

Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

**Statistical analysis of wine
consumption preferences**

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BACHELOR THESIS ASSIGNMENT

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Economics and Management

Thesis title

Statistical analysis of wine consumption preferences

Objectives of thesis

Bachelor thesis deals with assessment of wine consumption preferences. The main sense is to find out and assess possible factors which affect consumer behaviour. The assessment will be based on own questionnaire survey.

Methodology

The assessment of factors influencing consumer behaviour will be carried out by questionnaire survey. The dataset will be analysed using categorical data analysis.

The proposed extent of the thesis

30 – 40 pages

Keywords

Consumption, preference, marketing research, survey, wine, statistical analysis, hypothesis

Recommended information sources

AGRESTI, A. *Categorical data analysis*. Hoboken: John Wiley & Sons, 2013. ISBN 978-0-470-46363-5.

ARMSTRONG, G. – KOTLER, P. *Principles of marketing*. Harlow: Pearson, 2012. ISBN 978-0-273-75243-1.

FARBER, E. – LARSON, R. *Elementary statistics : picturing the world*. Boston: Pearson Prentice Hall, 2015. ISBN 9780321693624.

KOTLER, P. – KELLER, K L. *Marketing management*. Upper Saddle River: Pearson Prentice Hall, 2012. ISBN 978-0-13-600998-6.

NORDHAUS, W D. – SAMUELSON, P A. *Economics*. New York: McGraw-Hill, 1992. ISBN 0-07-054879-.

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Declaration

I hereby declare that I have worked on my bachelor thesis titled "Statistical analyses of wine consumption preferences" individually and I listed all sources I used to gain information and knowledge in the list of preferences. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any third person.

In Prague on 29.11.2016

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Statistická analýza preferencí ve spotřebě vína

Souhrn

Bakalařská práce se zabývá preferencemi ve spotřebě vína. Hlavním cílem je určit možné faktory, které pravděpodobně mohou ovlivnit chování spotřebitele. První část se věnuje základní metodice a objasnění teoretických vývodů. Hlavní pozornost je zde zaměřena na marketingový výzkum a pravidla při tvorbě dotazníku. V této části je rovněž popsána historie vína ve světě i v České republice nebo technologický postup při výrobě vína. Poslední podkapitola první části se zabývá spotřebním chováním a faktory, které ovlivňují spotřebitele při nákupu potravin. Praktická část práce je poté zaměřena na vyhodnocení dotazníkového šetření. Nejzajímavější otázky jsou vyhodnoceny graficky. Dále jsou zde testovány hypotézy, které jsou na základě výsledků přijaty nebo zamítnuty.

Klíčová slova: spotřeba, preference, marketingový výzkum, dotazníkové šetření, víno, statistická analýza, hypotéza

Statistical analysis of wine consumption preferences

Summary

This bachelor thesis deals with wine consumption preferences. The main aim is to assess factors, which may influence consumer behavior. The first part is devoted to the research and the rules for creating a questionnaire. I will focus on the history of wine worldwide and in the Czech Republic. Technological process of wine productions is also described in this part. The last subchapter of the first part deals with consumer behavior and with the factors, which influence the consumer when purchasing food. The most interesting questions in the practical research are evaluated graphically. The stated hypotheses are tested in this part, as well. The dataset is analyzed using categorical data analysis. According to the results the stated hypotheses are either accepted or rejected.

Keywords: consumption, preferences, marketing research, survey, wine, statistical analysis, hypothesis

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1 Introduction

Wine made from fermented grape juice is one of the oldest beverages in the world. The two main wine regions in the Czech Republic, Bohemia and Moravia. They are further divided into sub-regions. Wine is often served and consumed socially, such as in wine tastings at Czech wineries, dining in restaurants and during family events. In the Czech Republic, some consumers are highly educated on wine brands and varieties.

Consumer demographics will consist of age, sex, race, wine type, flavor and price. The colors and shapes of the wine labels have also influence on consumer's perceptions, and it seems that there are strong preferences for selected combinations of colors and shapes in the composition design of wine labels.

The average annual wine consumption, one of the wine demand factors, grew between 2003 and 2007 from 16.3 l to 18.5 per capita. Specifically, it is the daily feasible ratio of alcohol in wine and other alcoholic drinks, especially beer that we can treat as the substitute of wine. According to the available statistics, world wine production is approximately 275 million hectoliters per year in average and consumptions. The consumption of wine accounted for 11% of the volume of alcoholic beverages consumed in Czech Republic in 2010, while the average consumption was 19.4 liters of wine per person per year. (Czech Statistical Office, 2012)

With respect to alcohol consumption in the Czech Republic, the main competitor of wine is beer. The main goal of this thesis is to find the most important motivations to drink wine for Czech consumers. As wine consumption increases in the Czech Republic, motivations are of growing importance especially to the country's wine-growing regions.

2 Aims and methodology

The main aim of this study is to determine the factors, which may influence consumer behavior when choosing to drink wine. The partial aim is to statistically test the stated hypothesis and to find out whether the random sample differs from population.

2.1 Methodology

The theoretical portion is processed on the basis of knowledge gained by reading the books, research papers, and internet resources. The main parts are focused on marketing research, wine and consumer behavior.

2.1.1 Statistical hypothesis testing

A hypothesis is a conjecture about a population parameter. A hypothesis test is used to determine whether there is enough evidence in a sample of data infers that a certain condition is true for the whole population.

A hypothesis test examines two opposing hypotheses about a population which are the null hypothesis and the alternative hypothesis. The null hypothesis, symbolized by H_0 , statistical hypothesis that states difference between a parameter and a specific value, or that there is no difference between two parameters. The alternative hypothesis, symbolized by H_1 is a statistical hypothesis that states the existence of a difference between parameter and a specific value, or states that there is a difference between two parameters. (Agresti, 2014)

The alternative hypothesis should also be formulated precisely. H_1 can reject in three possible ways described as follows: $H_0 \neq H_1$, $H_0 > H_1$ or $H_0 < H_1$

A statistical test uses the data obtained from a sample to make a decision about whether the null hypothesis should be rejected. The null hypothesis may or may not be true, and the decision is made to reject on the basis of the data obtained from a sample.

The level of significance must always be chosen. This probability is symbolized by α . If a null hypothesis is true then a Type I error is made. On the other hand, a Type II error is accepting H_0 when it is false. The probability of a Type II error is symbolized by β . (Agresti, 2014)

Table 1 Statistical hypotheses testing: Type I and Type II error

	Decision	
	Accept Ho	Reject Ho
Ho (true)	Correct decision $1 - \alpha = 0.964$	Type I error $\alpha = 0.036$
Ho (false)	Type II error $\beta = 0.909$	Correct decision Power = $1 - \beta = 0.0961$

Source: (LLOYD, 1999), own elaboration

As mentioned above we can commit a Type I and Type II error while testing the hypotheses that there are two possibilities for a correct decision and two possibilities for an incorrect decision. We reject the null hypothesis when it is true, this would result in a Type I error. A Type II error occurs that we do not reject the null hypothesis when it is false. P-value is the probability of getting a sample statistic in the direction of the alternative hypothesis when the null hypothesis is true. If $P\text{-value} \leq \alpha$, we reject the null hypothesis. If $P\text{-value} > \alpha$, we do not reject the null hypothesis.

2.1.2 Categorical data analysis

A categorical variable is a variable that assumes a limited number of discrete values. Categorical variables described as ordinal or nominal. Examples of ordinal variables are social class (i.e. upper, middle, lower), patient condition (i.e. good, serious, critical) and clothing size (i.e. small, medium, large, extra large). Categorical variables without a natural ordering are called nominal. For example, sex (i.e. male, female), religious (i.e. Catholic, Jewish, other), and eye color (i.e. black, green, brown).

A variable's measurement scale determines which statistical methods are appropriate. We can define it if the data is the same or not. Ordinal and nominal variables are called qualitative. Qualitative characters are mainly used in the area of research for public opinions. Qualitative characters are expressed in words and it is possible to test the dependency and its intensity among them. Dependency between alternative characters is called association dependency; dependency between plural characters is called contingency.

2.1.3 Analysis of dependency in association tables

An association table is used for observing two qualitative alternative statistical characters. The result of the whole experiment can be summarized in the so-called

contingency table. In our case, the variables of an alternative type were considered, i.e. they assumed only two alternatives, and the special type of a contingency table, the so-called 2x2 contingency table was therefore used.

The aim of the test of the independence of qualitative variables is to determine whether relevant two statistical variables are mutually dependent or not. If the dependence is confirmed by the test, the strength of this dependence is also searched. Phases of the testing process correspond to the general procedure of testing statistical hypotheses.

While testing hypothesis H_0 : *There is no dependency between the observed characters (the wine preferences and gender of the wine drinker)*, two tests can be used: a χ^2 independence test and Fisher's factorial test. The utilization of mentioned tests is followed by rules:

If the sample size is greater than 40 and if all expected frequencies are greater than 5, then we use χ^2 independence test. If the sample size is lower than 20 and if at least one of expected frequencies is lower than 5 then we can use Fisher's factorial test. If $20 < n < 40$, then the expression of expected frequencies a_0, b_0, c_0, d_0 is needed:

$$a_0 = \frac{(a+b)(a+c)}{n} \quad (\text{Formula 1})$$

$$b_0 = \frac{(a+b)(b+d)}{n} \quad (\text{Formula 2})$$

$$c_0 = \frac{(c+d)(a+c)}{n} \quad (\text{Formula 3})$$

$$d_0 = \frac{(c+d)(b+d)}{n} \quad (\text{Formula 4})$$

χ^2 Independence test

The Chi-square test of independence is used to test the association between two categorical variables are independent each other. The Chi-square test has some assumptions: The data are obtained from a random sample, no more than 20% of the cells has an expected frequency less than five, and no empty cells. If the chi-square test

shows significant result, then we may be interested to see the degree or strength of association among variables, but it falls to explain another situation where more than or equal to 20% of the cells have an expected frequency less than five. In this case, the chi-square test is not valid. Then the Fisher Exact test will be used to test the association among variables. If the value of the test statistics for the Chi-square test of association is too large or a poor agreement between the observed and expected frequencies, the null hypothesis of independence is rejected.

H₀: There is no dependency between the observed characters.

Table 2 Association table 2x2

Character A	Character B		Total
	Yes	No	
Yes	a	b	a+b
No	c	d	b+d
Total	a+c	b+d	n

Source: Own elaboration

If margins of a table are fixed, the exact probability of a table with cells a,b,c,d and marginal totals.

The null hypothesis of independence is tested by the test criterion χ^2

$$\chi^2 = \frac{n(ad - bc)^2}{(a + b)(a + c)(b + d)(c + d)} \quad (\text{Formula 5})$$

If $\chi^2 > \chi^2_{\alpha(1)}$ or if p-value is lower than α and then the null hypothesis is rejected

Fisher`s factorial test

Fisher factorial test (Fisher, 1922) should be used as an alternative to be the fourfold chi-square test if the total number of observations is less than twenty or any of the expected frequencies are less than five. This procedure is normally used on 2 x 2 contingency tables.

H₀: There is no dependency between the observed characters.

In this case if the Fisher`s factorial test have to be used, the following approach is used:

The lowest associated frequency is found. This frequency decrease to 0 in auxiliary tables while keeping the same marginal frequencies. For each table the probability p_i is calculated by factorials

$$p_i = \frac{(a + b)! (c + d)! (a + c)! (b + d)!}{n! a! b! c! d!} \quad (\text{Formula 6})$$

The sum of all p_i is the value of the test criterion after that compared to the level of significance α . The null hypothesis is rejected when the sum $p_i < \alpha$. (Svatošová, 2008)

2.1.4 Determining of the strength of dependency in association table

An important part of any observational study is the choice of control variables. If a significant dependency between two alternative characters exists, it has to be expressed. The strength of dependency is expressed by the coefficient of the association. It is symbolized by V and calculated as follows:

$$V = \frac{ab - bc}{\sqrt{(a + b)(c + d)(a + c)(b + d)}} \quad (\text{Formula 7})$$

It is located at the interval from -1 to +1 and the greater the absolute value is, the greater the strength of dependency. The strength of dependency can also be calculated from the calculated value of the test criterion χ^2 . In this case, V is in its absolute value.

$$|V| = \sqrt{\frac{\chi^2}{n}} \quad (\text{Formula 8})$$

2.1.5 Analysis in contingency tables

Contingency table is the relationship of two or more qualitative statistical characters from which at least one is the plural character. The characters are structured as following:

Table 3 Contingency table

CharacterB \ A	b_1	b_2	b_3	...	b_m	...	B_j	Total
a_1	n_{11}	n_{12}	n_{13}	...	n_{1m}	...	n_{1j}	$n_{1.}$
a_2	n_{21}	n_{22}	n_{23}	...	n_{2m}	...	n_{2j}	$n_{2.}$
a_i				...	n_{im}	...		n_i
A_i	n_{i1}	n_{i2}	n_{i3}	...	n_{im}	...	n_{ij}	n_i
Total	$n_{.1}$	$n_{.2}$	$n_{.3}$...	$n_{.m}$...	$n_{.j}$	n

Source: Own elaboration

2.1.6 Testing the independence in contingency tables

When the data can be tabulated in table form in terms of frequencies, several types of hypotheses can be tested by using the Chi-square test. The test of independence is used to determine whether two variables are related or independent. (Agresti, 2014)

The procedure used to test the significance of contingency tables is similar to all other hypothesis tests. In this case the statistic computed as chi-square statistic then compared to a model if the experiment was repeated an infinite number of times where there were no effects.

For the purpose of testing in contingency tables the χ^2 test is used. There is a generalization of the χ^2 test for association tables. Talking about the formula, it is the difference between real (empirical) frequencies n_{ij} and theoretical (expected) frequencies n_{oj} . If the observed value is greater than the expected value and there is no effects then it is rejected.

Theoretical frequencies are formulated as the multiplication of the appropriate marginal frequencies divided by the total sample size.

$$n_{oj} = \frac{n_i \cdot n_j}{n} \quad (\text{Formula 9})$$

χ^2 independence test

H₀: There is no dependency between the observed characters.

$$\chi^2 = \frac{(n_{ij} - n_{oj})^2}{n_{oj}} \quad (\text{Formula 10})$$

The calculated value of test criterion is then compared to the critical value of $(\chi^2_{\alpha(k-1)(m-1)})$, where k represents the number of changes of the first character and m represents the number of changes of the second character. If $\chi^2 > \chi^2_{\alpha(k-1)(m-1)}$, the null hypothesis is rejected.

2.1.7 Determining the strength of dependency in contingency table

Pearson's and Cramer's (V) coefficients of contingency reflect the strength of the association in a contingency table. (Agresti, 1996)

Pearson contingency coefficient:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}} \quad (\text{Formula 11})$$

This coefficient needs to be normalized using value C_{\max} . This value can be found in appropriate statistical tables. Normalized coefficient is formulated as follows:

$$C_n = \frac{C}{C_{\max}} \quad (\text{Formula 12})$$

Final C_n is located in interval (0, 1). Determination of strength is based on the coefficient of association. It means the greater the value is, the greater is strength of dependency. Also cell-by-cell comparison of observed and estimated expected frequencies helps show the nature of the dependence.

Another possible way how to express the strength of dependency in contingency table is Cramer's contingency coefficient. If the realized value of the test criterion is in the critical field, the null hypothesis at the significance level of $100\alpha\%$ is dismissed and we accept the null hypothesis.

The strength of the dependence of statistical variables can be determined using the Cramer's contingency coefficient:

$$V = \sqrt{\frac{\chi^2}{n(q-1)}}, \text{ where } q = \min(r, s) \quad (\text{Formula 13})$$

where χ^2 is the test statistic used. The Cramer's contingency coefficient equals zero in case of total independence of the tested variables; if they are totally dependent, it equals one. In other cases, it reaches values in the interval (0, 1), while the higher value of this coefficient corresponds to tighter dependence of these variables, while values n , r , and s are the same

3 Literature review

3.1 Marketing

Marketing is about identifying and meeting human and social needs, as well as managing profitable customer relationships.

“Marketing is the science and art of exploring, creating, and delivering value to satisfy the needs of a target market at a profit. Marketing identifies unfulfilled needs and desires. It defines measures and quantifies the size of the identified market and the profit potential. It pinpoints which segments the company is capable of serving best and it designs and promotes the appropriate products and services.” (Kotler)

"Marketing is the management process responsible for identifying, anticipating and satisfying customer requirements profitably." This means the ideas, the brand, how you communicate, the design, print process, market research, and the psychology of consumer behavior all count as part of the bigger picture of “marketing”.

An understanding of what customers need and value is central to marketing. Learning customer’s needs and how you can add value through marketing activities paves the way for a successful long-term business. Marketing is a diverse profession with opportunities to be involved in all kinds of businesses.

Marketing is no longer a company department charged with a limited number of tasks—it is a company-wide undertaking. It drives the company’s vision, mission, and strategic planning. Marketing includes decisions like who the company wants as its customers, which of their needs to satisfy, what products and services to offer, what prices to set, what communications to send and receive, what channels of distribution to use, and what partnerships to develop. Marketing succeeds only when all departments work together to achieve goals: when engineering designs the right products; finance furnishes the required funds; purchasing buys high-quality materials; production makes high-quality products on time; and accounting measures the profitability of different customers, products, and areas. To address all these different shifts, good marketers are practicing holistic marketing. Holistic marketing is the development, design, and implementation of marketing programs, processes, and activities that recognize the

breadth and interdependencies of today's marketing environment. (Chartered Institute of Marketing - CIM)

Four key dimensions of holistic marketing are:

1. Internal marketing—an element of holistic marketing, is the task of hiring, training, and motivating able to employees who want to serve costumers well.
2. Integrated marketing—ensuring that multiple means of creating, delivering, and communicating value are employed and combined in the best way.
3. Relationship marketing—having rich, multifaceted relationships with customers, channel members, and other marketing partners. A key goal of marketing is to develop deep, aims to build mutually satisfying long-term relationships with key constituents in order to earn and retain their business.
4. Performance marketing—understanding returns to the business from marketing activities and programs, as well as addressing broader concerns and their legal, ethical, social, and environmental effects. These four dimensions are woven throughout the book and at times spelled out explicitly. Performance marketing requires understanding the financial and non financial returns to business and society from marketing activities and programs.

The text specifically addresses the following tasks that constitute modern marketing management in the 21st century:

1. Developing marketing strategies and plans
2. Capturing marketing insights and performance
3. Connecting with customers
4. Building strong brands
5. Shaping the market offerings
6. Delivering and communicating value
7. Creating successful long-term growth (Kotler, 14th Edition)

3.1.1 Marketing research

A marketing research “*is the systematic design, collection, analysis, and reporting of data relevant to a specific marketing situation facing an organization*” (Kotler, Armstrong “Principles of marketing”). Companies use marketing research in a wide variety of situations.

A marketing information system also includes an internal information system. An internal information system involves information about orders, sales, prices, inventories, receivables, debts etc. A good analysis of these factors can help identify opportunities and problems, too. Mainly, it is about the cycle order-delivery-invoice. The analysis needs to be fast and correct. Modern companies use modern equipment (laptops) for these purposes.(Kotler, 1992)

Marketing mix

The marketing mix and its 4 Ps is an essential and fundamental tool used by every marketer. The marketing mix consists of product offerings to consumers. The four elements of marketing mix as follow:

P1 = product (the features, brands, and packaging offered)

P2 = price (the list price, including discounts)

P3 = promotion (the advertising, sales promotion)

P4 = place (the distribution of the product)

The most communicative element in marketing mix is clearly ‘promotion’.

3.1.2 The Marketing Research Process

Marketing research as well as other scientific projects should follow a certain pattern.

1. Define the problem, the Decision alternatives, and the research objectives
2. Develop the research plan
3. Collect the information
4. Analyze the information
5. Present the findings

6. Make the decisions (Kotler 14th edition)

Winery Marketing Research goes through certain steps. Once you have completed all of the steps you will know your target market, competitors, and company goals; your points of differentiation from your competitors; what your brand means to your customers; your marketing strategies; with an action plan with dates, responsibilities, and budget. The steps are according to the web source¹:

Step 1: Understand your customers

Step 2: Analyze your competitors

Step 3: Look at your company goals, personalities, and stories

Step 4: Choose your niche

Step 5: Create or define your brand

Step 6: Review the marketing mix

Step 7: Create your marketing plan

Step 8: Review

3.1.3 Marketing research system

The marketing research process consists of four main parts:

Table 4- Marketing research process



Source: (KOTLER, 2007)

¹ <http://www.winemarketingpros.com/category/winery-marketing/>

3.1.4 Defining the research objectives

The marketing manager and the researcher must work very closely to define the problem carefully and agree on research objectives. The manager must know enough marketing research and the researcher must be able to help the manager to make the best decision.

Example: We are trying to find if the customers are able to pay more for new flavored wine. The definition must be neither too narrow, nor so wide. We should be able to answer the questions:

- What is the target group?
- What will be the increase of consumers?
- What will be the increase of goodwill?
- What is the relative significance of other factors influencing people?
- Which product features are most salient to costumers?
- Which price point will be the most appropriate?

After the problem has been defined carefully, the manager and the researcher must set the res each objective. A marketing research project might have one of three types of objectives.

The objective of exploratory research is “*to gather preliminary information that will help define the problem and suggest hypotheses*”.

The objective of descriptive research is “to describe things, such as the market potential for a product or the demographics and attitudes of consumers who buy the product.” The aim is to describe the variables, for example how many people would buy the flavored wine if the price is (Cheap)

The objective of causal research examines the cause-and-effect. For example, if the price goes down, will there be the increase of costumers by 25%?

Research approach marketers collect primary data in five main ways: through observation, focus groups, surveys, behavioral data, and experiments.

Observational Research Researcher can gather new data by observing the relevant actors and settings unobtrusively as they shop or consume products. The gather primary data by observing relevant people, actions, and situations.

Ethnographic research is a particular observational research approach that uses concepts and tools from anthropology and other science disciplines to provide deep cultural understanding of how people live and work. A form of observational research that involves sending trained observers to watch and interact with consumers in their “natural environments”.

Focus Group Research- A focus group is gathering of 6 to 10 people carefully selected by researchers based on certain demographic, psychographic, or other considerations and brought together to discuss various topics of interest at length.

Behavioral research- Customers leave traces of their purchasing behavior in store scanning data, catalog purchases, and customers databases. Experimental research- The most scientifically valid research is experimental research, designed to capture cause-and-effect relationships by eliminating competing explanations of the observed findings. (Kotler, 14 the edition)

3.1.5 Developing the research plan

Research objectives can be translated into specific information needs. The plan must be qualified. The marketing researchers cannot say: “When find someone to ask if they are able to pay 200 CZK for flavored wine”. It means we also should to know the presumption of costs per realization.

3.1.6 Sources of information

We are able to collect two types of information- primary and secondary. Researchers usually start by gathering secondary data. Secondary data used for this research were collected from various sources including relevant books. Researchers use a method where secondary research is consulted first, and thereafter recommends proceeding with specific purpose in mind: to answer your research question and to meet objectives. For the survey questionnaires were designed on commercial website (www.surveymonkey.com). We can use internal and external (state publications, books,

commercial information) sources. The primary information is collected for a specific research purpose.

3.1.7 Research survey

A survey is simply a systematic attempt to gather information by asking a group of people a series of questions. The advantage of survey research is its flexibility. Information can be gained by observing people in relevant situations, for example in a restaurant setting in our case; we can get important information about how people choose their wine.

3.1.8 Research tools

The questionnaire is the most frequently used tool for gathering information. Questionnaires are found quite common place (in newspapers, on social networks). Research produces valid information when it measures what it supports to measure; it produces reliable information when its results are accurate and consistent.

We have been surveyed at least once in our lives. Survey questions should be evaluated from three perspectives:

1. Can study participants understand the question?
2. Can study participants answer the question?
3. Will study participants answer the question? (William, 2th edition)

Table 5-Example of questionable questionnaire

Question	
What is your income?	Usually they do not know their income precisely. The researcher should not ask this question.
Are you “Strong” or “weak” supporter of something?	What do the terms “weak” and “strong” really mean?
How many advertising operators mailed you last 2 months?	This is a difficult question to answer as most people don`t keep track

Source: (Kotler, 2000), own elaboration

The three most common ways to collect survey data are through mail questionnaires, telephone interviews, and personal interviews.

Questionnaires must be designed with great care. The important thing is survey design. It helps get better and trustworthy results to researcher.

There are 2 types of questions:

- Closed-End questions: Dichotomous questions- A question with 2 possible answers, Multiple choice –A question with three or more answers
- Open-End questions: Sentence completion- An incomplete sentence is presented and respondents complete the sentence.

Questions should be clear and not use technical language or language that is inappropriate for the respondents. The questionnaire should be explicit, clear and polite. An option “I do not know” or “Others” should also be included in the response alternatives of a survey.

3.1.9 Selection plan

There must be 3 types of decisions:

- Who should be surveyed?
- How many people should be surveyed? In general, the more, the better. At the same time, construction of the sample should not be excessively large. In other words, it should be large enough to give us a confidence interval of the desired width. This number is also known as the optimal size.
- How should the respondents be selected? There are many ways of selecting the sample (Kotler, 1992; Kothari, 2004).

3.1.10 Implementing the research plan

The researcher next puts the marketing research plan into action that involves collecting, processing, and analyzing the information. We, the researchers, must not affect the responses and we must use the same approach with everyone. To analyze the data we can use many precise statistical techniques. (Kotler, 1992)

3.1.11 Reporting on the results

The market researcher must interpret the findings, draw conclusions, and report them to management. (Kotler, Armstrong “Principles of Marketing”)

When we are representing the results, we should only inform about important and significant findings. We should analyze issuable questions, as well (Kotler, 1992)

3.1.12 Analyzing and Using marketing Information

Information gathered in internal databases and through competitive marketing intelligence and marketing research usually requires additional analysis. (Kotler, Armstrong “Principles of Marketing”).

3.2 Wine

3.2.1 History in the world

Wine has evolved as part of European life, culture and diet since time immemorial. Wine making emerged in Europe with the expansion of the Roman Empire throughout the Mediterranean, when many major wine producing regions that still exist today were established. Even then, wine making was a precise husbandry that fostered the development of different grape varieties and cultivation techniques. Barrels for storing and shipping emerged, bottles were used for the first time, and even a rudimentary appellation system developed as certain regions gained a reputation for fine wine. Well documented in numerous Biblical references, evidence of wine can be traced back to Egypt as far as 5,000 B.C. Tomb wall paintings showing the use of wine as well as actual wine jars found in Egyptian tombs provide evidence of this fact.

The growth of the wine industry can be traced from its emergence along the Nile River in Egypt and Persia, northward into Europe, and eventually, to North America. Though the wines of antiquity were coarse and hard and had to be mixed with water, ancient Greek wine proved superior to Egyptian wine. For this reason, Egyptians began importing it. Then Roman wines (from what would emerge to be Italy, Spain, and France) became notably superior. Eventually, French and German wines grew to be the most desirable, thereby shifting the center of production from the Mediterranean to central Europe. Some of the best wine in the world is still produced in southern France, particularly in the Bordeaux region, where wine has been made for more than 2,000 years.

3.2.2 History in the Czech republic

The history of Czech wine reaches back to the time of Marcus Aurelius, Emperor of Rome, when his legions brought viticulture to the region during the ninth and tenth centuries. The first recorded mention of wineries in Czech Republic was in 1057, referring to newly established vineyards around Litoměřice, about 30 miles north of Prague and near the border with Germany. Wineries in Czech Republic are concentrated in two main regions, Moravia in the east and south Bohemia, occupying most of the western half of the country. Moravian wine is the best and the vintages of this region spread all the way across the border into Austria and Slovakia. The history of Moravian wine dates to the year 1101 when a Benedictine monastery was founded in Třebíč, about 30 miles west of Brno. The Emperor Charles IV issued law that protected local vintners from the importation of foreign wine and grapes. The Moravian wine region is largely concentrated on the border with Austria. This is where the Austrian section of the beautiful Blue Danube River waters the hundreds of vineyards of the famed Wachau Valley, located only about 35 miles south of the border.

About three quarters of Czech wine production consists of white varieties. The primary varieties are Müller-Thurgau, Pinot blanc, Riesling. There are also red varieties, including the popular cabernet sauvignon.

3.2.3 What is wine?

Wine is an alcoholic beverage produced through the partial or total fermentation of grapes. Other fruits and plants, such as berries, apples, cherries, dandelions, elderberries, palm and rice can also be fermented.

Grapes belong to the botanical family *vitaceae*, of which there are many species. The species that are most widely used on wine production are *Vitis labrusca* and, especially, *Vitis vinifera*, which has long been the most widely used wine grape throughout the world.

A prevalent theory that wine was discovered by accident is because wine grapes contain all the necessary ingredients for wine, including pulp, juice, and seeds that possess all the acids, sugars, tannins, minerals, and vitamins that are found in wine. As a natural process, the frosty-looking skin of the grape, called “bloom”, catches the airborne yeast and enzymes that ferment the juice of the grape into wine. The

cultivation of wine grapes for the production of wine called “viticulture”. Harvested during the fall, wine grapes may range in color from pale yellow to hearty green to ruby red. Wine can be made in the home and in small-, medium- or large sized wineries by using similar methods. Wine is made in a variety of flavors, with varying degrees of sweetness or dryness as well as alcoholic strength and quality. Generally, the strength, color, and flavor of the wine are controlled during the fermentation process. Wine is characterized by color: white, pink or rose and red divided into four broad categories: table wines, sparkling wines, fortified wines, and aromatic wines. Table champagne and other “bubbly” wines; aromatic wines contain fruits, plants, and flowers and fortified wines are table wines with brandy or other alcohol added.

The name of a wine almost invariably is derived from one of three sources: the name of the principal grape from which it was made, the geographical area from which it comes, or- in the case of the rationally finest wines-from a particular vineyard or parcel of soil. The year in which a wine is made is only printed on bottles that have aged for two known as “vintages” or “vintage years”. While certain wines are considered good or bad depending on the year they were produced, this can vary by locality. In general, red wines are supposed to age from seven to ten years before being sold. And, since the quality of wine can depend on proper ageing, older wines are generally more expensive than younger ones. Other factors, however, can affect the quality of win, and proper ageing does not always ensure quality. Other factors affecting quality include the grapes themselves, when the grapes are picked, proper care of the grapes, the fermentation process, as well as other aspects of wine production.

The process of wine production has remained much the same throughout the ages, but new sophisticated machinery and technology have helped streamline and increase the output of wine. Whether such advances have enhanced the quality of wine is, however, a subject of debate. These advances include a variety of mechanical harvesters, grape crushers, temperature-controlled tanks and centrifuges.

The procedures involved in creating wine are often times dictated by the grape and the amount and type of wine being produced. Recipes for certain types of wine require the winemaker (the vintner) to monitor and regulate the amount of yeasts, the fermentation process, and other steps of the process. While the manufacturing process is

highly automated in medium- to large-sized wineries, small wineries still use hand operated presses and store wine in musty wine cellars, a universal factor in the production of the wine is timing. This includes picking grapes at the right time, removing the must at the right time, monitoring and regulating fermentation, and storing the wine long enough.

3.2.4 Ingredients

Wine is produced from water, grape and yeasts.

Water

Water is one of the basic ingredients and has a great influence on the final product.

Yeasts

Yeasts have a major impact on the final product. Yeasts contribute to the flavors of the wine. After harvest, winemakers need to add some surplus dioxide to eliminate any indigenous yeast present on grapes.

Sugar

The higher the concentration of sugar in the grape, the higher the level of alcohol.

3.2.5 Why wine differs

Most of the wines are produced in the way satisfy the higher percentage of all consumers. The price must be competitive and the taste must not annoy to anyone.

3.2.6 Technological process of wine production

The wine-making process can be divided into four distinct steps: harvesting and crushing grapes; fermenting must; ageing the wine; and packaging.

Every wine harvest includes these basic vine-to-wine steps: Pick the grapes, crush the grapes, ferment the grapes into wine, and age the wine, bottle the wine.

3.2.7 Consumer behavior

The Consumer behavior is closely connected to buying- related process. The consumer behavior is defined as the behavior that consumer display in searching for, purchasing using, evaluating and disposing of products and services that they expect will satisfy their needs.

Lifestyle is defined as: “patterns in which people live and spend time and money”.

The consumer behavior focuses on how individuals make decisions to spend their available resources on consumption-related items that include what they buy, why they buy. The consumer not only collects information and determines selection criteria but also decision concerning taste, quality, color and the like. Consumers are often ‘product involved’ in the wine market means it could be complicated to choose the “right” wine, especially when purchasing wine as a gift. Consumers are in a tough spot.

One of the most important types of segmentation of wine consumers is the internal motives for purchase.

Motivation is the “why” of behavior. A person has many needs at any given time.

The price is defined as the exchange value of a good or service. The role of price in competitive strategy and the marketing mix. Many consumers are generally not willing to pay extra for high quality products. They are more interested in special discount events, deals and sales.

The brand plays a very important role in the consumer decision making processes. Consumers prefer the products from well-known producer. A brand has a symbolic value which helps the people to choose the best product, and the satisfaction or content of the customer in its products and services.

Own experience is another factor, which consumers take into their consideration. During the decision making process of purchasing, consumer usually prefer the product, which he or she already has good experience. Very often the consumers do not even think about the new product. They are buying the satisfactory good automatically. (Hes, 2009)

Consumer is more likely to make repeat purchase only if they derive an acceptable minimum level of satisfaction from the last purchases. Attitude behavior is a function of how strongly individual believes that the action will lead to specific outcome. Consumers buy products or services that meet their need and demand. There are two perspectives on consumer research should be discussed. Positive approach emphasizes that human reason is supreme and there is a single, objective truth that science can discover. The interpretive approach emphasizes the important of symbolic,

subjective experience and the idea that meaning is in the mind of the person- in other word individuals construct their own meanings based on individuals own unique and shared cultural experiences, therefore there is no right or wrong answers. More importantly, research relationship in interpretive approach focuses on interactive, cooperative with researcher being part of phenomenon under study. (Solomon, 2013)

Also satisfaction is important in creating desirable consumer outcomes for manufactures and retailers. Packaging is the outward of a product plays a critical role- consumers choose by eyes.

The recommendations of friend may also have the influence. Sometimes this may even be greater, than the targeted advertisement. In this case, people recommend the objective information among themselves. (Hes, 2009)

4 Own work

4.1 Statistical analysis of data and its evaluation

The questionnaire was used to the purpose of analysis. It was created according to the rules, which are deeply described in the theoretical part. A self-administered questionnaire survey was conducted. Statistical analysis of the responses was carried out via independent Chi-Square test. The survey questionnaire consists of 26 questions. Most of questions are closed-end; include the option “other” in the response alternatives.

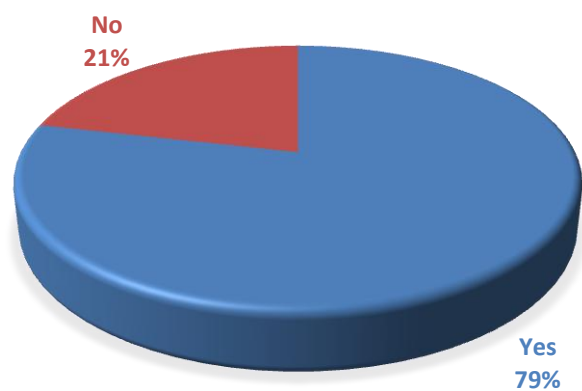
4.2 Evaluation of survey

In the questionnaire, totally 224 respondents filled in. For collecting the data, a survey questionnaire was distributed both physically and through online. A “snowball sampling” was adopted for questionnaires distribution. This method of sampling the researcher make initial contact with small group of people who are relevant to the research topic and then uses to establish contact with others. For this study, firstly questionnaires were designed on website (www.survey.com), later the survey links were sent out to initial contacts that were carried out through emails and social media.

4.2.1 Structure of respondents

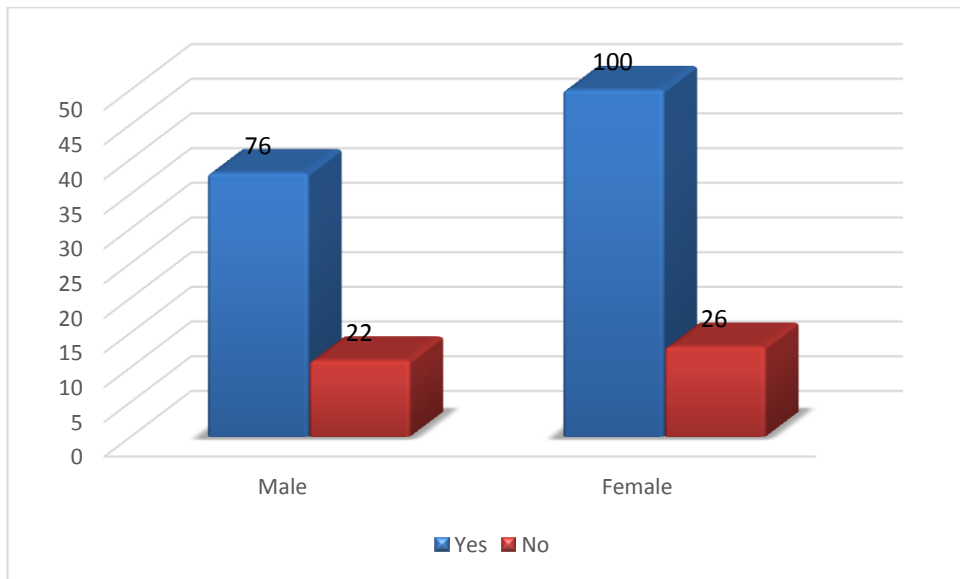
The following graph no.1 shows the answers on the question “Do you drink wine”?

Graph 1 - Evaluation of question: Do you drink wine?



As mentioned earlier, 224 people answered first question, we can see that only 22 of 98 males and 26 of 126 females who do not drink wine.

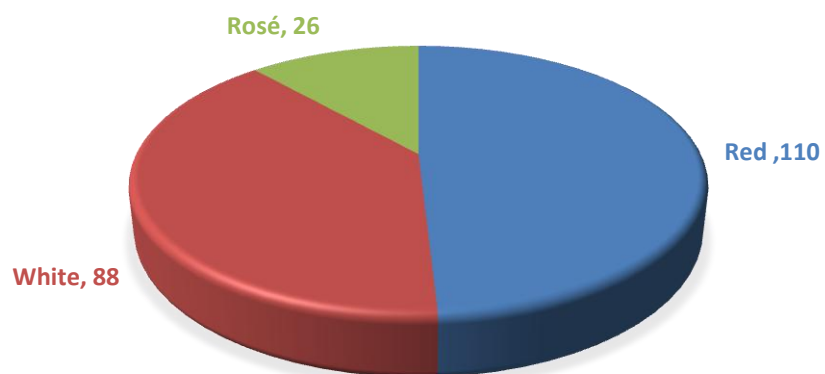
Graph 2 - Evaluation of question: Do you drink wine? - According to gender



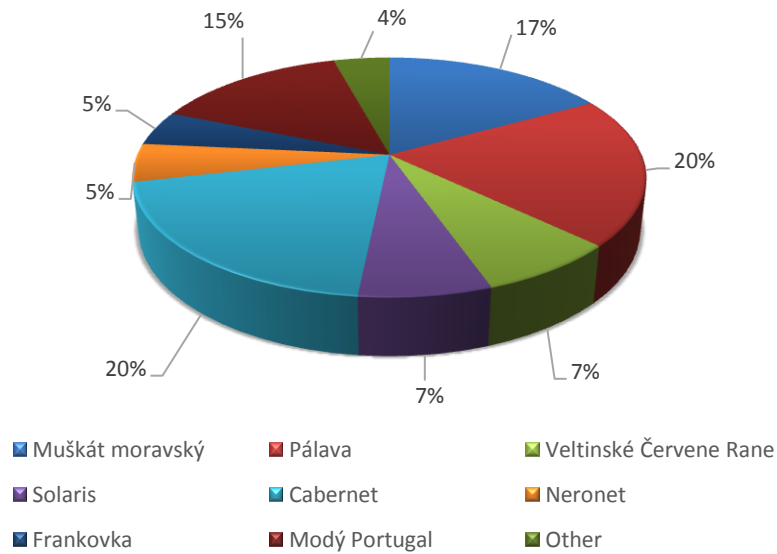
4.2.2 Evaluation of wine drinkers

The following analyses are focused on wine drinkers. The first graph (no.3) of this group shows the preferred type of wine.

Graph 3 - Evaluation of question: Which type of wine do you prefer?

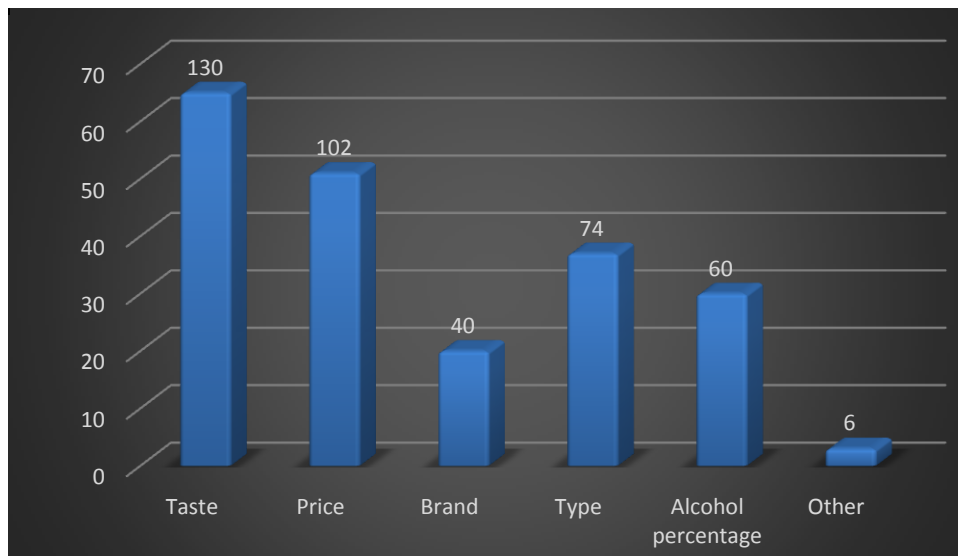


Graph 4 - Evaluation of question: Which foreign varieties do you prefer?



The following graph no.4 shows that most popular Czech red wine is Cabernet and white wine is Pálava.

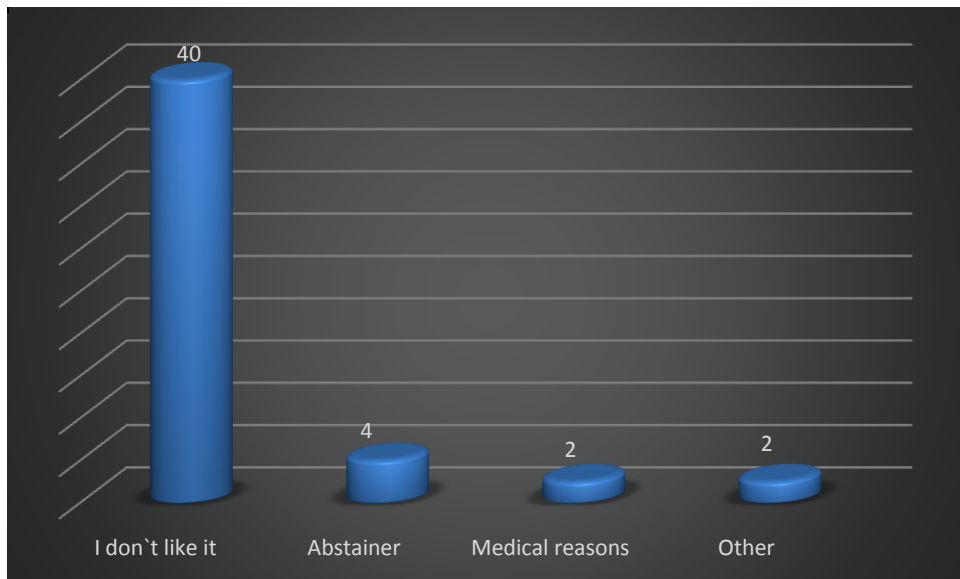
Graph 5 - Evaluation of question: What is the important criterion when purchasing wine?



4.2.3 Evaluation of wine non-drinkers

Only 21 percent of people do not drink wine. It is very important to know, why they do not. The wine consumption in the Czech Republic has been increasing. Next graph no.6 analyses this issue.

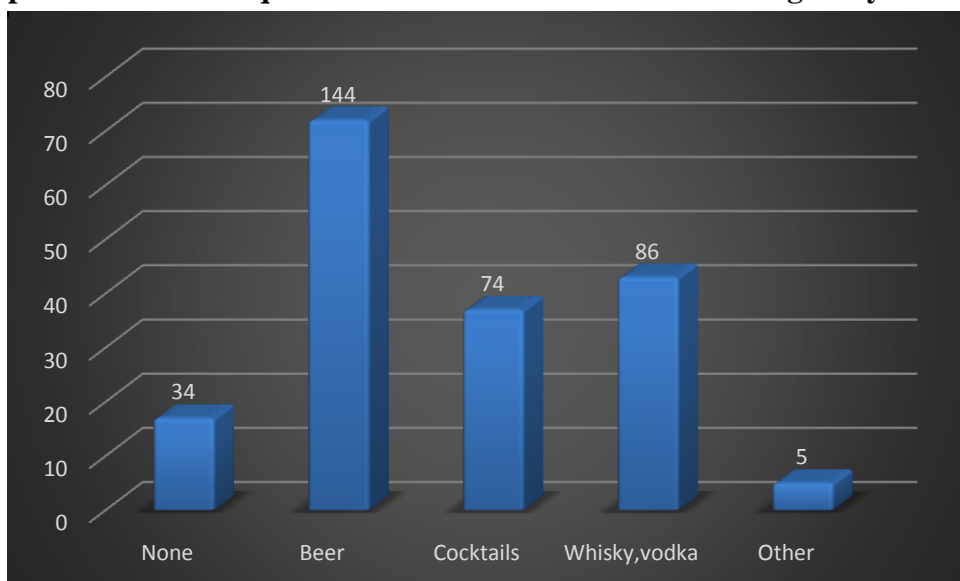
Graph 6 - Evaluation of question: Why do not you drink wine?



The respondents were able to choose more options. 40 of 48 people, that do not drink wine, state the reason “I don't like it”. 4 people are abstainers, 2 person mentioned “medical reasons”. 2 person mentioned that “some of alcoholic allergy”.

One could have a question “What to drink instead of wine?” The issuable question is analysed in the graph no.

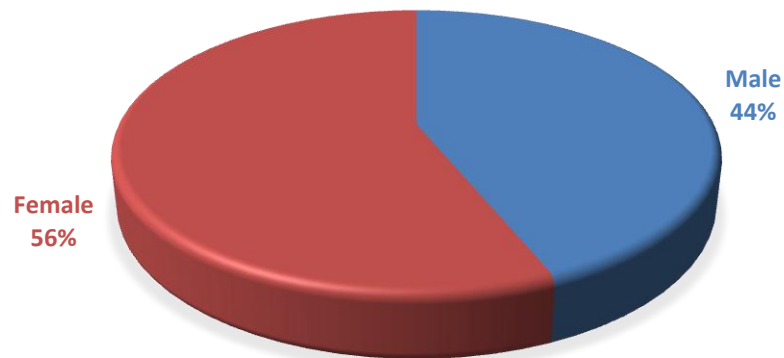
Graph 7 - Evaluation question: Which other alcoholic beverage do you drink?



4.2.4 Evaluation of identification questions

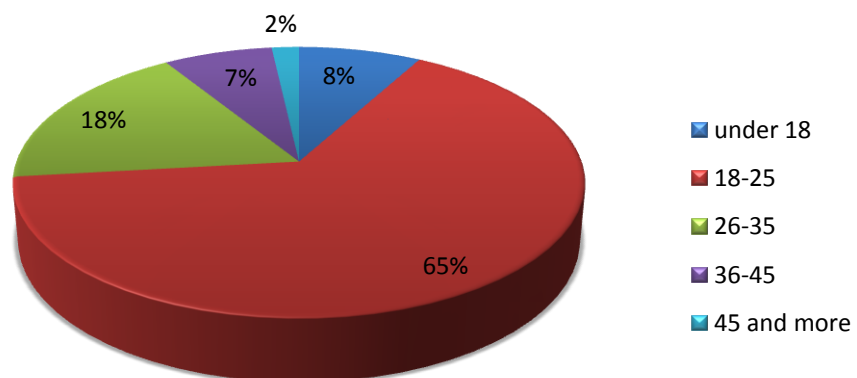
There were the identification questions situated at the end of the questionnaire. The first of them was related to the gender of respondents.

Graph 8 - Evaluation of question: What is your gender?



From the graph.8, we can see that our total respondents were 224 from which male 98 are whereas female are 126. The percentage of the gender is male 44% and female is 56%. There are 5 groups of age. Respondents were grouped into 5 brackets: under 18, 18-25, 26-35, 36-45, 45 and more.

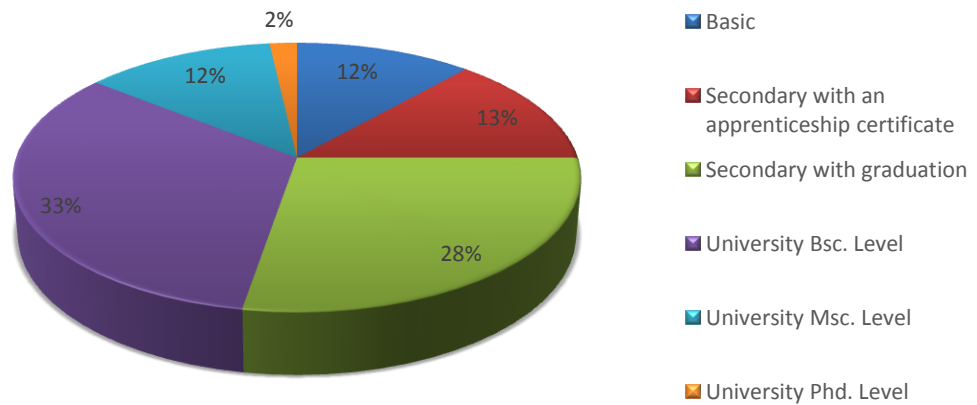
Graph 9 - Evaluation of question: What is your age?



The first second groups are represented by young people; many of them are still studying. The third group is represented by young people who are consider involved in

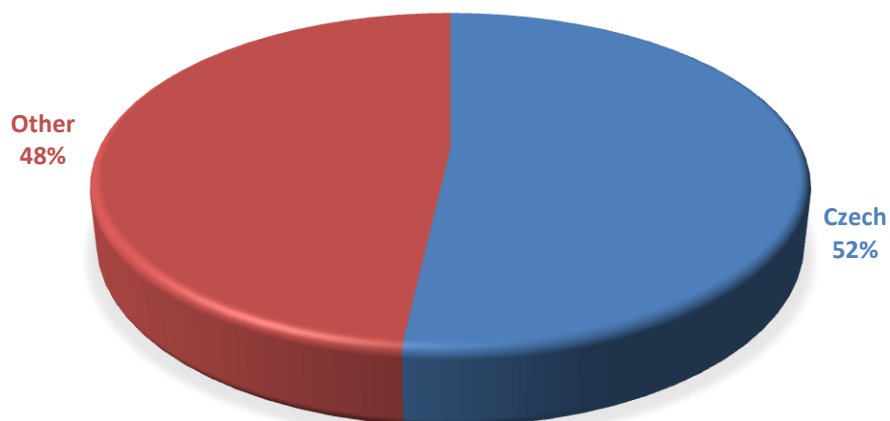
their careers. In last two groups are older people. A majority of respondents were young people with the age between 18 and 25 years.

Graph 10 - Evaluation of question: What is your highest reached education?



The strongest group is “Bachelors” representing 33 % of respondents. Only 2 percent of respondents have Doctorates.

Graph 11 - Evaluation of question: What is your nationality?



52 percent of respondents were Czechs. 108 respondents chose the answer “Other”. The most foreigners (3) came from Russia, Mongolia and Vietnam. Other countries were for example Kazakhstan, Nepali, Korea and Taiwan.

4.3 Statistical hypothesis testing

Statistical hypotheses are listed here:

H₀: It is expected, that there is no dependency between age and wine consumption

H₁: It is expected, that there is a dependency between age and wine consumption

H₀: It is expected, that there is no dependency between gender and wine consumption.

H₁: It is expected, that there is a dependency between gender and wine consumption.

H₀: It is expected, that there is no dependency between highest reached education and wine consumption.

H₁: It is expected, that there is a dependency between highest reached education and wine consumption

H₀: It is expected, that there is no dependency between free time activity and wine consumption.

H₁: It is expected, that there is a dependency between free time activity and wine consumption.

H₀: It is expected, that there is no dependency between economic activity and wine consumption

H₁: It is expected, that there is a dependency between economic activity and wine consumption

H₀: It is expected, that there is no dependency between gender and wine consumption of white varieties.

H₁: It is expected, that there is a dependency between gender and wine consumption of white varieties.

H₀: It is expected, that there is no dependency between gender and wine consumption of red varieties

H₁: It is expected, that there is a dependency between gender and wine consumption of red varieties

H₀: It is expected, that there is no dependency between gender and wine consumption of particular type

H₁: It is expected, that there is a dependency between gender and wine consumption of particular type

H₀: It is expected, that there is no dependency between nationality and wine consumption.

H₁: It is expected, that there is a dependency between nationality and wine consumption

H₀: It is expected, that there is no dependency between wine varieties of Czech and wine consumption.

H₁: It is expected, that there is a dependency between wine varieties of Czech and wine consumption

The hypotheses were tested using categorical data analysis. The level of significance was stated at $\alpha = 0.05$. Results are elaborated in form of association or contingency tables. For this purpose statistical software SAS enterprise guide 7.1 was used.

4.3.1 Analysis of dependency between age and wine consumption

H_0 : It is expected, that there is no dependency between age and wine consumption

H_1 : It is expected, that there is a dependency between age and wine consumption

Table 6 - Age group x wine consumption

Table of Age group by Wine consumption				
		Wine consumption		Total
		Yes	No	
Age group				
Under 18	Frequency	6	12	18
	Expected	13.821	4.1786	
18-25	Frequency	126	26	152
	Expected	116.71	35.286	
26 and more	Frequency	40	14	54
	Expected	41.464	12.536	
Total	Frequency	172	52	224

Source: (SAS, Output), own elaboration

Table 7 - Age group x wine consumption

Statistic	DF	Value	Prob
Chi-Square	2	22.4713	<.0001
Phi Coefficient		0.3167	
Cramer's V		0.328	

Source: (SAS, Output), own elaboration

According to our first hypothesis, the conditions of good approximation are met; chi-square test can be used. For the decision does rejection of H_0 two approaches can be used. In this case the calculated value of test criterion is compared to critical value $\chi^2 > \chi^2_{\alpha(2)}$, the null hypothesis is rejected. If $p\text{-value} > \alpha$, null hypothesis is accepted. Hence, we can reject this hypothesis. P-value is < 0.0001 , which is lower than α . H_0 can be rejected.

There is a dependency between age and wine consumption.

4.3.2 Analysis of dependency between gender and wine consumption

H_0 : It is expected, that there is no dependency between gender and wine consumption.

H_1 : It is expected, that there is a dependency between gender and wine consumption.

Table 8 - Association table: gender x wine consumption

		Wine consumption		Total
		Yes	No	
Gender				
Male	Frequency	76	22	98
	Expected	77	21	
Female	Frequency	100	26	126
	Expected	99	27	
Total	Frequency	176	48	224

Source: (SAS, Output), own elaboration

4.3.3 Analysis of dependency between reached education and wine consumption

H_0 : It is expected, that there is no dependency between highest reached education and wine consumption.

H_1 : It is expected, that there is a dependency between highest reached education and wine consumption

Table 9 - Contingency table: higher reached education x wine consumption

Highest reached education		Wine consumption		Total
		Yes	No	
Basic	Frequency	12	14	26
	Expected	19.732	6.2679	
Secondary with graduation	Frequency	58	4	62
	Expected	47.054	14.946	
Secondary with an apprenticeship certificate	Frequency	24	6	30
	Expected	22.768	7.2321	
Bachelor`s	Frequency	54	20	74
	Expected	56.161	17.839	
Master`s	Frequency	20	8	28
	Expected	21.5	6.75	
Doctorate	Frequency	2	2	4
	Expected	3.0357	0.9643	
Total	Frequency	170	54	224

Source: (SAS, Output), own elaboration

Table 10 – Statistics: higher reached education x wine consumption

Statistic	DF	Value	Prob
Chi-Square	5	25.5241	0.0001
Phi Coefficient		0.3376	

Source: (SAS, Output), own elaboration

In this case, relationship between highest reached education and wine consumption is significant. The null hypothesis is rejected. **There is dependency between highest reached education and wine consumption.**

4.3.4 Analysis of dependency between free time activity and wine consumption

H_0 : It is expected, that there is no dependency between free time activity and wine consumption.

H_1 : It is expected, that there is a dependency between free time activity and wine consumption.

Table 11 - Association table: free time activity x wine consumption

Table of Free time activity by wine consumption				
		Wine consumption		Total
Free time activity		Yes	No	
Passively	Frequency	28	12	40
	Expected	32.143	7.8571	
Both	Frequency	102	16	118
	Expected	94.821	23.179	
Activity	Frequency	50	16	66
	Expected	53.036	12.964	
Total		180	44	224

Source: (SAS, Output), own elaboration

Here, we can see from table no.14 that 40 wine consumers spend their time passively, 66 wine consumers are actively and 118 of wine consumer mentioned both. P- Value is lower than alpha. It means the null hypothesis is rejected. **There is dependency between free time activity and wine consumption.**

4.3.5 Analysis of dependency between economic activity and wine consumption

H_0 : It is expected, that there is no dependency between economic activity and wine consumption

H_1 : It is expected, that there is a dependency between economic activity and wine consumption.

Table 12 – Contingency table: economic activity x wine consumption

Table of Employment by Wine consumption				
		Wine consumption		Total
		Yes	No	
Employment				
Yes	Frequency	64	14	78
	Expected	61.286	16.714	
No	Frequency	112	34	146
	Expected	114.71	31.286	
Total	Frequency	176	48	224

Source: (SAS, Output), own elaboration

Table 13 - Statistics: economic activity x wine consumption

Statistic	DF	Value	Prob
Chi-Square	1	0.8607	0.3535
Phi Coefficient		0.0620	

Source: (SAS, Output), own elaboration

As seen from table no.15, number of drinking unemployed people is 146. There are 64 employed people, who drink wine. The null hypothesis is rejected. **There is dependency between economic activity and wine consumption.**

4.3.6 Analysis of dependency between gender and wine consumption of particular brand

H_0 : It is expected, that there is no dependency between gender and wine consumption of white varieties.

H_1 : It is expected, that there is a dependency between gender and wine consumption of white varieties.

Table 14 - Contingency table: gender x wine consumption of white varieties

Table of Gender by Preferences							
Gender		Preferences of Czech white wine varieties					Total
		Muškat moraský	Pálava	Veltinské	Solaris	Other	
Male	Frequency	14	26	14	4	8	66
	Expected	15	21	12	11.25	6.75	
Female	Frequency	26	30	18	26	10	110
	Expected	25	35	20	18.75	11.25	
Total	Frequency	40	56	32	30	18	176

Source: (SAS, Output), own elaboration

4.3.7 Analysis of dependency between gender and wine consumption of red varieties

H_0 : It is expected, that there is no dependency between gender and wine consumption of red varieties

H_1 : It is expected, that there is a dependency between gender and wine consumption of red varieties

Table 15 - Contingency table: gender x wine consumption of red varieties

Table of Gender by Preferences						
Gender		Preferences of Czech red wine varieties				Total
		Cabernet	Neronet	Modrý Portugal	Other	
Male	Frequency	26	10	24	4	64
	Expected	28.596	7.4894	21.106	6.8085	
Female	Frequency	58	12	38	16	124
	Expected	55.404	14.511	40.894	13.191	
Total	Frequency	84	22	62	20	188

Source: (SAS, Output), own elaboration

4.3.8 Analysis of dependency gender and wine consumption of particular type

H_0 : It is expected, that there is no dependency between gender and wine consumption of particular type

H_1 : It is expected, that there is a dependency between gender and wine consumption of particular type

Table 16 – Contingency table: gender x wine consumption

Table of Gender by Preferences					
		Preference of type of wine			Total
		Red	White	Rosé	
Gender					
Male	Frequency	48	34	16	98
	Expected	48.125	38.5	11.375	
Female	Frequency	62	54	10	126
	Expected	61.875	49.5	14.625	
Total	Frequency	110	88	26	224

Source: (SAS, Output), own elaboration

4.3.9 Analysis of dependency between wine varieties of Czech and wine consumption

H_0 : It is expected, that there is no dependency between wine varieties of Czech and wine consumption.

H_1 : It is expected, that there is a dependency between wine varieties of Czech and wine consumption

The conditions of good approximation are met and chi-square test can be used at the level of significance $\alpha=0.05$. 34 respondents drink Czech wine and 144 of them consume foreign brand of wine. P-Value is greater than alpha. The null hypothesis is accepted. **There is no dependency between wine varieties of Czech and wine consumption.**

Table 17 - Association table: wine consumption x wine consumption of foreign brand

Table of consumption of foreign varieties				
Consumption of foreign varieties		Wine consumption		
		Yes	No	Total
No	Frequency	34	14	48
	Expected	38.143	9.8571	
Yes	Frequency	144	32	176
	Expected	139.86	36.143	
Total	Frequency	178	46	224

Sources: (SAS, Output), own elaboration

Table 18 - Statistics: wine consumption x wine consumption of foreign brand

Statistic	DF	Value	Prob
Chi-Square	1	2.7888	0.0949
Phi Coefficient		0.1116	

Sources: (SAS, Output), own elaboration

4.3.10 Analysis of dependency between nationality and wine consumption

H_0 : It is expected, that there is no dependency between nationality and wine consumption.

H_1 : It is expected, that there is a dependency between nationality and wine consumption

Table 19– Association table: nationality x wine consumption

Table of Nationality by Wine consumption				
		Wine consumption		Total
		Yes	No	
Nationality				
Czech	Frequency	90	26	116
	Expected	93.214	22.786	
Other	Frequency	90	18	108
	Expected	86.786	21.214	
Total	Frequency	180	44	224

Source: (SAS, Output), own elaboration

Table 20 – Statistics: nationality x wine consumption

Statistic	DF	Value	Prob
Chi-Square	1	1.1703	0.2793
Phi Coefficient		-0.0723	

Source: (SAS, Output), own elaboration

P-value is greater than α . The null hypothesis is accepted. Wine consumption of Czechs is not statistically different than the consumption of foreigners. **There is no dependency between nationality and wine consumption**

Table 21 – Statistics: gender by categorized table

Gender by	DF	Value	Prob	H ₀
Wine consumption	1	0.1077	0.7427	Accepted
Wine consumption of white varieties	4	10.3907	0.0343	Rejected
Wine consumption of red varieties	3	3.9912	0.2624	Accepted
Wine consumption of particular type	2	4.2787	0.1177	Accepted

Source: (SAS, Output), own elaboration

From the table no.23 shows that relationship between gender and wine consumption is not significant. P-value is 0.7427 which means the level of significance α is lower. The null hypothesis is not rejected. **There is no dependency between age and wine consumption.**

We can see that relationship between gender and wine consumption of white varieties. P-value is lower than alpha. It means the null hypothesis is rejected. **There is dependency between gender and white wine consumption of white varieties.**

According to our hypothesis, relationship between gender and wine consumption of red varieties is not significant (0.2624) as $p > 0.05$. It means we accept

the null hypothesis. **There is no dependency between gender and wine consumption of red varieties.**

From the table below the relationship between gender and wine consumption of particular type is not significant. P-value is greater than α . The null hypothesis is accepted. **There is no dependency between sex and wine consumption of particular color.**

5 Conclusion

Educated consumers are the main reason why business has been succeeded through the entire history. The main of the statistic (thesis) to determine whether there was an influence in behavior of the consumers while they were drinking a wine. First and foremost, the research process started with a questionnaire survey with 224 respondents where 56.3 percent of total participants were females, on the other hand, 43.8 percent were males. The majority of respondents were from Czech Republic. Another significant part of this research project was to identify the factors which had an impact on people's wine consumption. The survey has shown that the most favored wine is Gabernet, where the most preferred white wine is Pálava. Indeed, based on taste and price, people selected one of the many diverse kinds of wine. Next, to test the hypothesis is another part of the project, therefore 10 of them were accepted where 4 of them were rejected for evaluation. To be more precise,

- There is a dependency between gender and wine consumption
- There is dependency between economic activity and wine consumption.
- There is dependency between gender and white wine consumption of white varieties.
- There is dependency between highest reached education and wine consumption.

From this data, it is important to mention about wine's specific commodity in which a consumer demands development based on moral characteristics, experience and attitude. Moreover, purchasers not only expect enjoyment from wine but also a certain improvement of self-confidence that may reach positive spirits, liaison of social contact and of course, the integration with social group. According to these results, gender plays a substantial role in world of wine consumption. By focusing on segments of consumers, there can be development in business market. Mostly females prefer wine rather than males, thus, in order to be beneficial for costumers, special loyalty card could be established for improvement of consumption.

6 Preferences

AGRESTI, Alan. *Categorical data analysis*. 2nd ed. Hoboken: John Wiley & Sons, c2002. Wiley series in probability and statistics. ISBN 0-471-36093-7.

Kotler, P., Armstrong, G.: *Principles of Marketing*, New Jersey: Pearson Prentice Hall, 2011, ISBN 0-471-29008-4.

KOTLER, Philip. a Kevin Lane KELLER. *Marketing management*. 14th [ed.]. Upper Saddle River, N.J.: Prentice Hall, c2012. ISBN 0132102927.

LLOYD, Chris J. *Statistical analysis of categorical data*. New York: Wiley, c1999. Wiley series in probability and statistics. ISBN 04712900

KARDES, Frank R. *Consumer behavior and managerial decision making*. Reading, Mass.: Addison-Wesley, c1999. ISBN 0321001990.

CHLÁDKOVÁ, Helena. *Situace na trhu vína v ČR: Situation on the Czech wine market : monografie*. Brno: Mendelova zemědělská a lesnická univerzita v Brně, 2006. Folia Universitatis Agriculturae et Silviculturae Mendelianae Brunensis. ISBN 8071579688.

CUNNINGHAM, William Hughes., Isabella C. M. CUNNINGHAM a Christopher M. SWIFT. *Marketing, a managerial approach*. 2nd ed. Cincinnati: South-Western Pub. Co., c1987. ISBN 0538191104.

Řezanková, H.: *Analýza dat z dotazníkových šetření. 3. Akt. Vydání*. Praha: Professional Publishing, 2010. ISBN 978-80-7431-019-5.

SVATOŠOVÁ, Libuše a Bohumil KÁBA. *Statistické metody II*. V Praze: Česká zemědělská univerzita, Provozně ekonomická fakulta, 2008. ISBN 9788021317369.

SOLOMON, Michael R. *Consumer Behavior: buying, having, and being*. 10th Edit. Harlow: Pearson Education, 2013. ISBN 978-0-273-76731-2.

7 Internet resources

AGRESTI, A. Analysis of ordinal categorical data: methods. 2nd ed. Hoboken, N.J: Wiley,2010. ISBN 04-700-8289-5. ©2016 [cited 03.01.2016]

[http://ebooks.narotama.ac.id/files/Marketing%20Management%20\(http://www.winemarketingpros.com/category/winery-marketing/\)](http://ebooks.narotama.ac.id/files/Marketing%20Management%20(http://www.winemarketingpros.com/category/winery-marketing/).). ©2016 [cited 03.01.2016]

http://gigpars.com/upload/fbua_marketing_management_p0-58.doc. ©2016 [cited 23.01.2016]

<http://socioline.ru/book/philip-kotler-kevin-lane-keller-marketing-management>. ©2016 [cited 03.01.2016]

<http://www.pearsonmiddleeastawe.com/pdfs/SAMPLE-marketing-management.pdf>. ©2016 [cited 03.01.2016]

<http://www.philipkotlermarketing.com> ©2016 [cited 13.07.2016]

<http://ebooks.narotama.ac.id/files/Marketing%20Management%20> ©2016 [cited 13.07.2016]

http://www.wineofczechrepublic.cz/files/ovine/vinarstvi_letak_EN.pdf. ©2016 [cited 20.10.2016]

<http://www.madehow.com/Volume-1/Wine.html#ixzz41juljK7d>). ©2016 [cited 15.11.2016]

<http://www.destination360.com/europe/czech-republic/wineries>. ©2016 [cited 16.11.2016]

<http://www.uzis.cz/en/cze-regions/regions/region-hl-m-praha>. ©2016 [cited 20.11.2016]

8 Appendix

Appendix1- Questionnaire

1. Do you drink wine?
 - Yes
 - No
2. Which wine do you like to drink?
 - White
 - Red
 - Rosé
3. Which Czech varieties do you prefer?
 - I Muškát moravský(White)
 - Pláva(White)
 - Veltlinské Červene Rane(White)
 - Solaris(White)
 - Cabernet Moravia(Red)
 - Neronet(Red)
 - Frankovka (Red)
 - Modrý Portugal (Red)
 - Other
4. Do you drink wine of foreign brand?
 - Yes
 - No
5. Which foreign varieties do you prefer?
 - Riestling(White)
 - Sauvignon blanc(White)
 - Malbec(Red)
 - Cabernet sauvignon(Red)
 - Other
6. What is your approximate net income (monthly)?(CZK)
 - Less than 5,000 CZK
 - Between 5,000 CZK to 10,000 CZK
 - Between 10,001 CZK to 20,000 CZK
 - 20,001 CZK and over
7. Please, indicate the price range(per 750 ml bottle of wine) that you typically buy in a wine/liquor store(not in a restaurant):
 - Under 200 CZK
 - Between 201 CZK and 300 CZK
 - Between 301 CZK and 400 CZK
 - 401 CZK and over
8. What is important criterion when purchasing wine?
 - Taste
 - Price
 - Varieties
 - Type

- Alcohol percentage
 - Other
9. Are you influenced by advertisement when purchasing wine?
- Yes
 - No
 - I don't know
10. Please, indicate the sources which you learn about wine?(Check all that apply)
- Newspapers
 - Wine blogs
 - Friends/relatives/gift
 - Attending wine tasting
 - Wine order staff
 - Restaurant staff
 - Other
11. Where do you buy wine most frequently?
- Wine/Liquor store
 - Grocery store
 - Drug store
 - Wine tasting room
 - Online
 - Other
12. Where do you consume wine most frequently?
- Restaurants
 - Lounge/Club/Bar
 - At home
 - Other
13. What is the main wine for you?
- Any
 - Beer, flavored beer, cider
 - Champagne
 - Martini
 - Spirit
14. Why do you prefer to drink wine?
- I like to drink
 - I like the taste
 - It helps me relax
 - For health reasons
 - It goes well with food
 - Other
15. How often do you drink wine?
- Daily
 - Almost daily
 - At least one a week
 - Several times a month
 - Less often

- I don't drink
16. How has your wine consumption changed in last 2 years?
- It has decreased
 - It has increased
 - It has stayed at the same level
17. If you do not drink wine, what is the reason? (opened question)
18. Which other alcoholic beverage do you drink?
- None
 - Beer
 - Cocktails
 - Whisky, vodka
 - Other
19. How do you mostly spend free time?(in percentages)
- Passively (for example reading)
 - More passive than active
 - Both
 - More active than passive
 - Actively (for example sport)
20. What is your gender?
- Male
 - Female
21. What is your age?
- Under 18
 - 18-25
 - 36-35
 - 36-45
 - 46 and over
22. What is your marital status?
- Single
 - Married
 - Divorced
23. What is your highest reached education?
- Basic
 - Secondary with an apprenticeship certificate
 - Secondary with graduation
 - Bachelor`s degree
 - Master`s degree
 - Doctorate degree
24. What is your current employment status?
- Employed
 - Self-employed
 - Unemployed
 - Student
 - Retired
 - Unable to work

25. What is your nationality?

- Czech
- Other

26. What is the population in your town?

- Villages(less than 2,000 inhabitants
- Town between 2,001 and 10,000 inhabitants
- Town between 10,001 and 500,00 inhabitants
- Town between 50,001 and 100,000 inhabitants
- Town more than 100,001 inhabitants