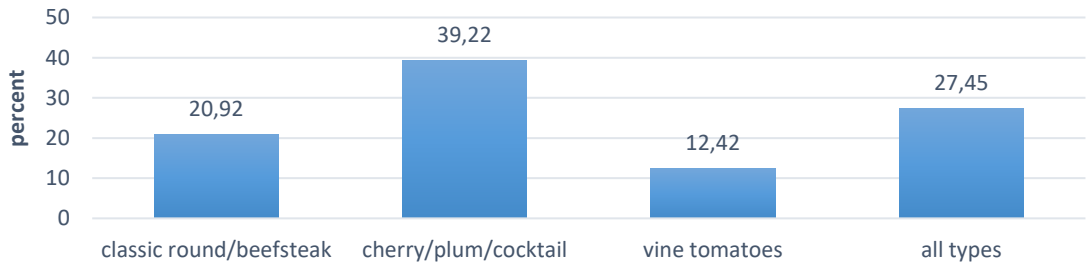


Figure 23 Type of tomatoes that respondents usually buy
Source: made by author

10.2.3. Organic purchases

Figure 24 shows the percentage of organic purchases in total purchasing of tomatoes. Most of the respondents (37,3%) buys less than 5% organic tomatoes. 24,2% of all respondents buy 5-25% organic tomatoes. 29,9% of respondents buy 25-50% organic tomatoes, while the rest (17,7%) buys more than 50% organic tomatoes. In average, respondents buy 5-25% organic tomatoes and the rest is conventional.

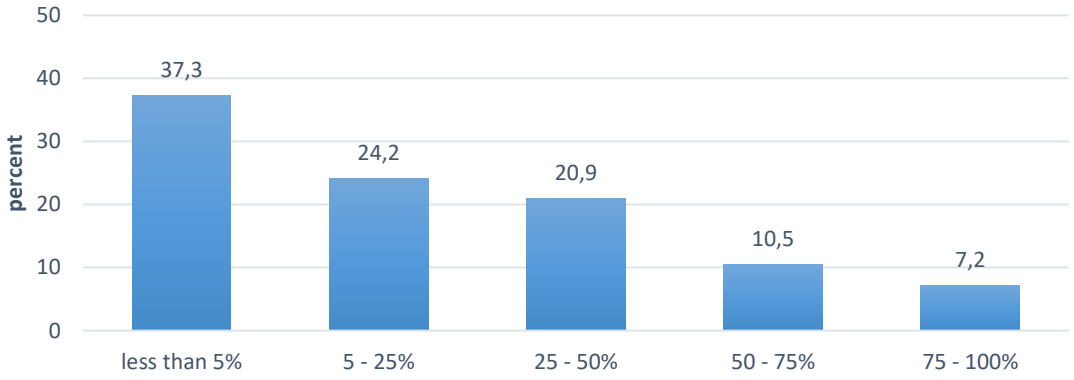


Figure 24 Percentage of organic purchases
Source: made by author

10.2.4. Importance of origin

On the question, do you pay attention to the origin of tomatoes, following answers in the Figure 25 can be observed. For more than a half of respondents (60,7%) origin is of small importance, or not important at all. 18,3% respondents consider origin as important, by always paying attention to it, while 20,9% often pay attention on the origin of tomatoes that they buy.

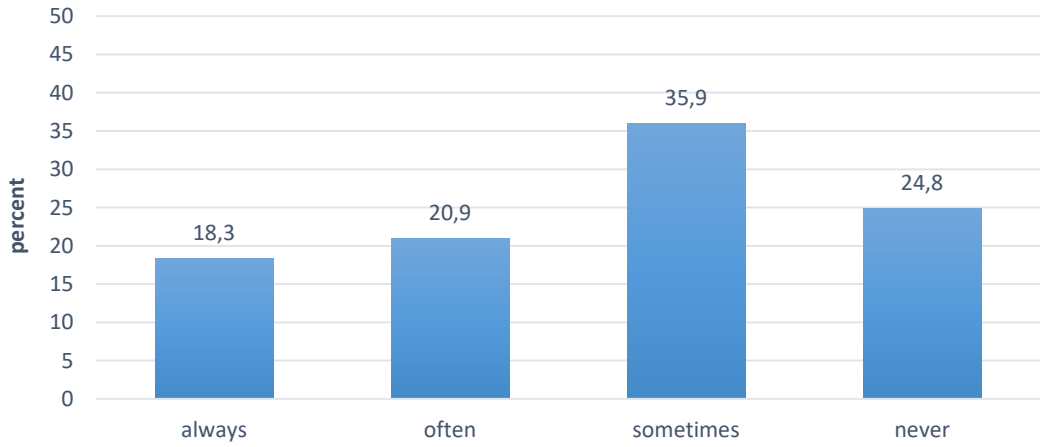


Figure 25 Importance of origin by purchasing tomatoes
Source: made by author

10.2.5. Packaging

About packaging, two questions were asked. Fist about preference of packed tomatoes versus tomatoes without packaging, and second if there is an influence of packaging on purchase decision. Figure 26 shows that slightly more than a half of respondents (51%) prefer packed tomatoes, while the rest of 49% prefer tomatoes without packaging.

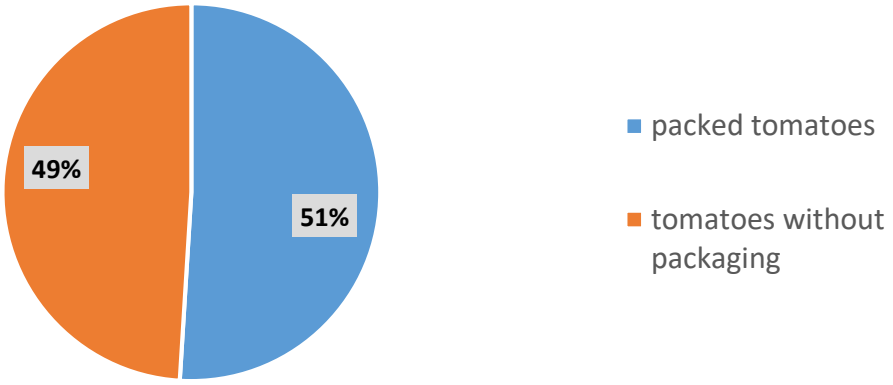


Figure 26 Preference of packaging
Source: made by author

Although the respondents have nearly the same distribution of preferences regarding packaging, the influence of packaging on their purchase decision varies. Figure 27 shows that for most of the respondents packaging has a small (47,7% of respondents) or not any influence at all (30,1% of respondents). Only 8,5% respondents claim that they always consider packaging when buying tomatoes.

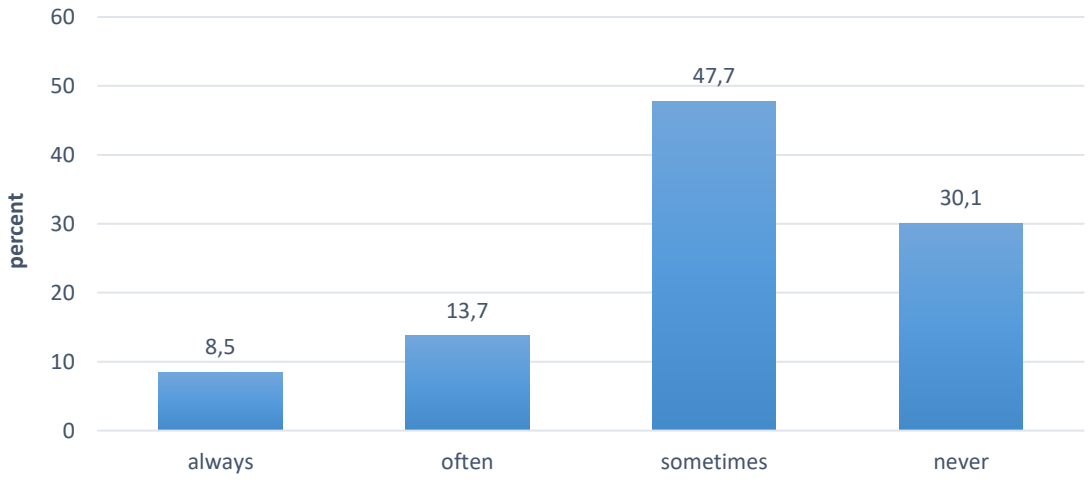


Figure 27 Influence of packaging on purchase decision
Source: made by author

10.3. Customer satisfaction

10.3.1. Mean overall Satisfaction

To create a first impression of customer satisfaction with tomatoes in retail, overall satisfaction is calculated, without considering partial satisfactions with product attributes. Overall satisfaction with conventional tomatoes amounts 50 and with organic tomatoes 60, which can be seen in Figure 28. Scale values of customer satisfaction are between 0 and 100, they vary from total dissatisfaction (0), dissatisfaction (25), neither…nor (50), satisfaction (75) and total satisfaction (100). The value for conventional tomatoes is on the scale "neither...nor" (value 50), and the value for organic tomatoes is between "neither…nor" (value 50) and satisfied (value 75). In average, overall satisfaction with tomatoes amounts 55.

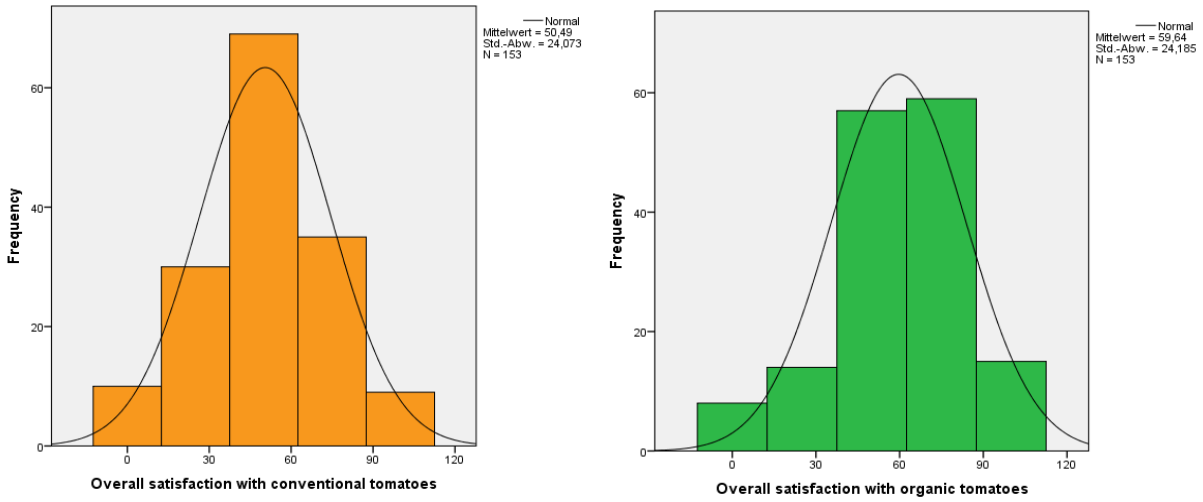


Figure 28 Overall satisfaction with tomatoes in retail without taking in account partial satisfactions with product attributes
Source: Made by author

Figure 28 also gives an information about standard deviation (Std.Abw.). For conventional tomatoes, it is 24,07. It means that 50% of respondents have an overall satisfaction between 26,42 and 74,56. For organic tomatoes, standard deviation is 24,19, which can be interpreted as following: 60% of respondents have an overall satisfaction between 32,45 and 80,83.

Mean, median and mode values for overall customer satisfaction are shown in Table 7. Mode value for conventional tomatoes is 50, which means that customers are neither satisfied nor unsatisfied with tomatoes in retail. For organic tomatoes, mode value is 75, which means that customers are satisfied with tomatoes in retail.

Table 7 Mean, median and mode values for overall satisfaction. Source: made by author

	Overall satisfaction with conventional tomatoes	Overall satisfaction with organic tomatoes
Mean	50,49	59,64
Median	50,00	50,00
Mode	50	75

10.3.2. Satisfaction with product attributes of conventional tomatoes

Mean values of customer satisfaction with product attributes given in Figure 29 show that customer satisfaction with appearance lies above overall customer satisfaction with conventional tomatoes. The lowest satisfaction values are present by taste, odor and health benefits. The sample error of 7,92% should be considered when discussing about these results, because some of the values showed in Figure 29 do not show significant differences.

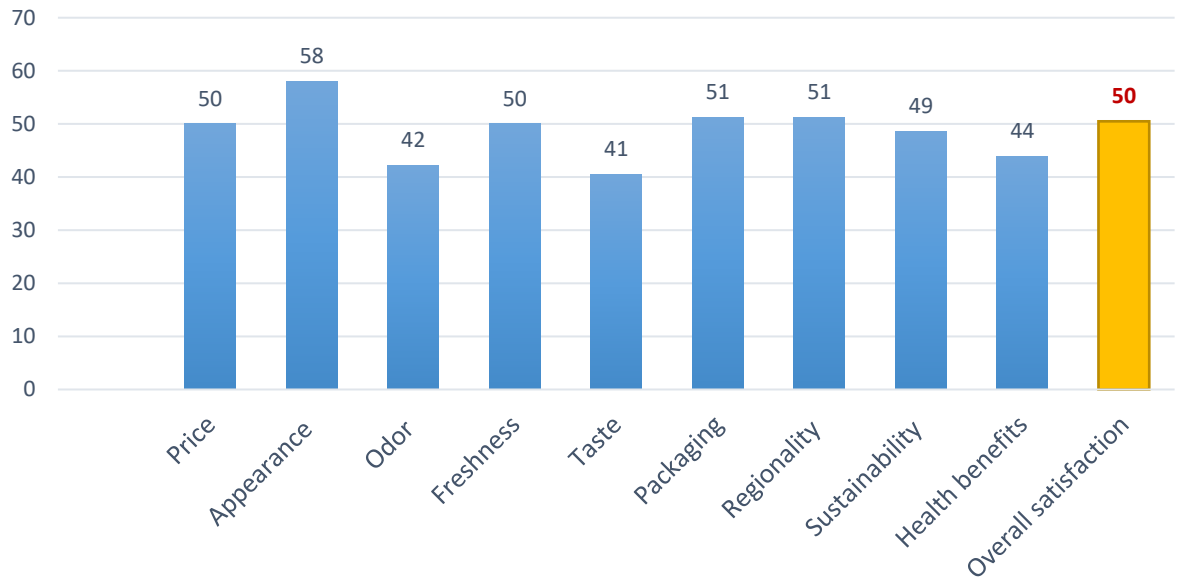


Figure 29 Mean values of customer satisfaction with product attributes of conventional tomatoes Source: made by author

Figure 30 shows customer satisfaction with product attributes by percentage of respondents. Customers are generally more unsatisfied with taste, odor and health benefits, while they are generally more satisfied with appearance, packaging and price. By almost all attributes, except appearance, customers are neither unsatisfied, nor satisfied. By appearance, most of them are satisfied.

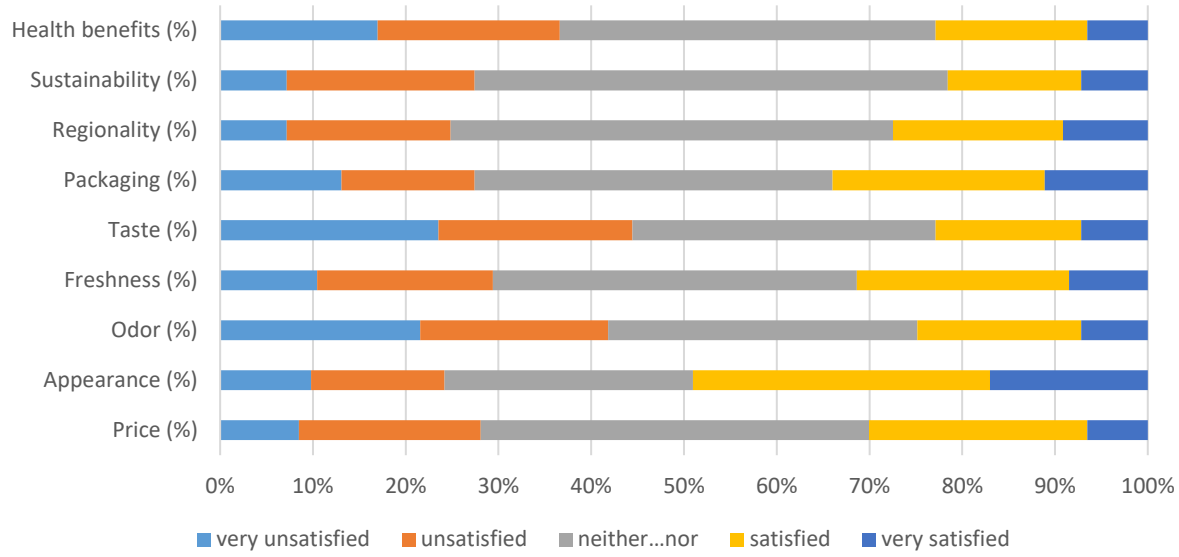


Figure 30 Customer satisfaction with product attributes of conventional tomatoes by percentage of respondents
Source: made by author

Importance of product attributes of conventional tomatoes

In order to determine the importance of product attributes, regression analysis is done. It says what is the influence of partial satisfactions with product attributes to the overall satisfaction. Following tables 8, 9 and 10 show the results of regression analysis for conventional tomatoes. In the Table 8, model summary of the regression is presented. The value R Square is 0,551. It says that the dependent variable "Overall satisfaction" (with conventional tomatoes) can be estimated through independent variables in extent of 55,1%.

Table 8 Model summary of the regression (customer satisfaction with conventional tomatoes).
Source: made by author

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,743[a]	0,551	0,542	16,284	2,061

a. Predictors: (Constant), Health benefits, Taste, Sustainability

Significance of the total model is presented in the ANOVA (Analysis of Variance) that follows in Table 9. The significance value is 0,00%, which means that there is error possibility of 0,00% for the assumption that there is a relationship between dependent and independent variables. The total model is significant.

Table 9 ANOVA for customer satisfaction with conventional tomatoes. Source: made by author

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48576,821	3	16192,274	61,062	,000[b]
	Residual	39511,415	149	265,177		
	Total	88088,235	152			

a. Dependent Variable: Overall satisfaction with conventional tomatoes

b. Predictors: (Constant), Health benefits, Taste, Sustainability

Even though the Table 9 shows that the total model is significant, it does not mean that every independent variable (product attribute) is significant. The Table 19 in Appendix 13.3 show coefficients table for all product attributes, while the Table 10 shows only the significant independent variables (product attributes) for the model. Taste, sustainability and health benefits are only significant variables, with small to medium correlation (see Table 20 in Appendix 13.4). All other variables are being excluded because they are not significant, and they do not influence overall satisfaction with conventional tomatoes.

Table 10 Significant coefficients for conventional tomatoes. Source: made by author

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	15,523	3,071		5,055	0,000		
	Taste	0,287	0,054	0,361	5,367	0,000	0,667	1,500
	Sustainability	0,280	0,070	0,279	4,018	0,000	0,624	1,604
	Health benefits	0,222	0,060	0,258	3,698	0,000	0,620	1,612

a. Dependent Variable: Overall satisfaction with conventional tomatoes

An increase of partial satisfaction with Z_{taste}, $Z_{sustainability}$ and $Z_{health\ benefits}$ for one unit increases overall satisfaction for 0,287, 0,280 and 0,222 units. Taking in consideration only significant variables, the regression function is following:

$$Z_{overall} = 15{,}523 + 0{,}287 \cdot Z_{taste} + 0{,}280 \cdot Z_{sustainability} + 0{,}222 \cdot Z_{health\ benefits}$$

The biggest influence of customer satisfaction has taste, followed by sustainability and health benefits. Following this model, overall satisfaction is calculated, and it amounts 50,78.

In order to validate a regression analysis, testing of their assumptions is needed. Through their violation, it can come to multi-collinearity, non-linearity between dependent and independent variables, heteroscedasticity, autocorrelation, not normal distribution of variables in the population ((Backhaus et al., 2016, 103). Because of high correlation values (see Appendix 13.4), some product attributes are removed, so there is no high correlation between three

significant variables. Because tolerance values (Table 10) are higher as 0,1, there is no multi-collinearity between three independent variables. Non-linearity is inspected with testing of autocorrelation and heteroscedasticity. Durbin-Watson test tells if there is an autocorrelation. The Durbin-Watson value is 2,061 (see Table 8). If the value is close to 2, there is no autocorrelation. The test of heteroscedasticity is shown in Figure 46 in Appendix 13.4. There is no violation of this assumption, because the residua have a linear relation. In the regression, the residua are normally distributed, which can be seen in Figures 44 and 45 in Appendix 13.4 (Haas, 2001, 191-193).

Since there is no violation of assumptions, it can be concluded that the regression model is valid.

Satisfaction with country of origin of conventional tomatoes

Country of origin was another product attribute that was considered in this study. There were more questions regarding this attribute, and each of them addressed one specific country. The survey gave the possibility to answer the question (How satisfied are you with conventional tomatoes from…?) with "I do not know", through which can be concluded that this respondent does not pay attention to the country of origin. Results given in Table 11 show following: customers are more satisfied with conventional tomatoes from Austria then with those from foreign countries. They are more satisfied with conventional tomatoes from Spain and Italy, then with those from Netherlands and Morocco. This creates three groups of countries – first Austria, second Spain and Italy, perceived as a group that delivers better tomatoes, and Netherlands and Morocco as third, perceived as a group that does not deliver high quality products. The first column "N" shows the number of responses that evaluate customer satisfaction, while the second column "No values" shows the number of respondents that answered with "I do not know". Most of the respondents (70%) gave an evaluating answer for Austria, followed by Spain (55%), Italy (49%), Netherlands (44%) and Morocco (39%).

Table 11 Customer satisfaction with conventional tomatoes from different countries.
Source: made by author

	N	No values	Min	Max	Mean	St. Deviation
Conventional tomatoes from Spain	84	69	0	100	48,51	26,985
Conventional tomatoes from Italy	75	78	0	100	48,67	26,282
Conventional tomatoes from Netherlands	68	85	0	100	40,07	25,238
Conventional tomatoes from Morocco	60	93	0	100	41,67	29,353
Conventional tomatoes from Austria	107	43	0	100	57,71	28,403

10.3.3. Satisfaction with product attributes of organic tomatoes

Mean values of customer satisfaction with product attributes or organic tomatoes given in Figure 31 show that customer satisfaction with appearance, freshness and taste lies slightly above overall customer satisfaction with organic tomatoes. The lowest satisfaction is detected by price and packaging. A sample error of 7,92%, should be kept in mind when interpreting this figure. Only a difference in satisfaction with price and overall satisfaction is significant when considering a sample error.

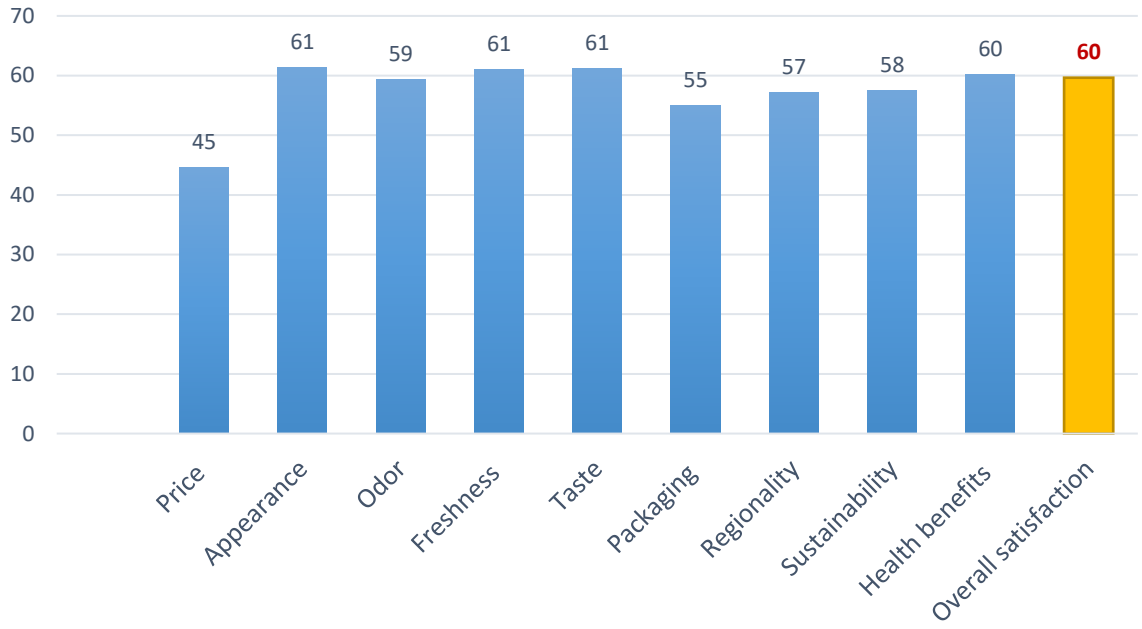


Figure 31 Mean values of customer satisfaction with product attributes of organic tomatoes
Source: made by author

Figure 32 shows customer satisfaction with product attributes of organic tomatoes by percentage of respondents. Customers are generally more unsatisfied with price, while they are generally more satisfied with all other product attributes. By almost all attributes, except taste, appearance, and health benefits, customers are neither unsatisfied, nor satisfied. Consumers are mostly satisfied with taste, appearance and health benefits.

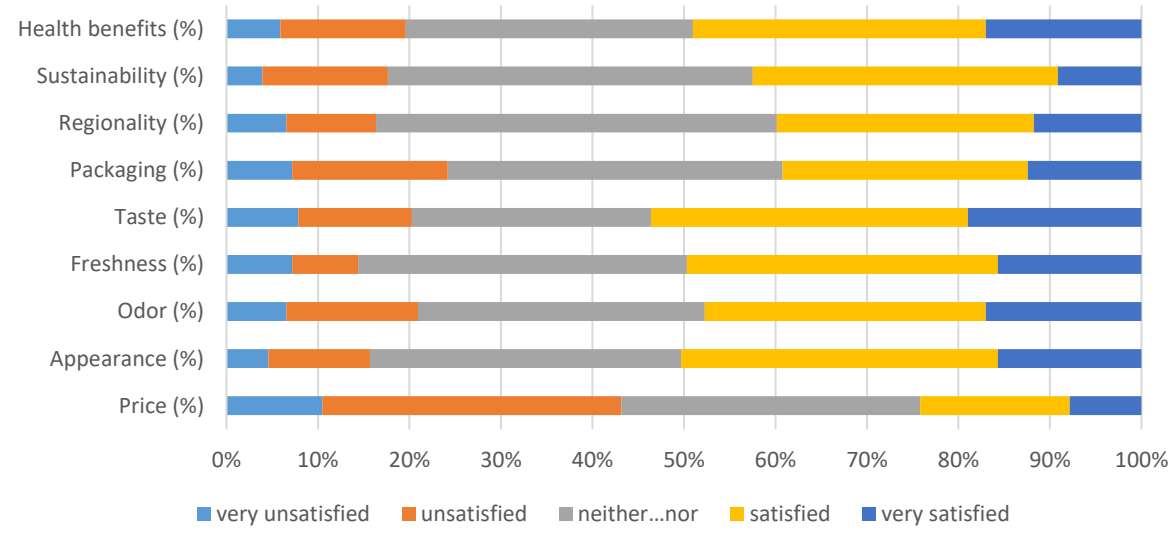


Figure 32 Customer satisfaction with product attributes of organic tomatoes by percentage of respondents
Source: made by author

Importance of product attributes of organic tomatoes

In following Tables 12, 13 and 14 the results of regression analysis for organic tomatoes are presented. Table 12 summarizes the regression model. The value R Square is 0,668, which means that dependent variable "Overall satisfaction" (with organic tomatoes) can be estimated through independent variables in extent of 66,8%.

Table 12 Model summary of the regression (customer satisfaction with organic tomatoes).
Source: made by author

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,817[a]	0,668	0,659	14,117	2,127

a. Predictors: (Constant), Price, Appearance, Taste, Sustainability

The ANOVA (Analysis of Variance), presented in Table 13 shows the significance of total regression model. The significance value is 0,00%, which means that there is error possibility of 0,00% for the assumption that there is a relationship between dependent and independent variables. Total model for customer satisfaction with organic tomatoes is significant.

Table 13 ANOVA for customer satisfaction with organic tomatoes. Source: made by author

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59410,974	4	14852,744	74,530	,000[b]
	Residual	29494,255	148	199,286		
	Total	88905,229	152			

a. Dependent Variable: Overall satisfaction with organic tomatoes

b. Predictors: (Constant), Price, Appearance, Taste, Sustainability

In Table 14, significant independent variables (product attributes) for this model are presented. Coefficients of all product attributes can be seen in the Table 23 in Appendix 13.5. Price, appearance, taste and sustainability are only significant variables, with small to medium correlation (see Table 24 in Appendix 13.5). All other variables are excluded because they are not significant, and they do not influence overall satisfaction with organic tomatoes.

Table 14 Significant coefficients for organic tomatoes. Source: made by author

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5,736	3,471		1,652	0,101		
	Price	0,173	0,047	0,195	3,699	0,000	0,808	1,237
	Appearance	0,147	0,055	0,156	2,659	0,009	0,648	1,544
	Taste	0,309	0,055	0,371	5,607	0,000	0,511	1,956
	Sustainability	0,318	0,062	0,314	5,102	0,000	0,593	1,687

a. Dependent Variable: Overall satisfaction with organic tomatoes

An increase of partial satisfaction with Z_{price}, $Z_{appearance}$, Z_{taste} and $Z_{sustainability}$ for one unit increases overall satisfaction for 0,173, 0,147, 0,309 and 0,318 units. Taking in consideration only significant variables, the regression function is following:

$$Z_{overall} = 5{,}736 + 0{,}173 \cdot Z_{price} + 0{,}147 \cdot Z_{appearance}\ 0{,}309 \cdot Z_{taste} + 0{,}318 \cdot Z_{sustainability}$$

The most influence on customer satisfaction have sustainability and taste, which are followed by price and appearance. Following this model, overall satisfaction amounts to 59,78.

In order to validate regression model, its assumptions are tested. Because of high correlation values (see Appendix 13.6), some product attributes are removed, so there is no high correlation between four significant variables. Because tolerance values (Table 14) are higher as 0,1, there is no multi-collinearity between three independent variables. Non-linearity is inspected with testing of autocorrelation and heteroscedasticity. The Durbin-Watson value is 2,127 (see Table 12), so there is no autocorrelation. The test of heteroscedasticity is shown in Figure 49 in Appendix 13.6 and it shows that there is no violation of this assumption, because the residua have a linear relation. In regression, the residua are normally distributed, which can be seen in Figures 47 and 48 in Appendix 13.6 (Haas, 2001, 191-193).

Since there is no violation of assumptions, it can be concluded that this regression model is also valid.

Satisfaction with country of origin of organic tomatoes

Customer satisfaction with tomatoes from different countries was also observed for organic tomatoes. Results given in Table 15 show that results for organic tomatoes are similar to the results for conventional tomatoes. Customers are most satisfied with Austrian tomatoes. The difference is that customers are more satisfied with organic tomatoes from Italy, then from Spain. These two countries create a second group, perceived as countries that deliver tomatoes with higher quality, and Netherlands and Morocco create a third group, perceived as a group of countries that does not deliver high quality tomatoes. The first column "N" shows a number of responses that evaluate customer satisfaction, while the second column "No values" shows the number of respondents that answered with "I do not know". Most of the respondents (68%) gave an evaluating answer for Austria, followed by Spain (44%), Italy (40%), Netherlands (36%) and Morocco (36%).

Table 15 Customer satisfaction with organic tomatoes from different countries. Source: made by author

	N	No values	Min	Max	Median	St. Deviation
Organic tomatoes from Spain	67	86	0	100	50,75	28,858
Organic tomatoes from Italy	63	90	0	100	55,16	28,806
Organic tomatoes from Netherlands	57	96	0	100	47,37	26,171
Organic tomatoes from Morocco	56	97	0	100	45,09	29,162
Organic tomatoes from Austria	104	49	0	100	63,46	29,544

10.3.4. Summary of customer satisfaction with tomatoes

The results depicted in Figure 33 show regression coefficients for significant product attributes and customer satisfaction with conventional and organic tomatoes. Customer satisfaction with conventional tomatoes amounts 50,78, and most important product attributes are taste, sustainability and health benefits. On the other side, customer satisfaction with organic tomatoes amounts 59,78 and the most important product attributes are sustainability, taste, price and appearance.

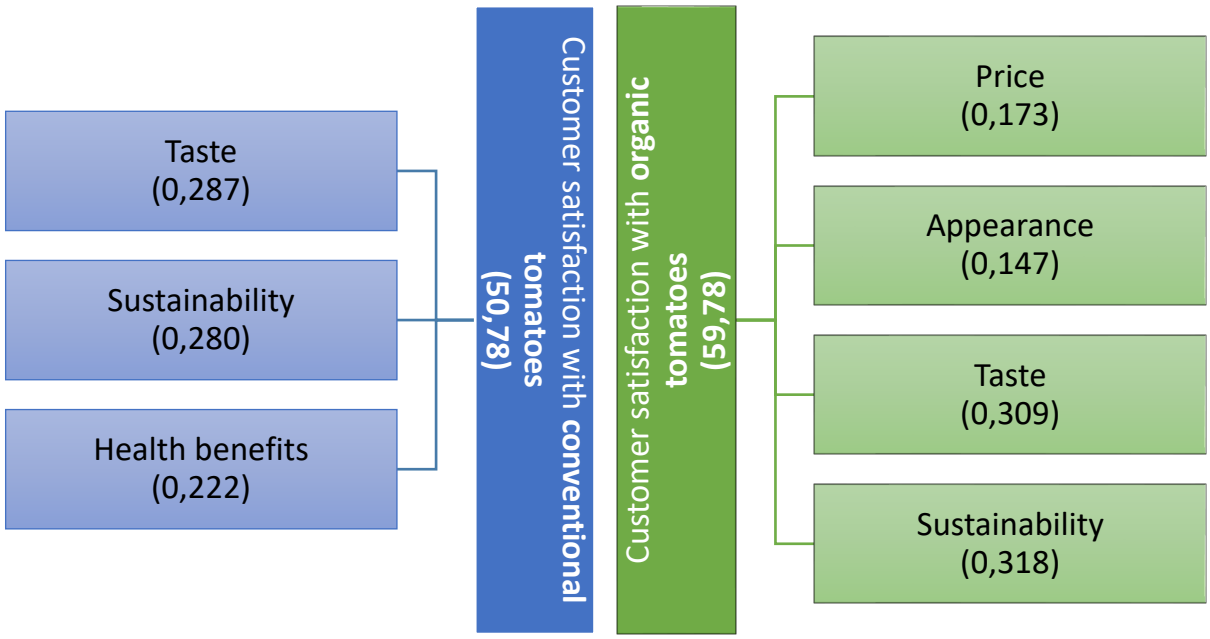


Figure 33 Summary of customer satisfaction with tomatoes
Source: made by author

With these results, it is possible to create customer satisfaction profile (see page 47) for conventional and organic tomatoes. For conventional tomatoes (see Figure 34) it can be seen that taste is an attribute that needs improvement. Figure 35 shows that customers are satisfied with taste and sustainability of organic tomatoes, and that those attributes should be kept as they are. Price is a disadvantage for organic tomatoes, but customers accept it as so.

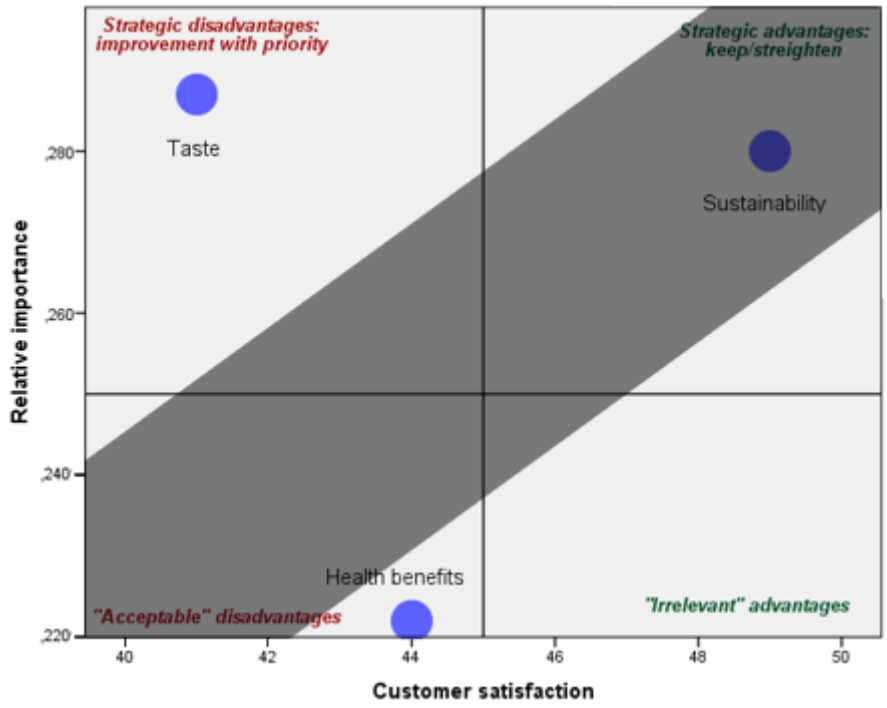


Figure 34 Customer satisfaction profile for conventional tomatoes
Source: made by author based on Haas, 2001, 224

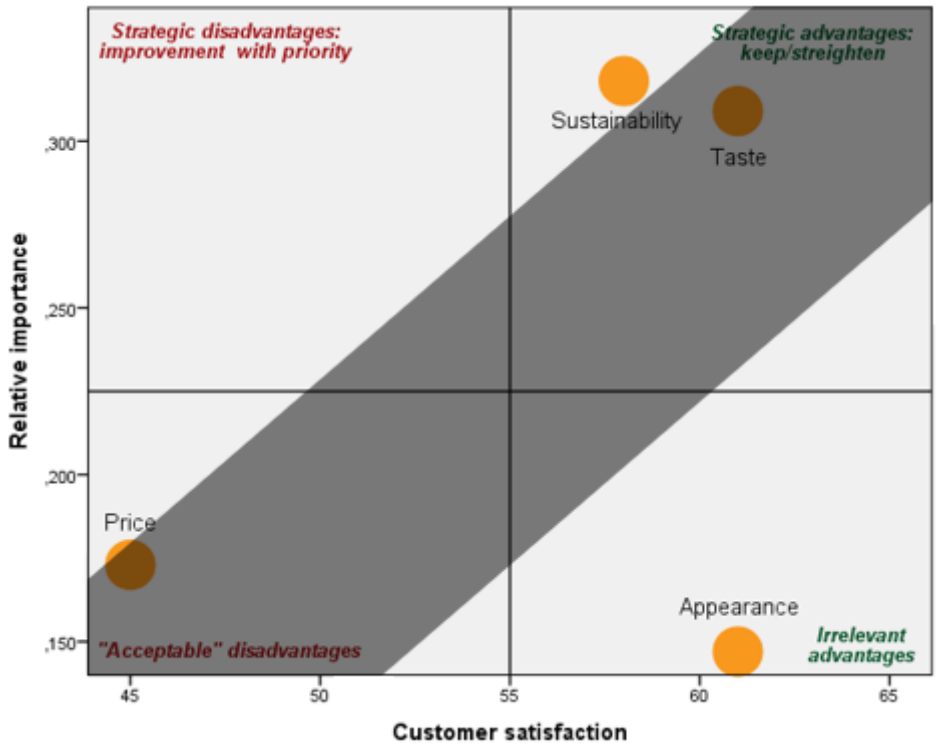


Figure 35 Customer satisfaction profile for organic tomatoes
Soruce: made by author based on Haas, 2001, 224

10.4. Further analysis

In this part, customer satisfaction is analyzed in relation to purchasing frequency, type of tomatoes and percentage of organic purchases. Furthermore, the biggest differences between respondents from cities and villages are presented.

Figure 36 shows customer satisfaction with conventional (blue) and organic (orange) tomatoes in relation to purchasing frequency. Because of the sample error (7,92%), this data should be interpreted with caution. The figure shows that most satisfied with organic tomatoes are customers that buy tomatoes once in three months and weekly. Customer satisfaction with conventional tomatoes shows lower level of satisfaction by less frequent purchases.

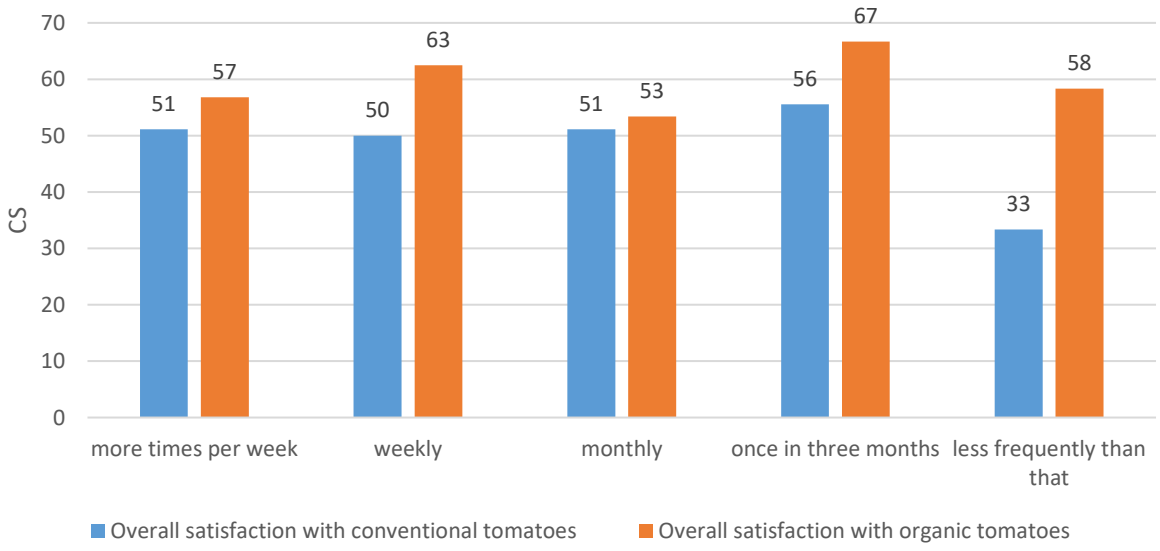


Figure 36 Customer satisfaction with tomatoes by purchasing frequency
Source: Made by author

Further, Figure 37 shows overall satisfaction and satisfaction with the attribute "taste" regarding type of tomatoes.

Overall satisfaction with tomatoes varies by different types. In total, customers are more satisfied with organic tomatoes. With considering a sample error of 7,92%, more satisfied customers are those that buy classic round and beefsteak tomatoes, as well as customers that buy all types of tomatoes. Lower levels of satisfaction are noticed by vine tomatoes, followed by cherry, plum and cocktail tomatoes.

Taste is one significant attribute for both conventional and organic tomatoes. Customers are more satisfied with taste of organic tomatoes. The Figure 37 shows that most satisfied with taste of organic tomatoes are those customers that buy all types of tomatoes, while most satisfied with conventional tomatoes are customers that buy cherry, cocktail and plum tomatoes, but because of the sample error (7,92%), it cannot be stated with certainty. Most unsatisfied with taste of tomatoes are customers that buy vine tomatoes.

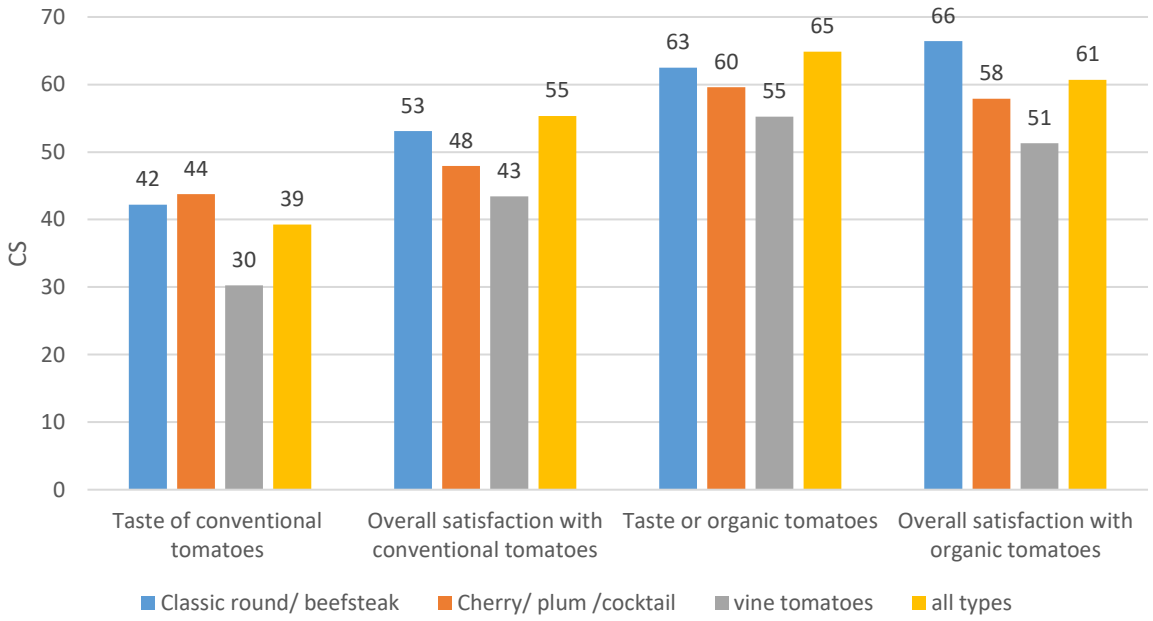


Figure 37 Overall satisfaction and satisfaction with taste regarding type of tomatoes
Source: made by author

Talking about the analysis of overall satisfaction by percentage of organic purchases which can be seen in Figure 38, we can identify two important customer groups. First are conventional customers, that buy 0-25% organic tomatoes and second are organic customers, that buy 25-100% organic tomatoes. Groups are divided so, that every group has similar number of respondents as possible. The first group has 94 respondents and the second 59. These two groups are to be analyzed separately because they do not have an equal number of respondents.

Figure 38 shows that conventional customers are mostly neither satisfied nor unsatisfied with tomatoes. On the other hand, organic customers are mostly satisfied with organic tomatoes. Regarding conventional tomatoes, organic customers are mostly neither satisfied nor unsatisfied with them.

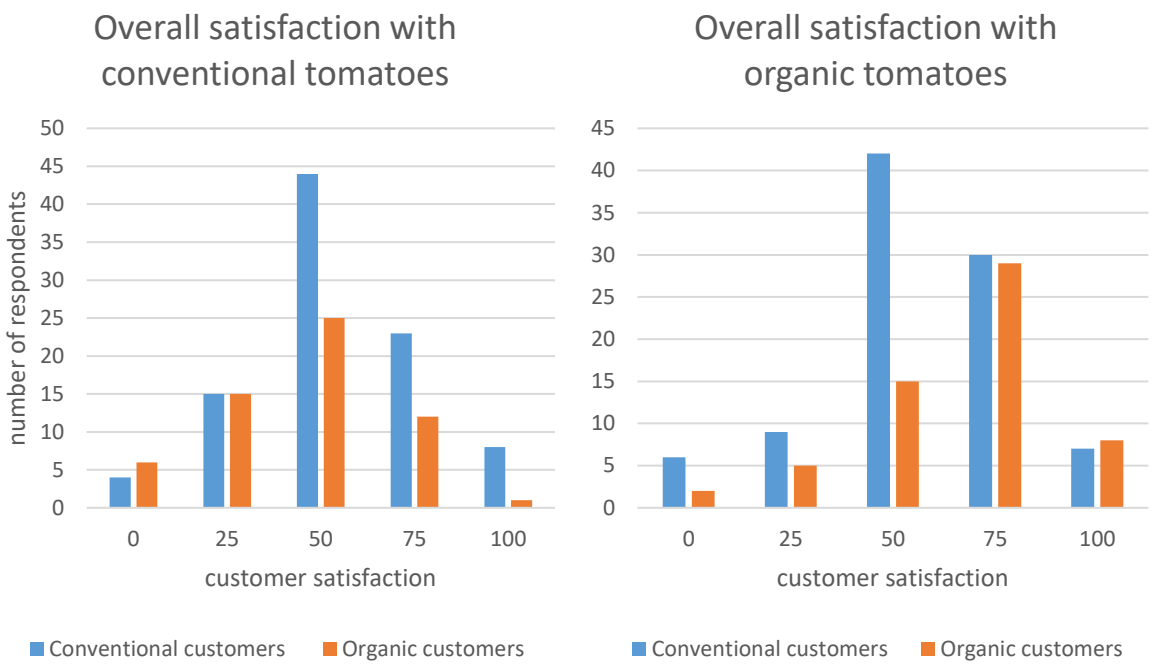


Figure 38 Overall satisfaction with tomatoes by percentage of organic purchases
Source: made by author

The biggest differences in results by place of residence are presented on the Figures 39 and 40. Figure 39 shows that respondents from village pay attention to origin more when buying tomatoes. Most of village residents always pays attention to origin, while most of city residents do it sometimes.

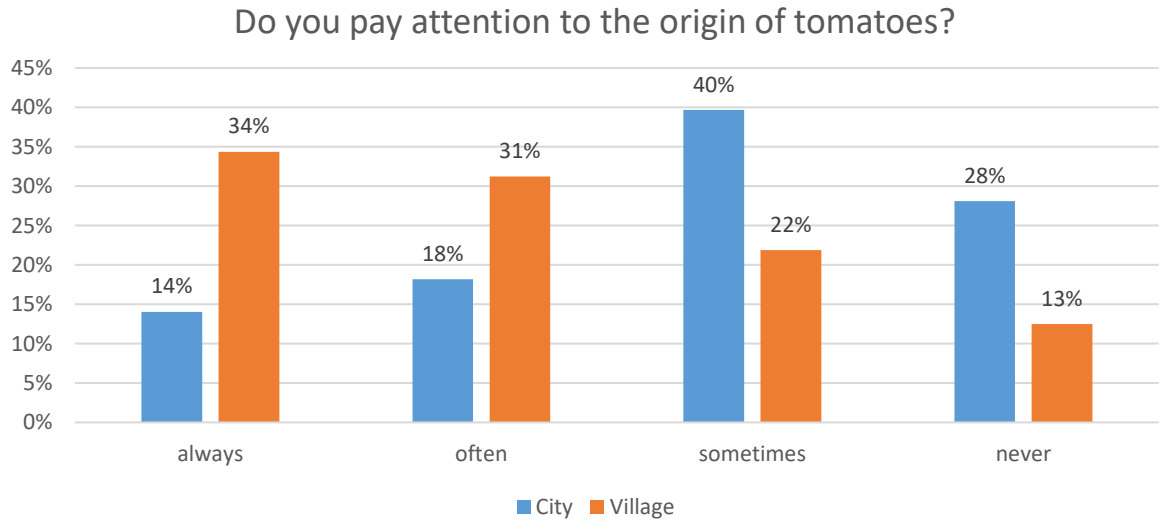


Figure 39 Importance of origin to consumers by place of residence
Source: made by author

As shown on the Figure 40, most of city residents prefer packed tomatoes, while most of village residents prefer tomatoes that have no packaging.

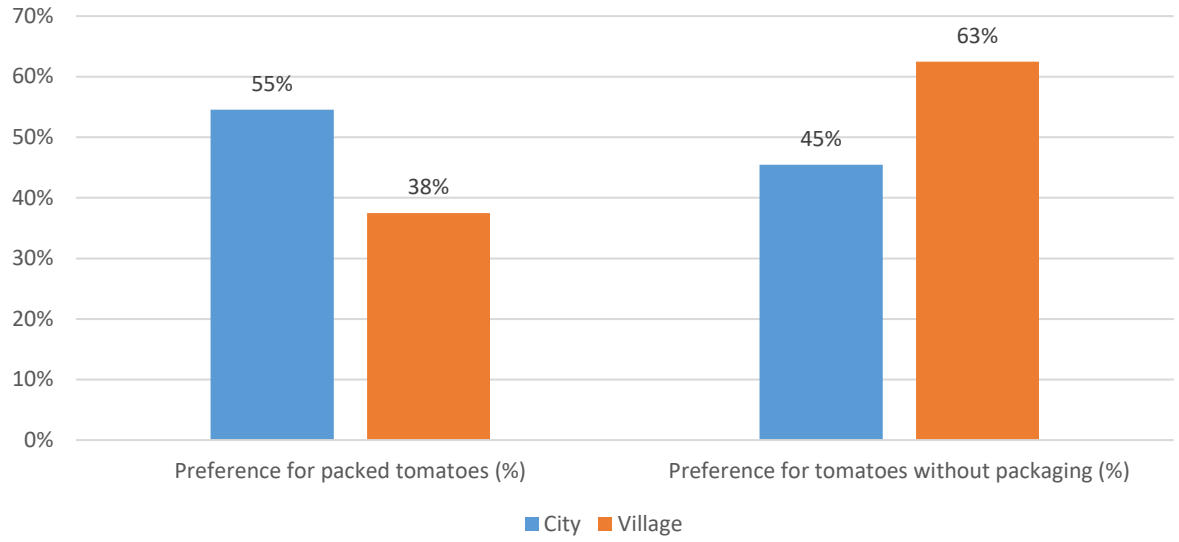


Figure 40 Preference for packed or unpacked tomatoes by place of residence
Source: made by author

11.Discussion

11.1. Discussion about the used methodology

This study used multidimensional (multivariate, multi-attribute) measurement to quantify customer satisfaction. In this method, overall customer satisfaction is a construct of an aggregation of partial satisfactions with product attributes (performance parameters). The non-compensatory model of multidimensional measurement was used. In this model, weights for product attributes are necessary because every attribute participates differently in creating overall satisfaction. These weights are obtained using an analytical method – multiple regression.

On the other side, in some studies (Agrarmarkt Austria, 2017a; Helo & Luomala, 2011; Jiménez-Guerrero et al., 2012; Ragaert et al., 2004; ZBG, 2014), the estimation of product attribute weights was done using rating scales. Respondents gave their subjective judgements about the importance of product attributes. This has not been the case in this master thesis, because respondents tend to give the answers they think they are supposed to give, without revealing their real opinion, what is called social desirability effect, and which was noticed in a study made by ZBG (2014). Although using a multiple regression had given results without this effect, the results showed that not all attributes are significant. Because of low significance of some attributes and strong correlation between some other ones, some of them had to be removed, so the model could not explain customer satisfaction in total. If subjective satisfaction judgements had been collected, there would have been no necessity to remove some product attributes and the results would probably be completely different.

In order to collect data, a non-restricted non-probability web survey was used because of the possibility to reach a large group of people and because of the low costs that this type of surveying demands. With this survey, the representativeness issue must be emphasized. Although this study is not representative, other studies that deal with similar subject matter have the same issue (Helo & Luomala, 2011; Ragaert et al., 2004). Another problem that emerged was surveying population older than 60 years. This age group shows the lowest activity online because there were no respondents from this age group.

It can be assumed that doing a representative survey with collecting satisfaction judgements, as well as with using a multiple regression, would give the most accurate results and it would be possible to compare results from both collecting methods.

11.2. Discussion about the results

In the first section about customer satisfaction, the results of the survey and the results of the expert interviews will be discussed. In the second section about the importance of product attributes, the results of the survey will be compared with some previous literature referring to this subject and with the results of expert interviews.

Customers are generally more satisfied with organic than they are with conventional tomatoes, but there are more conventional than organic customers. Although experts believe that the quality of conventional and organic tomatoes is similar, customers do not think so. High standards for both organic and conventional tomatoes lead to high quality products. However, the results still show higher overall satisfaction with organic tomatoes.

Price

Customer satisfaction with the price of conventional tomatoes is 50, and for organic tomatoes 45, but because of the sampling error of 7.92%, this difference is not very relevant. The survey shows that customers are neither satisfied nor unsatisfied with tomatoes in Austrian retail. In regression analysis of conventional tomatoes, price is in strong correlation with other product attributes and therefore it has not been considered. The initial regression coefficient for the price of conventional tomatoes was 0.125 (see Table 19 in Appendix 13.3). As mentioned on page 19, it could have been considered because of its big importance in other studies, but it would not have given exact results. On the other hand, the results of customer satisfaction with organic tomatoes show that the price of organic tomatoes is a significant product attribute with regression coefficient of 0.173. This is still higher than 0.125 (initial regression coefficient for the price of conventional tomatoes). Price is more important for organic than for conventional tomatoes, although a customer satisfaction analysis shows that customers are more satisfied with the price of conventional than with the price of organic tomatoes. Price is the third most important product attribute for organic tomatoes, and it would be the fourth most important product attribute for conventional tomatoes, if it had been considered. As mentioned on page 19, the former study made by Agrarmarkt Austria (2017a) shows that Austrian consumers put price in third place when buying vegetables. This master thesis supports the data.

Appearance and odour

As two most important intrinsic quality cues, appearance and odour were observed. Customer satisfaction with appearance is 58 for conventional tomatoes and 61 for organic, while customer satisfaction for odour amounts to 42 for conventional, and 59 for organic tomatoes. Since those attributes are indicators of the expected perceived quality (Oude Ophuis & Van Trijp, 1995), it can be concluded that customers regard organic products as products of higher quality. These results confirm that customers perceive appearance and odour of conventional and organic foods differently (Moser et al., 2011). By looking at the importance of those attributes for consumers, it can be inferred that appearance is important for purchasing of organic tomatoes. Experts think that appearance is important. It is a predetermined requirement in order for a product to be on the shelf. Appearance is a "must" criterion, but its fulfilment does not increase customer satisfaction. These product attributes are less important when buying conventional tomatoes. It is contrary to the results of Agrarmarkt Austria (2017a), where appearance takes second place for purchase-decision criteria for fruit and vegetables.

Freshness and taste

Freshness and taste are two most significant quality attributes. Customer satisfaction with them is following: customers are more satisfied with freshness (61:50) and taste (61:41) of organic tomatoes. This differs from the opinion of the experts, who say that there is not much difference in taste of organic and conventional tomatoes, due to strong regulations for both of them.

The studies from Agrarmarkt Austria (2017a) and from Jiménez-Guerrero et al. (2012) say that freshness is the first purchase-decision criterion for fruit and vegetables, while this study shows that it is an irrelevant product attribute. The results from Agrarmarkt Austria (2017b) show that taste takes first place for quality criteria of fruit and vegetables. This study confirms that theory.

Packaging material

Pre-packaging of tomatoes has a growing tendency. The necessity of packaging was discussed extensively with experts. It has its benefits, like keeping products fresh, extending their shelf life and making them more hygienic. The experts had different opinions about the customer preferences, one of them said that customers do not want packed vegetables, while the other stated that they prefer vegetables that are packed. The results of this study showed that 51% of customers prefer packed tomatoes, while 49% prefer ones without packaging. These results are in-between the sampling error so that it cannot be stated with certainty. According to an expert

opinion, there should be another system of presenting tomatoes offered by retail, to make selling tomatoes without packaging possible. Experts think that packaging is conditioned more from the industrial side than from customers.

But how important is packaging to customers? The survey results show that for most of the customers (77.8%) packaging has, sometimes or never, an influence on purchase decision. The results of regression analysis show that packaging has a negative correlation with tomatoes (see Tables 19 and 23 in appendix). That could be explained as follows: the more customers are satisfied with packaging, the more unsatisfied they are generally, which does not support the model of overall satisfaction as an aggregation of partial satisfactions with product attributes, and therefore it was removed from the equation. Another reason for the elimination is an insignificance of the attribute. To sum up, packaging is an irrelevant factor when buying tomatoes.

Origin (regionality and international origin)

According to the literature research (see page 22), origin and regionality are very important to Austrian consumers. Origin took first and regionality third place when buying groceries.

According to experts, regionality is important because customers trust regional products and the regionality guarantees them the quality of products. Regional products are fresh, they are environmentally friendly due to less transportation. These products preserve domestic economy and have a good image. This expert opinion correlates with the literature research (see page 23). When asking customers, how satisfied they are with the regionality of tomatoes, most of them are neither satisfied nor unsatisfied. They are more satisfied with the regionality of organic tomatoes. More respondents are satisfied than unsatisfied (see Figures 30 and 32) with regionality. Regression analysis showed that regionality is an irrelevant product attribute. The reason for it could be sought in the fact that they believe that most of the products are regional. An explanation is that 24.8% of customers are completely unsatisfied or unsatisfied with the regionality of conventional and 16.3% of them with the regionality of organic tomatoes. In conclusion, customers respect regionality as a concept and they are mostly not unsatisfied with it, but it does not affect purchasing tomatoes.

When talking about international origin of tomatoes, customers are most satisfied with tomatoes from Austria. They are more satisfied with tomatoes from Spain and Italy than with tomatoes from the Netherlands or Morocco. This confirms the theory by Aichner (2014) that country of

origin has a significant effect on consumer product evaluation. The results can be contrasted with a study from Cembalo, Cicia, Giudice, Scarpa, & Tagliafierro (2007), where two groups of countries were also created. The difference is that in their study, products from Spain were considered as ones of lower quality. When talking to experts about the country of origin, they declared that, if tomatoes come from abroad, it must not automatically mean that their quality is poorer. They emphasize that domestic products have high standards and shorter transportation distances, and that this is one big advantage. Due to the complexity of questions regarding origin, it was left out of regression analysis.

Sustainability

Customers are mainly neither satisfied nor unsatisfied with the sustainability of tomatoes. There are more customers that are unsatisfied with the sustainability of conventional tomatoes, while for organic ones, the figures are contrary. The results of regression analysis show that sustainability is an important product attribute for both conventional and organic tomatoes. Customer satisfaction with sustainability is higher and has greater importance for organic than for conventional tomatoes. The literature research shows that carbon footprint for greenhouse production is much higher than for field production and that there is a small difference between greenhouse production of conventional and organic tomatoes. Such information about production is not given to the customers on a product, so they cannot judge about sustainability based on it. Experts claim that Austrian products are more sustainable than import products, because of shorter transportation distances and because of high production standards. For example, in Austria, organic tomatoes produced in greenhouses must be produced in soil, while this is not the case in some other countries. Another thing is that in Austria, production in winter is much more expensive than in some import countries, due to the climate. Consumers create their opinion about sustainability based on production system (conventional or organic), so that organic tomatoes are products perceived as more sustainable.

Health benefits

Consumption of tomatoes has many benefits for human health, as mentioned in the literature research. Regression analysis shows that health benefits have a big impact on overall satisfaction with conventional tomatoes. In the regression analysis of customer satisfaction with organic tomatoes, health benefits are not taken into account because of strong correlation with sustainability. The customer satisfaction with health benefits for organic tomatoes is 60 and with conventional 44. Although customers are more satisfied with health benefits of organic

tomatoes, the regression model shows that it is insignificant for organic tomatoes. A possible explanation is that customers regard organic tomatoes as healthy in any case so that it does not affect overall satisfaction.

11.3. Discussion about the application in practice

Experts pointed out in a discussion that knowing more about customer satisfaction with product attributes could be very important. They think that this piece of information is useful, but it could cost money and that it might not be financially rewarding. Producers get their intelligence through customer and retail complaints, but there is not such analysis that gives them more insight into customer satisfaction with their products.

This study shows the consumer satisfaction with tomatoes in retail and what is important to them when buying tomatoes. It discloses that consumers give more value to domestic products and that taste is a very important factor in overall customer satisfaction, which producers may have an influence on. Bringing out new varieties of tomatoes that have a better taste could increase customer satisfaction with both conventional and organic tomatoes. With understanding of it, retail might involve more domestic producers to increase supply and seek for new varieties with a better taste. Customer satisfaction analysis is a vital factor of quality improvement of tomatoes in retail. Consequently, it could trigger an increase in sales for retail, as well as for domestic producers. Another thing is that results supply facts about the irrelevance of some product attributes and that investing in development of those attributes would cause unnecessary expenses. An example of it is trying to improve packaging, or freshness.

12.Conclusion

The aim of the study "Customer satisfaction with tomato supply in retail. An application of the multidimensional measurement method" was to examine how satisfied customers are with conventional and organic tomatoes in Austrian retail, based on satisfaction with the following product attributes of tomatoes: price, appearance, odour, freshness, taste, packaging, origin (regional and international), sustainability and health benefits, which were chosen from literature that deals with similar topics. It shows results about which product attributes are significant for overall satisfaction, which is determined with a regression analysis done with IBM SPSS software. The conclusions of the study also give particulars about purchasing habits of respondents.

The data were collected using an unrestricted (self-selected) web survey and expert interviews. The quantitative web survey included 219 respondents, out of whom 153 completed the survey. 122 respondents were women and the rest of 31 were men. Most of them have a university degree and live in town. They are mostly 19 to 30 years old and have an average net household income from 1,500 to 2,000 Euro. The survey results are not representative. The expert interviews included three experts that produce vegetables, i.e., tomatoes.

The answers illustrate that most of respondents buy tomatoes on a weekly basis, and that most of them buy cherry, plum or cocktail tomatoes. They predominantly buy less than 5 percent of organic tomatoes. Origin and packaging are sometimes taken into consideration when purchasing tomatoes, and packed tomatoes have a slight, insignificant advantage over unpacked ones.

Regression model could explain the overall customer satisfaction with conventional tomatoes in the extent of 55.1%, and with organic in the extent of 66.8%. According to the regression model, the customer satisfaction with conventional tomatoes is 50.78 and with organic ones 59.78. Therefore, customers are neither satisfied nor unsatisfied with tomatoes in Austrian retail. The most significant product attributes that contribute to the regression model are taste (B = 0.287), sustainability (B = 0.280) and health benefits (B = 0.222) for conventional tomatoes, and sustainability (B =0.318), taste (B = 0.309), price (B = 0.173) and appearance (B = 0.147) for organic tomatoes.

Other results suggest that customers are more satisfied with Austrian tomatoes than with those from import countries. The customers that buy tomatoes every three months and weekly are most satisfied. The customers that buy classic round and beefsteak tomatoes as well as the

customers that buy all types of tomatoes are most satisfied. Customers are more satisfied with the taste of organic tomatoes. Customer dissatisfaction (overall and with taste) is visible with vine tomatoes. Organic customers are mostly satisfied with organic tomatoes, while they are neither satisfied nor unsatisfied with conventional ones. On the other hand, conventional customers are neither satisfied nor unsatisfied with both conventional and organic tomatoes. Village residents pay more attention to the origin of tomatoes and they prefer tomatoes without packaging, while for city residents, the results are opposite.

The results have practical value because they display the importance of customer satisfaction analysis. Customer satisfaction analysis gives guidelines for further development of products, i.e., tomatoes, by giving data about what is relevant, what should be invested in, and what is insignificant to customers. Nevertheless, in today's competitive times, customer satisfaction is an important prerequisite for successful marketing.

13. Appendix

13.1. Pretest protocol

Table 16 Results of the pretest. Source: modified from Anonymus (2009) and Callegaro et al. (2015)

	FRAGE	JA	NEIN	ERKLÄRUNG
1	Sind die Fragen umfassend? Haben die Fragen das Thema abgedeckt?	**6**	0	
2	Gibt es irgendwelche Fragen, die Sie erwartet haben, und die nicht gefragt wurden?	1	**5**	Glaubwürdigkeit der Bio-Tomaten
3	Gibt es Fragen, die Ihrer Meinung nach zu empfindlich sind oder die die Antwortquote beeinflussen können?	2	**4**	Zufriedenheit der Tomaten aus verschiedenen Herkunftsländern
4	War die Länge des Fragebogens angemessen?	**4**	2	Zu lang x2
5	Sind die Fragen verständlich?	**6**	0	
6	Hatten Sie technische Probleme bei der Teilnahme an der Umfrage?	0	**6**	Android x6
7	Haben Sie noch irgendwelche Bemerkungen?	2	**4**	- Käufer schauen nicht so oft auf die Herkunft. Es gibt zu viele Fragen über die Herkunft und es ist nicht so wichtig. Wichtiger sind das Aussehen und die Farbe. - Das Wort „konventionell“ nicht bekannt.

13.2. Web survey

Kundenzufriedenheit mit Tomaten im Einzelhandel (ID 671863)

Umfrage URL:

Deutsch (Basissprache):	https://survey.boku.ac.at/index.php/671863?lang=de
End-URL:	-

Umfragetexte:

Beschreibung:	
Willkommenstext:	Sehr geehrte Damen und Herren, ich lade Sie ganz herzlich zu eine Befragung über Kundenzufriedenheit mit Tomaten ein, die ich im Rahmen meiner Masterarbeit duchführe. Der Fragebogen besteht aus vier Teilen. Im ersten Teil befinden sich die Fragen über Kaufgewohnheiten, der zweite und der dritte Teil umfassen Kundenzufriedenheit mit herkömmlichen Tomaten und Bio-Tomaten, und der letzte Teil beschäftigt sich mit soziodemographischen Merkmalen. Es ist wichtig zu erfahren, wie zufrieden Sie mit Tomaten im österreichischen Einzelhandel sind. Daher bitte ich Sie, den Fragebogen nach bestem Wissen und Gewissen komplett auszufüllen. Die Teilnahme dauert ungefähr 5-10 Minuten und ist anonym. Sie können von jedem beliebigen Endgerät mit Internetanschluss an der Befragung teilnehmen. Wenn Sie die Bearbeitung des Fragebogens unterbrechen wollen, können Sie dies jederzeit tun und sie später fortführen. Die Befragung steht bis zum 23. Juni 2019 online zur Verfügung. Mit freundlichen Grüßen Đurđica Markić, BSc
Endnachricht:	Vielen Dank für Ihre Teilnahme! Bei Rückfragen stehe ich Ihnen gerne zur Verfügung.E-Mail: durdica.gasparovic@students.boku.ac.at Mit freundlichen Grüßen Đurđica Markić, BSc
Administrator Name:	Đurđica Markić (durdica.gasparovic@students.boku.ac.at)
Start-Datum/Zeit:	10.06.2019 08:00
Ablaufdatum/-zeit:	23.06.2019 23:59
Vorlage:	boku
Anzahl Fragen/Gruppen:	19/4
Umfrage-Einstellungen:	Antworten zu dieser Umfrage sind anonymisiert. Es wird Gruppe für Gruppe angezeigt. Teilnehmer können teilweise fertiggestellte Umfrage zwischenspeichern.

Figure 41 Survey summary
Source: made by author

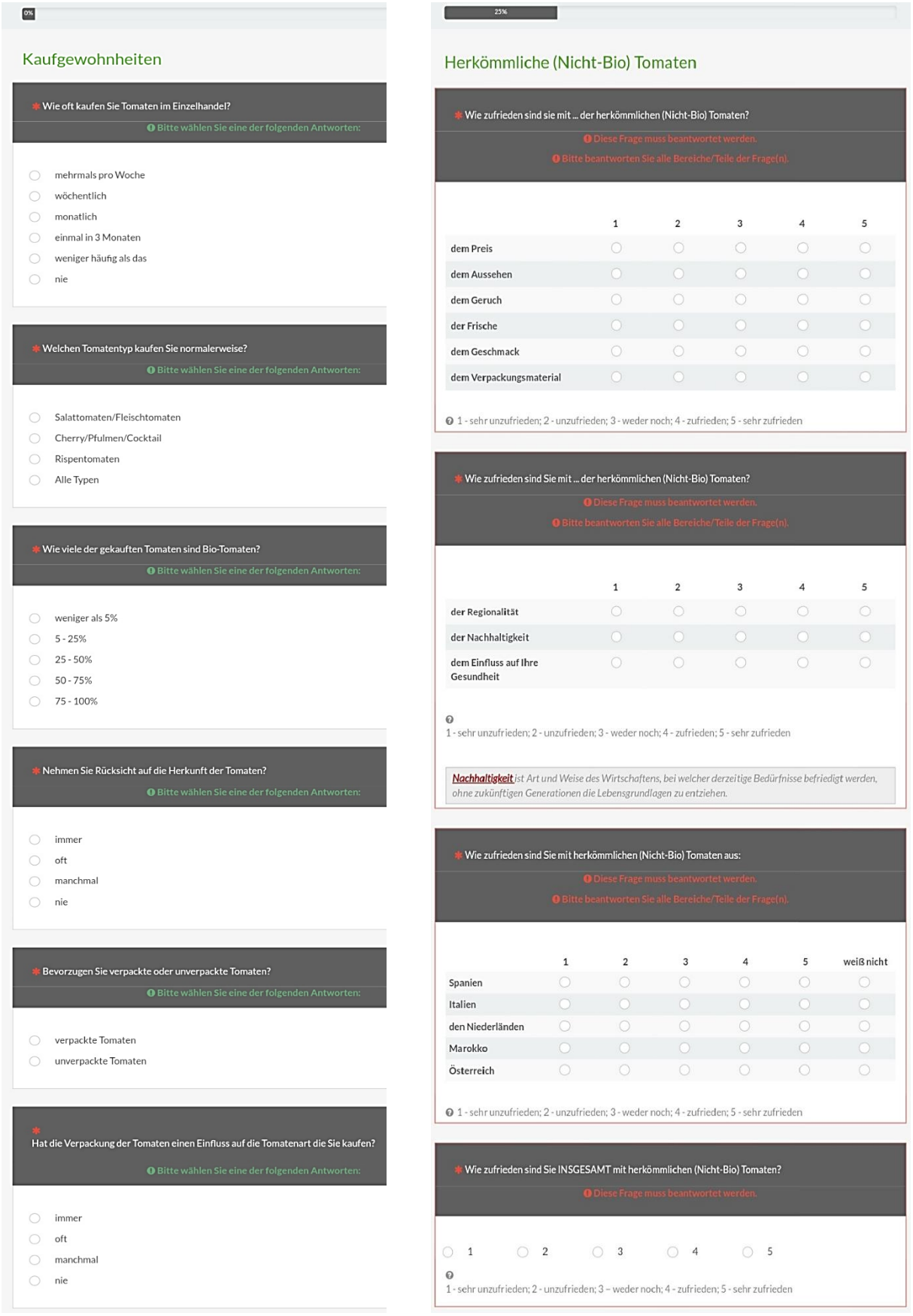


Figure 42 Questions about purchasing habits and customer satisfaction with conventional tomatoes
Source: made by author

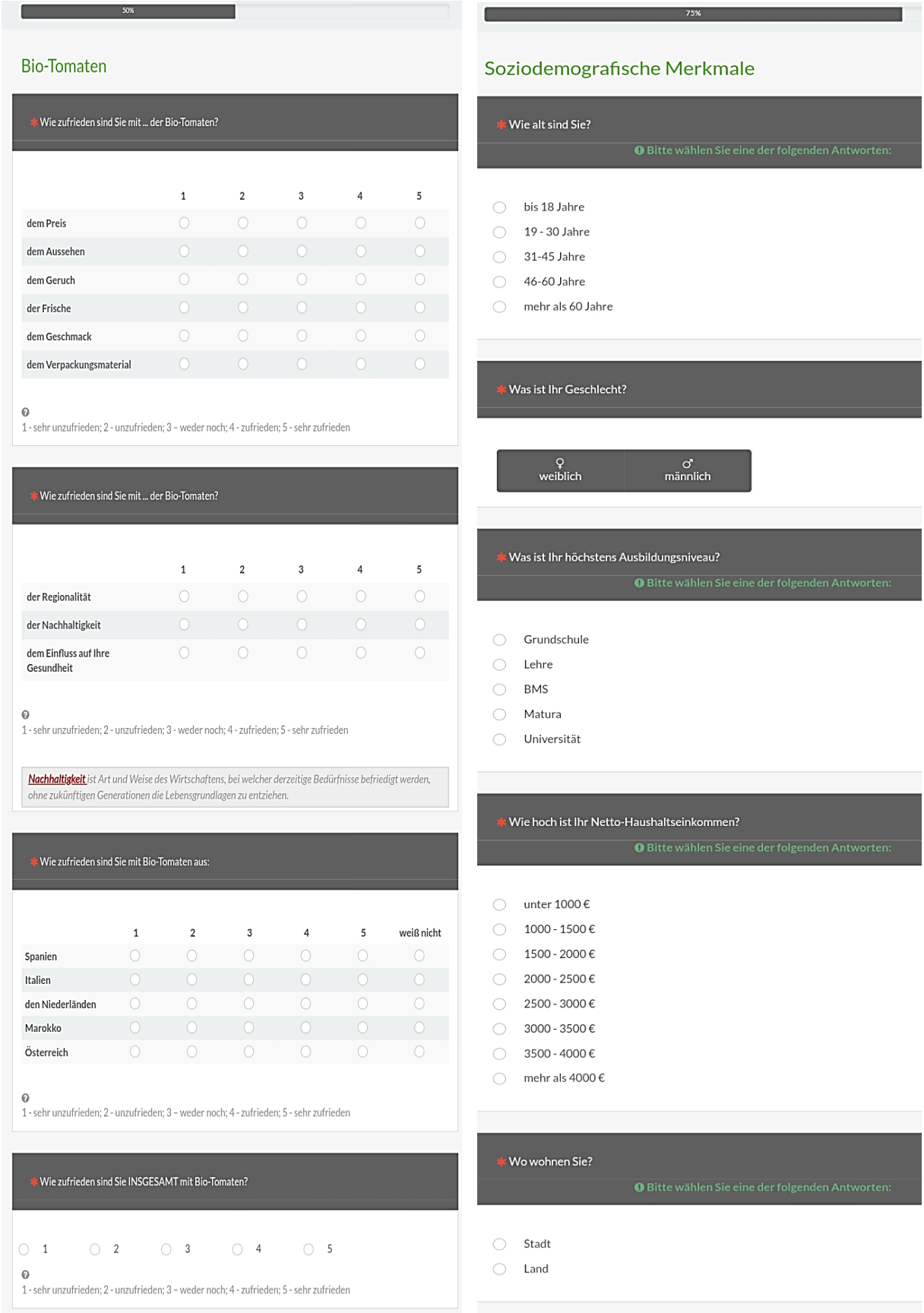


Figure 43 Questions about CS with organic tomatoes and sociodemographic characteristics
Source: made by author

13.3. Regression analysis of all product attributes for conventional tomatoes

Table 17 Model summary including all variables for conventional tomatoes. Source: made by author

Model	R	R Square	Corrected R Square	Standard Error of the Estimate	Durbin-Watson
1	,762[a]	0,581	0,555	16,058	2,026

a. Predictors: (constant), Health benefits, Appearance, Packaging, Price, Taste, Sustainability, Freshness, Regionality, Odor
b. Dependent Variable: Overall satisfaction with conventional tomatoes

Table 18 ANOVA of all variables for conventional tomatoes. Source: made by author

Model		Sum square	Df	Mean Square	F	Sig.
1	Regression	51213,254	9	5690,362	22,067	,000[b]
	Not standardized Residua	36874,981	143	257,867		
	Total	88088,235	152			

a. Dependent Variable: Overall satisfaction with conventional tomatoes

b. Predictors: (constant), Health benefits, Appearance, Packaging, Price, Taste, Sustainability, Freshness, Regionality, Odor

Table 19 Coefficients table for all variables for conventional tomatoes. Source: made by author

Model		Not standardized coefficients		Standardized coefficients		
		B	Standard Error	Beta	T	Sig.
1	(constant)	10,816	3,870		2,795	0,006
	Price	0,125	0,064	0,133	1,955	0,053
	Appearance	-0,042	0,056	-0,052	-0,749	0,455
	Odor	0,099	0,073	0,123	1,344	0,181
	Freshness	0,014	0,068	0,016	0,207	0,836
	Taste	0,206	0,068	0,259	3,020	0,003
	Packaging	-0,009	0,055	-0,011	-0,162	0,872
	Regionality	0,058	0,077	0,061	0,753	0,452
	Sustainability	0,271	0,081	0,271	3,367	0,001
	Health benefits	0,158	0,068	0,184	2,330	0,021

13.4. Testing assumptions for multiple regression of overall satisfaction with conventional tomatoes

Table 20 Correlation matrix for attributes of conventional tomatoes. Source: made by author

		Price	Appearance	Odor	Freshness	Taste	Packaging	Regionality	Sustainability	Health benefits
Price	Korrelation nach Pearson	1	,473**	,495**	,433**	,331**	,300**	,365**	,222**	,300**
	Signifikanz (2-seitig)		0,000	0,000	0,000	0,000	0,000	0,000	0,006	0,000
	N	153	153	153	153	153	153	153	153	153
Appearance	Korrelation nach Pearson	,473**	1	,403**	,498**	,261**	,428**	,362**	,267**	,293**
	Signifikanz (2-seitig)	0,000		0,000	0,000	0,001	0,000	0,000	0,001	0,000
	N	153	153	153	153	153	153	153	153	153
Odor	Korrelation nach Pearson	,495**	,403**	1	,625**	,716**	,365**	,360**	,377**	,531**
	Signifikanz (2-seitig)	0,000	0,000		0,000	0,000	0,000	0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Freshness	Korrelation nach Pearson	,433**	,498**	,625**	1	,525**	,354**	,372**	,333**	,487**
	Signifikanz (2-seitig)	0,000	0,000	0,000		0,000	0,000	0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Taste	Korrelation nach Pearson	,331**	,261**	,716**	,525**	**1**	,397**	,354**	**,507****	**,511****
	Signifikanz (2-seitig)	0,000	0,001	0,000	0,000		0,000	0,000	**0,000**	**0,000**
	N	153	153	153	153	**153**	153	153	**153**	**153**
Packaging	Korrelation nach Pearson	,300**	,428**	,365**	,354**	,397**	1	,352**	,451**	,363**
	Signifikanz (2-seitig)	0,000	0,000	0,000	0,000	0,000		0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Regionality	Korrelation nach Pearson	,365**	,362**	,360**	,372**	,354**	,352**	1	,640**	,611**
	Signifikanz (2-seitig)	0,000	0,000	0,000	0,000	0,000	0,000		**0,000**	**0,000**
	N	153	153	153	153	153	153	153	**153**	**153**
Sustainability	Korrelation nach Pearson	,222**	,267**	,377**	,333**	**,507****	,451**	,640**	**1**	**,556****
	Signifikanz (2-seitig)	0,006	0,001	0,000	0,000	**0,000**	0,000	0,000		**0,000**
	N	153	153	153	153	**153**	153	153	**153**	**153**
Health bebefits	Korrelation nach Pearson	,300**	,293**	,531**	,487**	**,511****	,363**	,611**	**,556****	**1**
	Signifikanz (2-seitig)	0,000	0,000	0,000	0,000	**0,000**	0,000	0,000	**0,000**	
	N	153	153	153	153	**153**	153	153	**153**	**153**

**. The correlation is on the Level from 0,01 (2-side) significant.

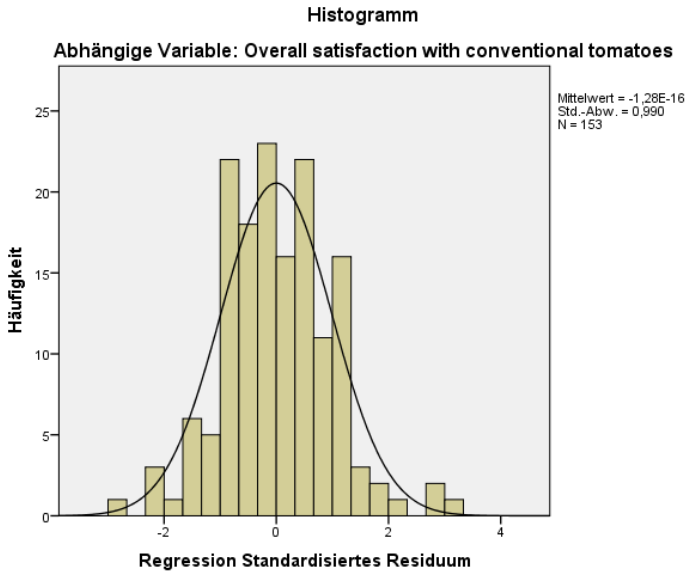


Figure 44 Analysis of residuum 1 - histogram for conventional tomatoes
Source: made by author

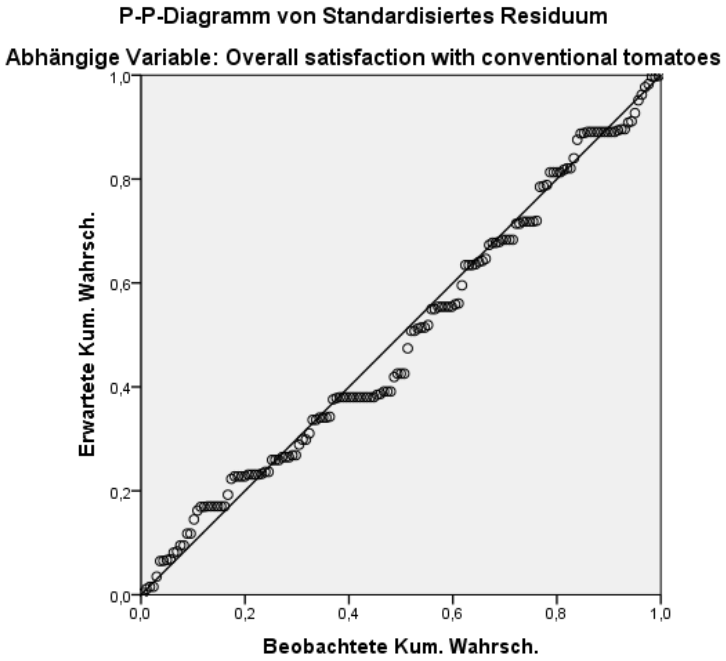


Figure 45 Analysis of residuum 2 - conventional tomatoes
Source: made by author

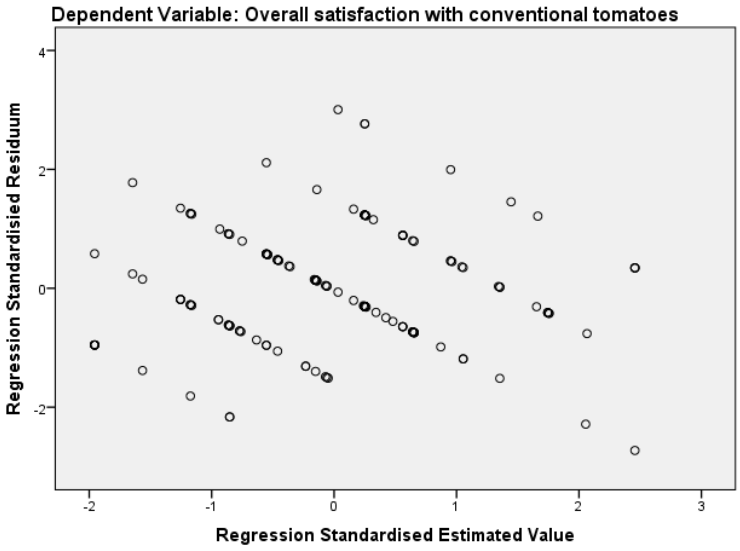


Figure 46 Test on heteroscedasticity for conventional tomatoes
Source: made by author

13.5. Regression analysis of all product attributes for organic tomatoes

Table 21 Model summary including all variables for organic tomatoes. Source: made by author

Model	R	R Square	Corrected R Square	Standard Error of the Estimate	Durbin-Watson
1	,829[a]	0,688	0,668	13,937	2,127

a. Predictors: (constant), Health benefits, Appearance, Packaging, Price, Taste, Sustainability, Freshness, Regionality, Odor
b. Dependent Variable: Overall satisfaction with organic tomatoes

Table 22 ANOVA for all variables for organic tomatoes. Source: made by author

Model		Sum square	Df	Mean Square	F	Sig.
1	Regression	61130,380	9	6792,264	34,970	,000[b]
	Not standardized Residua	27774,849	143	194,230		
	Total	88905,229	152			

a. Dependent Variable: Overall satisfaction with organic tomatoes

b. Predictors: (constant), Health benefits, Appearance, Packaging, Price, Taste, Sustainability, Freshness, Regionality, Odor

Table 23 Coefficients table for all variables for organic tomatoes. Source: made by author

		Not standardized coefficients		Standardized coefficients		
Model		B	Standard Error	Beta	T	Sig.
1	(constant)	6,020	3,539		1,701	0,091
	Price	0,143	0,048	0,160	2,987	0,003
	Appearance	0,145	0,059	0,155	2,460	0,015
	Odor	-0,099	0,079	-0,115	-1,247	0,214
	Freshness	0,035	0,064	0,039	0,551	0,583
	Taste	0,299	0,076	0,359	3,943	0,000
	Packaging	-0,073	0,051	-0,082	-1,414	0,159
	Regionality	0,099	0,069	0,104	1,434	0,154
	Sustainability	0,244	0,079	0,241	3,095	0,002
	Health benefits	0,135	0,073	0,153	1,843	0,067

a. Dependent Variable: Overall satisfaction with organic tomatoes

13.6. Testing assumptions for multiple regression of overall satisfaction with organic tomatoes

Table 24 Correlation matrix for attributes of organic tomatoes. Source: made by author

		Price	Appearance	Odor	Freshness	Taste	Packaging	Regionality	Sustainability	Health benefits
Price	Korrelation nach Pearson	**1**	**,335****	,373**	,331**	**,419****	,187*	,377**	**,285****	,435**
	Signifikanz (2-seitig)		**0,000**	0,000	0,000	**0,000**	0,021	0,000	**0,000**	0,000
	N	**153**	**153**	153	153	**153**	153	153	**153**	153
Appearance	Korrelation nach Pearson	**,335****	**1**	,584**	,574**	**,547****	,449**	,475**	**,494****	,570**
	Signifikanz (2-seitig)	**0,000**		0,000	0,000	**0,000**	0,000	0,000	**0,000**	0,000
	N	**153**	**153**	153	153	**153**	153	153	**153**	153
Odor	Korrelation nach Pearson	,373**	,584**	1	,647**	,824**	,421**	,568**	,644**	,727**
	Signifikanz (2-seitig)	0,000	0,000		0,000	0,000	0,000	0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Freshness	Korrelation nach Pearson	,331**	,574**	,647**	1	,636**	,533**	,579**	,541**	,596**
	Signifikanz (2-seitig)	0,000	0,000	0,000		0,000	0,000	0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Taste	Korrelation nach Pearson	**,419****	**,547****	,824**	,636**	**1**	,421**	,614**	**,608****	,730**
	Signifikanz (2-seitig)	**0,000**	**0,000**	0,000	0,000		0,000	0,000	**0,000**	0,000
	N	**153**	**153**	153	153	**153**	153	153	**153**	153
Packaging	Korrelation nach Pearson	,187*	,449**	,421**	,533**	,421**	1	,457**	,460**	,407**
	Signifikanz (2-seitig)	0,021	0,000	0,000	0,000	0,000		0,000	0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Regionality	Korrelation nach Pearson	,377**	,475**	,568**	,579**	,614**	,457**	1	,697**	,622**
	Signifikanz (2-seitig)	0,000	0,000	0,000	0,000	0,000	0,000		0,000	0,000
	N	153	153	153	153	153	153	153	153	153
Sustainability	Korrelation nach Pearson	**,285****	**,494****	,644**	,541**	**,608****	,460**	,697**	**1**	,709**
	Signifikanz (2-seitig)	**0,000**	**0,000**	0,000	0,000	**0,000**	0,000	0,000		0,000
	N	**153**	**153**	153	153	**153**	153	153	**153**	153
Health bebefits	Korrelation nach Pearson	,435**	,570**	,727**	,596**	,730**	,407**	,622**	,709**	1
	Signifikanz (2-seitig)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	
	N	153	153	153	153	153	153	153	153	153

**. The correlation is on the Level from 0,01 (2-side) significant.

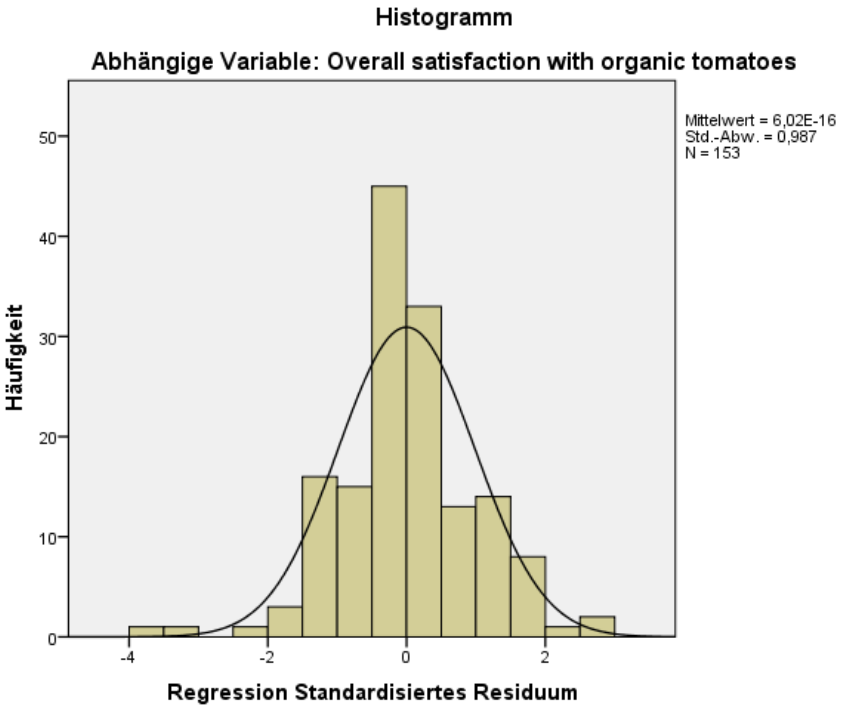


Figure 47 Analysis of residuum 1 - histogram for organic tomatoes
Source: made by author

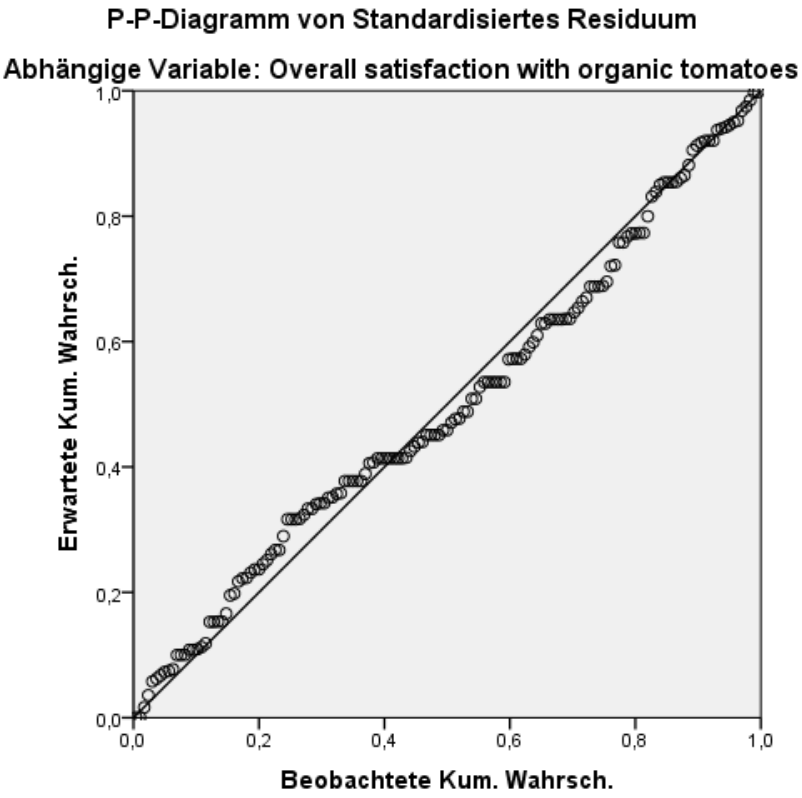


Figure 48 Analysis of residuum 2 – organic tomatoes
Source: made by author

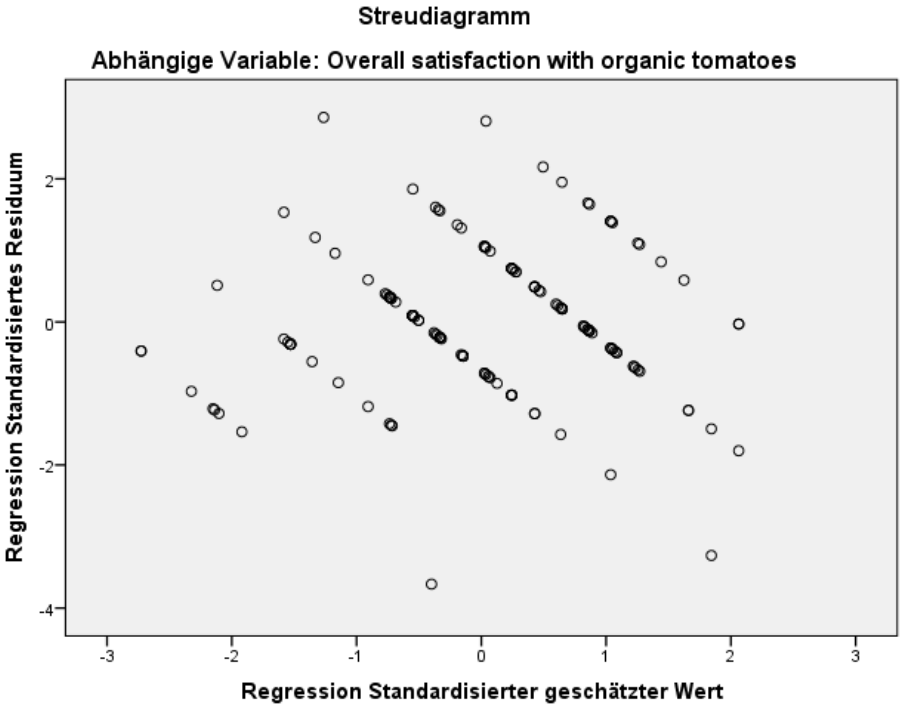


Figure 49 Test on heteroscedasticity for organic tomatoes
Source: made by author

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