Czech University of Life Sciences Prague

Faculty of Economics and Management
Department of Statistics

Statistical analysis of beer consumption preferences

Diploma Thesis

Author: Kristýna Váňová

Supervisor: Ing. Tomáš Hlavsa, PhD.

! ! !

**Místo této strany vložíte zadání diplomové práce.
(Do jedné vazby originál a do druhé kopii)**

! ! !

Declaration

I hereby declare that I have written the diploma thesis "Statistical analysis of beer consumption preferences" independently with use of quoted resources in bibliography.

In Prague, on 29th March 2013   ---------------------------------------

Acknowledgement

Statistical analysis of beer consumption preferences

Statistická analýza preferencí ve spotřebě piva

Summary

The thesis is focused on statistical analysis of beer consumption preferences. The main aim is to identify possible factors influencing consumer behaviour. The theoretical part of the thesis describes the marketing research process. Specially, reference is made to the process' objectives, functions and steps. It also offers a description of beer, its ingredients, production and examines beer consumption in the Czech Republic. After the theoretical part, a questionnaire was complied. The statistical software IBM SPSS Statistics 20.00 was used for the evaluation of the survey. The aim of the survey is to evaluate possible factors which influence beer consumption. An important step, therefore, was testing predetermined hypotheses. The obtained data of the thesis could be useful for marketing and sales departments of companies active in the beer industry.

Key words: consumption, preference, marketing research, survey, beer, statistical analysis, hypothesis

Souhrn

Předmětem diplomové práce je statistická analýza spotřebitelského chování v souvislosti se spotřebou piva. Hlavním cílem práce je identifikovat možné faktory, které mohou ovlivňovat chování spotřebitele. Teoretická část práce popisuje proces marketingového výzkumu, zejména jeho cílů, funkcí a postupů. Představuje pivo jako produkt, jeho suroviny a výrobu a zhodnocuje spotřebu piva v České republice. Na základě poznatků z teoretické části byl sestaven vlastní dotazník. Pro zhodnocení výsledků průzkumu byl použit statistický software IBM SPSS Statistics 20.0. Cílem výzkumu je zhodnotit možné faktory, které ovlivňují spotřebu piva. Důležitým krokem bylo testování předem stanovených hypotéz. Získaná data z diplomové práce můžou být využita v marketingových a obchodních odděleních společností působících v oblasti pivovarnictví.

Klíčová slova: spotřeba, preference, marketingový výzkum, průzkum, pivo, statistická analýza, hypotéza

Table of content

1 Introduction

Recently companies face high competition in goods and services markets. To succeed and attract as many customers as possible, companies need to differentiate their products by identifying needs and preferences of the consumers. A reliable method to gather information about customers and markets is marketing research, which is an important part of business strategy.

Marketing research collects and monitors information about participants in specific markets. Companies become more understanding of their customers' needs, attitudes, and wishes. They are able to create marketing strategies to fulfil their organisational mission(s).

Beer is one of the most consumed alcoholic beverages in the Czech Republic. Beer is viewed as a symbol of the Czech culture with its history dating back to 11th century. Since then it has been an important element of the Czech economy. Regardless changes in its prices beer consumption remains more or less the same. Recently large well-established breweries face rising competition from small, local breweries, which tend to be more successful at identifying specific needs and preference of their customers. This phenomenon illustrates a globally recognised trend of increasing popularity of local products.

2   Objectives of thesis and methodology

2.1   Objectives

The main objective of thesis is to assess possible factors which affect consumer behaviour in relation to beer consumption.

The first partial objective is to characterize the marketing research process, specifically its functions and objectives. Consumer behaviour and the possible factors that influence it are also considered consumer.

The second partial objective is to characterize beer, its ingredients and also beer consumption in the Czech Republic.

The final objective is to create own questionnaire for marketing research. The aim of the questionnaire is not only to carry out statistical analysis of beer consumption preferences, but also beer consumption itself.

Within fulfilment of the objectives of the thesis will be tested the following predetermined hypotheses:

- H_0: Variables of gender and beer consumption are independent of each other.
- H_0: Variables of age and beer consumption are independent of each other.
- H_0: Variables of education and beer consumption are independent of each other.
- H_0: Variables of profession and beer consumption are independent of each other.

- H_0: Variables of gender and type of beer are independent of each other.
- H_0: Variables of gender and non-alcoholic beer are independent of each other.
- H_0: Variables of gender and place where is beer mostly drunk are independent of each other.
- H_0: Variables of gender and season are independent of each other.
- H_0: Variables of gender and period of in which beer is mostly drunk are independent of each other.

- H_0: Variables of age and monthly average spending are independent of each other.
- H_0: Variables of age and place are independent of each other.

- H_0: Variables of age and flavoured beer are independent of each other.
- H_0: Variables of age and advertisement are independent of each other.
- H_0: Variables of age and increasing of price are independent of each other.

- H_0: Variables of amount of beer consumption and lifestyle are independent of each other.
- H_0: Variables of amount of beer consumption and gender are independent of each other.
- H_0: Variables of amount of beer consumption and income are independent of each other.
- H_0: Variables of amount of beer consumption and development salary are independent of each other.

2.2   Methodology

During the thesis was drawn from sources listed in the bibliography. Data for the practical part of this thesis was obtained through a questionnaire survey, which was carried out on the 15th – 22nd of February 2013. 351 respondents took part in this survey. The responses (309) were gained electronically through form of Google Document and the remaining questionnaires (42) were distributed by paper form. The questionnaire was anonymous and contained 26 questions.

After obtaining required data for the survey, ensued an assessment of the questionnaire, it was used statistical software IBM SPSS Statistics 20.0.

2.2.1   Hypothesis Testing

In practice, it is often forced to make decisions about a population on the basis of sample information. Such procedures are called statistical decisions. Assumptions about populations are statistical hypotheses. The null hypothesis H_0 specifies the hypothetical value of the population parameter under investigation. It is assumed to be true until it is declare false. Any hypothesis which differs from a null hypothesis is called alternative hypothesis H_1.

The general form of the null and alternative hypothesis is:

$$H_0: G = G_0; H_1: G \neq G_0 \text{ (two-sided form)},$$

$$\text{or } H_1: G > G_0 \text{ or } H_1: G < G_0 \text{ (one-sided form). (Klímek, 2010)}$$

Formal steps of hypothesis testing

1) Stating the null and alternative hypothesis and the significance level alpha ($\alpha = 0.05$ or $\alpha = 0.01$)
2) Specifying the sampling distributions of the appropriate statistic, assuming the null hypothesis is true
3) Determining the rejection region
4) Calculating the value of the test statistic
5) Making a decision

Hypothesis testing may not always lead to correct decisions. A type I error occurs when a true null hypothesis is rejected (α – significance level). A Type II error occurs when a false null hypothesis is not rejected (beta). These two types of errors depend on each other – lowering α rises β and vice versa. (Klímek, 2010)

2.2.2 Analysis of categorical data

Categorical (qualitative) data are represented by discrete binary (dichotomous) or multiple category variables, which describe some duality feature like colour, sex, health, customer behaviour, education level, degree of satisfaction, voting preference, product choice etc. Categorical variables divided to ordinal or nominal character. In ordinal variables, levels of the variable can be reliably ordered by a single unique criterion tied to levels of the variable. Ordinal data can be user satisfaction with a product with levels dissatisfied, rather dissatisfied, rather satisfied or satisfied.

Data that were gained from filled-in questionnaires or experiments can be summarized into two or multi dimensional contingency tables. These tables contain absolute or relative counts describing frequencies across levels of two or more factors. Procedure leading to categorical data organized in contingency tables is called cross-tabulation. Association tables (2 x 2) represent a factor like a gender or if the person is i.e. smoker or non-smoker etc. (Adamec, 2010)

Contingency tables

Contingency tables display relationship between two or more categorical variables. In most of contingency tables, one variable (Y) is a response variable and the second one (X) is an explanatory variable. The contingency table is represented by rows and columns. The joint distribution between two categorical variables determines their relationship and also it determines the marginal and conditional distributions. (Agresti, 2002)

Contingency table is a rectangular array of order (m x p), which has mp cells. Where m denotes the number of rows which are equal to the number of categories of variable A and p represents the number of categories of variables of criterion B. (Agarwal, 2006)

The matrix notation of contingency table is shown below.

Table 1: Scheme of Contingency Table

Variable B Variable A	B_1	B_2	…	B_j	…	B_p	Total
A_1	O_{11}	O_{12}	…	O_{1j}	…	O_{1p}	R_1
A_2	O_{21}	O_{22}	…	O_{2j}	…	O_{2p}	R_2
⋮	⋮			⋮			⋮
A_i	O_{i1}	O_{i2}	…	O_{ij}	…	O_{ip}	R_i
⋮	⋮			⋮			⋮
A_m	O_{m1}	O_{m2}	…	O_{mj}	…	O_{mp}	R_m
Total	C_1	C_2	…	C_j	…	C_p	n

Source: Agarwal, 2006

The cell frequency O_{ij} in (i, j)th cell represents the number oh the factors of A_i and B_j. Any of the row total R_i and column total C_j is a marginal total where i=1, 2,…m; j=1, 2, …, p and n is the grand total. (Agarwal, 2006)

Testing independence in Contingency Tables

This test is used when we want to test the hypotheses, if one variable is independent to the other or not:

H_0: Two variables are independent of each other;

against H_1: Two variables are dependent of each other.

The dependence is tested by **Chi-square test**:

$$\chi^2 = \sum_{i=1}^{m}\sum_{j=1}^{p} \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \qquad (2.1)$$

Statistic χ^2 has (m-1)(p-1) degrees of freedom where E_{ij} is the expected frequency corresponding to (*i, j*)th cell of observed frequency O*ij*.

$$E_{ij} = \frac{Ri \times C_j}{n} \qquad (2.2)$$

To make a final decision about H_0, the calculated value of chi-square is compared to the table value of chi-square for (m-1) (p-1) and significance level α.

If $\chi^2_{cal} \geq \chi^2_{\alpha\,(m-1)(p-1)}$, H_0 is rejected. (Agarwal, 2006)

If the software program calculates *p*-value, it is possible to use this value to compare to significance level. (Hendl, 2009)

If *p*-value $\leq \alpha$., H_0 is rejected,

p-value $> \alpha$., H_0 is valid.

Chi-square test cannot be used automatically. Firstly it is needed to verify conditions of its acceptability.

Conditions:

    a) Max 20 % of expected frequencies is < 5

    b) No expected frequencies less than 1

    If this condition is not fulfil, the test might be used after merging weak groups

Measures of the Association in Contingency tables

Pearson's Contingency coefficient

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}} \qquad (2.3)$$

When C = 0, there is no relationship between two variables. This coefficient cannot exceed the value C = 1 but it may be less than 1.

Cramer coefficient V

Cramer coefficient V is also called Cramer's V.

$$V = \sqrt{\frac{\Phi^2}{k-1}} = \sqrt{\frac{\chi^2}{n(k-1)}} \; ; \qquad (2.4)$$

where k is the smaller number of rows or columns

Cramer's V is based on Chi-square statistic, so it is interpreted on the interval (0;1).

It has three intensities of dependence

- $0 \leq |V| \leq 0.3$ – weak dependence
- $0.3 < |V| \leq 0.8$ – moderate dependence
- $0.8 < |V| \leq 1$ – strong dependence

2 x 2 Contingency tables

When we want to see a dependence of two alternative variables (dichotomy and binominal), we assume the results into the association table. Association table (2 x 2 table) is a special case of contingency table where r = c = 2. (Klímek, 2010)

Table 2: Scheme of 2 x 2 Contingency Table

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

Source: Svatošová, 2009

Testing independence in 2x2 contingency tables

Fort testing of H$_0$ is possible to use two tests:

1) 1) χ^2 test
2) Fisher's exact test

But firstly it needs to be find out if all recommended criterions are fulfilled:

1) If $n > 40$, χ^2 test will be used.
2) If $n < 20$, Fisher's exact test will be used.

3) If $20 < n < 40$, the expected frequencies (a_0, b_0, c_0, d_0) must be calculated.

$$a_0 = \frac{(a+b)(a+c)}{n} \qquad (2.5)$$

$$b_0 = \frac{(a+b)(a+d)}{n} \qquad (2.6)$$

$$c_0 = \frac{(c+b)(a+c)}{n} \qquad (2.7)$$

$$d_0 = \frac{(c+d)(b+d)}{n} \qquad (2.8)$$

Chi-square test

$$\chi^2 = \frac{n(ad - bc)^2}{(a+b)(a+c)(b+d)(c+d)} \qquad (2.9)$$

The test criterion is compared to critical value with one degree of freedom and the specific significance level (in this thesis the significance level will be $\alpha = 0.05$). If the value of the test criteria is greater than critical value ($\chi^2 > \chi^2{}_{\alpha(1)}$), H_0 is rejected.

Fisher test

The Fisher test is used when the chi-square test is inappropriate. When using the Fisher test, first find the cell with the lowest value, this value is gradually decreases from one to zero while maintaining marginal frequencies. For each table is calculated the probability p_i by using factorials.

Agresti (2002) defined that Fisher test is used for small sample size. For each table is calculated probability p_i by using factorials.

$$p_i = \frac{(a+b)!(c+d)!(a+c)!(b+d)!}{n!a!b!c!d!} \qquad (2.10)$$

When $\sum p_i < \alpha$, H_0 is rejected.

13

Measures of the Association

Phi Coefficient

$$\Phi = \frac{ad - bc}{\sqrt{(a+b)(c+d)(a+c)(b+d)}} \; ; \; \Phi = \sqrt{\frac{\chi^2}{n}} \qquad (2.11)$$

When Phi = 0 there is no correlation, when Phi is 1 there is perfect correlation.

Chances and risks in 2x2 contingency tables

Relative Risk

Relative risk interprets a ratio of the probability of the event which occurs in the exposed or non-exposed group. If RR = 1 there is no association, if RR < 1 it is negative association, if RR > 1 it is positive association.

$$RR_1 = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a(c+d)}{c(a+b)} \qquad (2.12)$$

$$RR_2 = \frac{b(c+d)}{d(a+b)} \qquad (2.13)$$

This statistic is in the interval $(0; \infty)$. If the outcome of value is higher than 1, it is better to do the activity. It says: "How many times is higher probability of threats". (Řezanková, 2011)

Table 3: Relative Risk

Exposition	Threats	
	Yes	No
Yes	A	B
No	C	D

Source: Svatošová, 2008

Odds Ratio

The odds ratio estimates the probability of disease given exposure to a specific factor by measuring the probability of exposition given the presence of threats. Under assumption of independence between the variables, the odds ratio reaches 1. Negative relationship is produced if OR < 1.0, a positive relationship is if OR > 1.0. The OR are always non-negative with OR > 1.0 when a success is more likely than failure. (Agresti, 2002)

$$OR = \frac{ad}{bc} \qquad (2.14)$$

$$or \ OR = \frac{RR_1}{RR_2} \qquad (2.15)$$

where RR is relative risk.

Indicators which are mentioned above say "How many times is higher chance to threats?" The answer for the variation of the probability of the risk is represented by an attributive risk and a relative attributable risk. (Svatošová, 2009)

Attributive Risk

Attributable risk says "How much of the threats that occurs can be attributed to a certain exposition?"

$$AR = \frac{a}{a+b} - \frac{c}{c+d} \qquad (2.16)$$

AR is <-1;1>

Relative Attributive Risk

The proportion of threats incidence which can be attributed to a specific exposition among those who were exposed.

$$AF = \frac{\frac{a}{a+b} - \frac{c}{c+d}}{\frac{a}{a+b}} \times 100 \ (\%) \qquad (2.17)$$

3 Literature review

3.1 Marketing research

"Marketing research is a key element within the total field of marketing information. It links the consumer, customer and public to the marketer through information that is used to identify and define marketing opportunities and problems; to generate, refine and evaluate marketing actions; and to improve understanding of marketing as a process and of the ways in which specific marketing activities can be made more effective." (ICC/ESOMAR [online])

Marketing research is the planning for, collection, and analysis of data which are relevant to marketing decision making and the communication of the results of this analysis to management. (McDaniel, 1998)

Marketing research is the systematic and objective search for, and analysis of, information relevant to the identification and solution of any problem in the field of marketing. Marketing research attempts to provide information to allow executives to make decisions to solve marketing problems. Managers typically use marketing research to facilitate decision making. (Smith, 2005)

Marketing research is a discipline based on knowledge of many science fields such as mathematics, statistics, econometrics, psychology, sociology, informatics etc. The most new is the technical development as in information and communication systems and development of needs of marketing research which responds to the demands of theory and practice. (Příbová, 1996)

Kotler (1999) defines marketing research as the function that links the consumers, customers, and the public to the marketer through information. Information is used to identify and define marketing opportunities and problems; to generate, refine, and evaluate marketing actions; to monitor marketing performance; and to improve understanding of the marketing process. Also marketing research specifies the information that needed to address marketing issues, design the method for collecting information, manages and implements the data collecting process, analyse the results, and communicates the findings and their implications.

Kozel (2006) says that the characteristics of marketing research are the uniqueness, the ability of the high and timeliness of the gained information. On the other hand, the research is very expensive because it relies on the gaining of information, and requires qualified employees.

According to Kinnear and Taylor (1991) marketing research studies can be classified as being basic or applied in nature. Basic research seeks to extend the boundaries of knowledge regarding some aspect of the marketing system. In contrast, applied research studies and investigations are concerned with assisting managers to make better decisions. Basic research studies are less specific and broader in purpose, guided by marketing hypotheses and theory.

Few surveys found that marketing researchers engage in a wide variety of activities, ranging from analysis of sales and market shares to studies of social values and policies. The ten most common activities are: measurement of market potentials, market-share analysis, the determination of market characteristics, sales analysis, studies of business trends, short-range forecasting, marketing information system studies, and pricing studies. A lot of people think that marketing research is a lengthy, formal process carried out by large companies. But it is not true because marketing research is also used by many small business and non-profit organizations. (Kotler, 1999)

3.1.1 The History of Marketing Research

The history of marketing research dates back to the 19th century. The first empirical research of behaving and decision of electors in presidential elections was realized in 1984 in the United States and these facts are linked to beginnings of marketing research. Marketing research builds on the traditions of sociological research and public opinion research. (Foret, 2008)

The development of marketing research during the early part of the twentieth century parallels the rise of marketing concepts. After the World War II, the growth of marketing research significantly increased. By 1948, over 200 marketing research organisations were formed in the United States. Marketing research made major methodological advances between the years 1910 – 1920. During this period

questionnaire studies or surveys became popular modes of data collection. (Kinnear and Taylor, 1991)

3.1.2   Types of marketing research

In marketing arenas there are in existence a lot of types of marketing research. But the most used is qualitative research and quantitative research.

Qualitative research is generally used for exploratory purposes. It has a small number of respondents. The research can be done individually or in small groups (i.e., five to six people). Due to the small number of population, the statistical significance and confidence are not calculated. The qualitative researches are done by group interviews, depth interviews, and projective techniques. The focus is on developing hypotheses and "why" of past and future behaviour. (Kinnear and Taylor, 1991)

Part of qualitative research is the preparation hypothesis. The research should confirm or disprove these hypotheses. It may also happen that it is neither confirmer nor refuted. If this happens, we need to continue on the research. (Přibová, 1996)

Quantitative research is used to draw conclusions. It uses specific hypothesis. In this research are involved a large number of respondents (i.e., 100 and more). Few simple questions are answered by respondents in a brief time span. The focus is made through surveys and questionnaires. (Kinnear and Taylor, 1991)

3.1.3   The Marketing research process

According to Kotler (1999) marketing research is divided to four steps:
- Defining the problem and research objectives,
- Developing the research plan,
- Implementing the research plan,
- Interpreting and reporting the findings.

Defining the Problem and Research Objectives

Firstly, the marketing research has to define the problem carefully and agree on the research objectives. The researchers have to be experienced about the marketing research to help in the planning and to interpret research results. The most difficult step in the research process is to define the problem and research objectives.

Developing the Research Plan

The second step entails determining the information needed, developing a plan for gathering it efficiently, and presenting the plan to marketing management. This plan outlines sources of secondary data and spells out the specific research approaches, contact methods, sampling plans, and instruments that researchers will use to gather primary data.

Implementing the Research Plan

After developing the research plan, researchers put marketing research into action. The beginning of the implementation involves collecting, processing, and analysing the information. The collected data has to be analyzed and processed to isolate important information and findings. Data gained from the questionnaire is checked for accuracy and completeness, and coded for computer analysis.

Interpreting and Reporting the Findings

At the end of the process the researcher must interpret all findings, draw conclusions, and report the outcomes to the management. The most important phase of the marketing process is interpretation.

3.1.4   Data sources

In marketing research projects, two data sources are used: secondary and primary. The difference between these sources of data is for which purpose the data was collected.

Primary data

Primary data consists of information which is collected for a specific purpose. Primary data is the data gathered by researcher. Primary data sources must be collected to supplement the secondary data.

Secondary data

Secondary data provides a good starting point for research and helps to define problems and objectives of research. Secondary sources cannot provide all required information hence the need to collect primary data. Secondary data is generally available free or for a small fee. Secondary data sources are divided into two groups: *internal* and *external* sources. (Kotler, 1999)

3.1.5 Techniques of collecting data

The basic methods of collecting primary data are: observation, survey and experiment.

Observation

Observation is a process of recognizing and recording the behaviour of people, objects, and events. It involves the recording of the respondents' behaviour. (Kinnear and Taylor, 1991)

In marketing researches are used five observations:

(1) Natural or contrived observation

- natural observation involves observing behaviour as it takes place normally in the environment x contrived observation involves creating an artificial environment

(2) Disguised or undisguised observation

- disguised refers to whether or not the respondents are aware they are being observed.

(3) Structured or unstructured observation

- structured observation is appropriate when the decision problem has been clearly defined and the specification of information needs permits a clear identification of the behaviour patterns to be observed and measured. Unstructured is appropriate in situations in which the decision problem has yet to be formulated

(4) Direct or indirect observation

- direct observation refers to observing behaviour as it actually occurs. Indirect observation refers to observing some record of past behaviour

(5) Human or mechanical observation

- the human observer is replaced with some form of mechanical observer. The major mechanical devices used in observation include the motion picture camera, audiometer, psycho galvanometer, eye camera and pupil meter.

(Kinnear and Taylor, 1991)

Survey

The main aim of a survey is to ask questions of its respondents. From their answers, the person of research project gains primary data. According to factors such as available resources contact, the questionnaire survey can be carried out by personal, telephone or mail interview. (Přibová, 2006)

Personal interview

Personal interviews are face to face interviews. Their principal advantage, is that they gain direct feedback between interviewer and interviewee. This interview can take from few minutes to several hours and can be done individually or in the groups. Sometimes respondents get a small payment. (Kotler, 1999)

Přibová (2006) identifies these interview methods:

Electronic interviews are a newer technique of collecting data using computers. This technique has advantage in that it is very fast, cheap and accelerates data processing.

Telephone interview

Telephone interviews are similar to personal interviews but without personal contact. The interviewer should be very professional and experienced. This method is the best for gaining information very quickly, and is more flexible than using mail questionnaires.

Mail interview

The main advantages of mail interviews are large amounts of information, cheap, respondents tend to be more open than in other methods and therefore provide more honest answers. On the other hand, they are inflexible and these surveys take longer to complete and the rate of completed questionnaires is really low. (Kotler, 1999)

Experiment

During the experiment testing is used in which observed and estimated behaviour and relations in artificially pre-determined conditions. There are two types of experiments: In-Hall Tests and In-Home test. In the In-Hall test respondents are invited to the places which are set up for the experiment. The difference between In-Home test is that people do not know that they are part of the experiment. (Kozel, 2006)

Table 4: Strengths and Weaknesses of four contact methods

	Mail	Telephone	Personal	Internet
Flexibility	Poor	Good	Excellent	Fair
Quantity of data	Good	Fair	Excellent	Good
Control of interview effects	Excellent	Fair	Poor	Excellent
Control of sample	Fair	Excellent	Fair	Fair
Speed of data collection	Poor	Excellent	Good	Excellent
Response rate	Poor	Good	Good	Poor
Cost	Good	Fair	Poor	Excellent

Source: Kotler, 1999

3.2 Questionnaire survey

According to Kinnear and Taylor (1991) a questionnaire is a formalised schedule for collecting data from respondents. The function of the questionnaire is that of measurement. The main of questionnaire is to measure past behaviour, attitudes, and respondent characteristics.

"*Consequently, a skilled researcher is needed to design the questionnaire such that the questions asked measure what they are supposed to measure*". (Kinnear and Taylor, pg. 337)

The questionnaire has to be interesting in relation to its graphic design at first sight. The introduction should explain to the respondent the aim of the research and the importance of his/her answers, emphasise the sense of provided information and convince the respondent to fill the questionnaire in. Also the questionnaire has to statement term until which it should be fill in and assure the respondent that the questionnaire is anonymous. The questions in the questionnaire should be in the order. At the beginning should be interesting questions, in the middle the important questions related to the problem of the research, at the end we should mention minor questions. (Foret, 2008)

Using questionnaires to collect data is a relatively quick way of gathering such information, with relatively good response rates at low monetary cost. This can be said

generally about most formats of surveys (online and paper-and-pencil questionnaires). Another important issue is that questionnaires preserve confidentiality. (Strathclyde University [online])

A questionnaire usually has five sections: (Kinnear and Taylor and Taylor, 1991)

1) Identification data
   - Gender, age, status of respondent (profession), rarely is used name, address, contact details etc.

2) Request for cooperation
   - Here is used the statement designed to enlist the respondent's help regarding the interview.

3) Instructions
   - Instructions and comments refer to respondents how to use and fill in the questionnaire.

4) Information sought
   - forms the major portion of the questionnaire

5) Classification data
   - these data are provided directly by the respondent, in the case of mail and electronic interview

Types of questions

Kinnear and Taylor and Taylor (1991) state 3 types of question in the questionnaire

1) Open-ended questions

   An open-ended question enable to respondents to answer in their own words. The respondent has a time to think and to be creative. Open-ended questions are mostly used in the preparatory phase of the research, especially in qualitative research and are most appropriate for explanatory research. In the questionnaire they are used as contact questions.

2) Multiple-choice questions

   Multiple-choice questions are provided in the questionnaire and the respondent only marks the answer. The respondents sometimes may be asked to choose

one, two or more answers. These questions may save a time and cost associated with data processing.

3) <u>Dichotomous question</u>

Dichotomous questions are close-ended questions. Dichotomous question is a form of the multiple choice questions. These questions are closed-end questions. Respondents can respond only with two alternatives (i.e.; yes or no, agree or disagree etc.).

Open-ended questions often reveal more than close-ended questions because respondents are not limited in their answers. Open-ended questions are mostly used in explanatory research in which the researcher is trying to find out what people think but not measuring how many people think in a certain way. On the other hand, closed-end questions provide answers that are easier to interpret and tabulate. (Kotler, 1999)

The researcher should use simple, direct, unbiased wording. The questions should be presented before they are used. Care should also be used in ordering of questions. The first questions should create interest. Difficult or personal questions should be asked late because the respondent does not tend to become so defensive. Questions should be arranged in the logical order. (Kotler, 1999)

Principles of the creation of questionnaires

According to Přibová (1996) the creation of questionnaire is divided into several stages.

1. List of information about the survey

   On the list is the information which will be asked in the survey

2. Choosing a technique of questioning

   We can ask respondents by personal contact, writing, telephone or electronic interview.

3. Specification of focus groups and their selection

   It should be asked to whom we will be asking the questions?

4. Questions construction

   When the questions are made it is necessary to confirm which function the question will have.

5. Questionnaire construction

Every questionnaire must have logical structure, must be dynamic and should not be overly long.

6. Pre-testing / Piloting

The purpose of the piloting is to check that the design of the questionnaire works in practice. We should identify and amend problematic questions and refine the questionnaire.

3.3 Model of consumer behaviour

In earlier times, marketers could understand consumers well through the daily experience of selling to them. But as firms and markets have grown in size, many marketing decision makers have lost direct contact with their customers. Most marketers therefore have to turn to consumer research. Modern marketers typically spend significant time and money on studying consumers and trying to learn more about consumer behaviour.

The company that best understands how consumers will respond to various product features, prices, and advertising appeals has a great advantage over its competitors.

A person's buying behaviour is the result of the complex interplay of cultural, social, personal, and psychological factors. Many of these factors cannot be controlled by marketers, but they are useful in identifying and understanding the consumers that marketers are trying to influence. (Kotler, 1999)

3.3.1. Factors influencing consumer behaviour

Consumer purchases are strongly influenced by cultural, social, personal and psychological factors. These factors are shown in the figure 1 below.

Figure 1: Factors influencing consumer behaviour
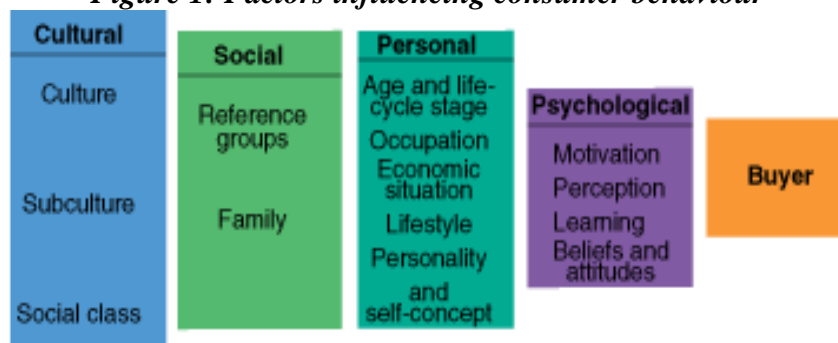
Source: Kotler, 1999

Cultural factors are represented by the values, ideas and attitudes which are accepted by some group and are passed to other generations. These factors have the broadest and deepest influence on consumer behaviour and person's wants. It includes basic values, perceptions, preferences, and behaviours that a person learns from family and other important institutions. The marketers should understand the roles played by the buyer's culture, subculture, and social class and focusing their marketing programmes on the special needs of certain groups.

Social factors – a consumer's behaviour is influenced by small groups, family and social roles and status. The product and brand choices are strongly affected by reference groups such as family, friends, social organisation and professional associations. Companies have to take these factors into account when designing their marketing strategies because these factors can strongly affect consumer responses.

Personal factors are associated with the consumer's personal characteristics such as age, life-cycle stage, occupation, economic situation, life style and self-perception.

Psychological factors express that the choosing of products depends on four psychological factors - motivation, perception, learning, beliefs and attitudes. (Hes, 2008; Kotler, 1999)

Factors

Hes (2008) has characterized consumer factors according to:

Price

Most consumers choose products according to price. In recent years, customers emphasize other factors such as quality of product, time spent shopping, freshness of products etc.

Origin country

Origin country is very important factor in the case of food which influences buyer's choice. For instance in the Czech Republic a lot of customers prefer local foods to imported foods.

Brand

Most of consumers during the buying process are orientated towards specific brands and prefer products of specific producers.

Personal experience

A customer prefer product which knows and has a good experience with it. On the other hand, consumer always chooses the same products and does not try different products.

Package

Consumers decide according to the package at the first sight. The package should attract consumers, provide information, ingredients, quality of the product.

Recommendation

The recommendation by friend can influences customers more than the promotions or advertisements.

Promotion

Customers when they are buying products they are very influenced by promotions of this product, advertisement on television, radio, newspapers or social networks.

Health aspect

Health aspect is also very important for consumer buying decision.

Season

The purchasing decision is also influenced by season. Consumers buy some goods more in winter or summer season. In winter are there is greater demand for products with higher fat and energy contents. In summer is a large demand for soft drinks and cold alcoholic drinks, fruit and vegetables and frosted products. (Hes, 2008)

These factors stated above are non-economic factors, exclude price. It must be recognized that economic factors influence consumer decision which are related to the spending power of individuals.

The consumer market buys goods and services for personal consumption. Consumers vary in age, income, education, tastes and other factors. So marketers must understand how consumers transform marketing and other inputs into buying responses. (Kotler, 1999)

3.4 Beer

Beer is an alcoholic beverage made from malted cereal grain (barley), is flavoured with hops and brew by slow fermentation. Beer is the most consumed alcohol beverage in the world and also it is the third most consummated drink after tea and water.

In the Czech Republic beer is typically a light alcoholic beverage which was made by fermentation saccharine solution that was boiled with hops or hops product. Beer is fermented with selected brewer's yeast at specific temperatures and times for the main fermentation and lying of beer. As a source of sugar it is used a starch which is contained in the barley malt. (Chládek, 2007)

3.4.1 The history of beer

Beer is one of the oldest drinks made by humans. During its history it was only dark, muddy drink which has very different from most beer produced today. Beer is as old as civilization, perhaps it is even older than bread. Beer should be known more than ten thousand years ago. The evidence says that the first roots of beer were in Mesopotamia as early as 4000 BC. The first beer that was made as a mass-market product was the American Budweiser that was launched in 1876. (Jackson, 1998)

3.4.2 Ingredients of Beer

Beer is typically made from malted grains, water, hops, and yeast.

3.4.2.1 Grains

A lot of beers are made entirely from grains that have been malted. Because malt provides natural enzymes that are needed in fermentation, it always accounts for at least 60 per cent of the grain. Even in wheat beers, malted barley usually accounts for at least 40 per cent of the grain. The barley imparts a softness and cleanness, and its husks form a natural filter in the brew house. Wheat imparts a quenching fruitiness and can contribute to a good head on the beer. Malted or rolled oatmeal, often used in stouts,

makes for silky smoothness. Rye, usually malted adds a spicy tastiness. Cooked rice lightens the beer, as corn (maize) that can be typically found in cheap beers**. (Jackson, 1998)

3.4.2.2   Hops

The hop is a climbing plant, most closely related to cannabis, and both are members of the botanical order that includes the nettle, mulberry, and elm. Hop shoots were known to the ancients as a salad and are still served in this way in growing regions. The part used to aromatize and flavour beer is the resin cone. Hops may be the plant referred to in relation to "strong drink" in the Jewish Talmud, but firm evidence of their use in beer is much later. The first undisputed reference is from the Benedictine Sister Hildegarde in Germany. The hop was to become the dominant flavouring in beer. (Jackson, 1998)

3.4.2.3   Additional flavourings

In the days when makers of drinks did not have the technical knowledge to achieve clean aromas and tastes, they used flavourings to cover defects. Long after techniques improved, the flavourings remained as part of the balance of some drinks. This is true of beers (whether the flavouring is the hop, or the other ingredients).

The Mesopotamians, the earliest known brewers, used "sweet" materials in their beers, but did not record which. Some experts feel this referred simply sweetness of malt, but others believe hone, dates, or figs may have been added. This would have been a very early precedent for today's fruit beers. (Jackson, 1998)

3.4.2.4   Water and yeast

Grain takes far smaller amounts of water from the soil, so the brewer has to provide some assistance. He or she runs water through the malted and milled grains in order to make a solution of their fermentable sugars. This solution is then boiled with hops, and sometimes other flavourings, and fermented by the addition of yeast. It could be argued that neither water nor yeast is an ingredient of beer. Water is a medium; east is an agent of fermentation, yet each has its own influence on the character of the finished product. (Jackson, 1998)

3.5 Making Beer

Brewing is an agricultural industry. Whether the brewing takes place in a farmhouse or what appears to be a factory, malted grains are made into an infusion or decoction, boiled with hops, and fermented.

3.5.1 The mash

At its simplest, the malted grains are ground in a mill, then put into vessel with warm water. The grains soak and infuse in the water for an hour or two hours. Then the false bottom of the vessel is opened so that the infusion can run through a filter-like base.
As with most stages of beer-making, this process, called mashing, can be varied in many ways to achieve different characteristics in the finished product. These variations are often decided in advance, according to the type of beer being made that day, but they may also be fine tuned by brewer on the day if the mash is not developing quite as planned. Despite everyone's best efforts, there might be slight variations in the character of the malt, and the weather may be influencing the water temperature. (Jackson, 1998)

3.5.2 Times and temperatures

The chief variables throughout beer-making are times and temperatures. And the different regimes of mashing are the good example of that. Lower temperatures release sugars that are fermentable, higher ones liberate unfermentable sugars, making for more body in the beer but less alcohol. Temperatures can be increased, often in several steps, by adding more hot water or by using a vessel with a heated jacket.
 A more complex system, often used by traditionalist lager brewers in the Czech Republic and Germany. Involves moving proportions of the mash to a second vessel, boiling them, then blending them back. This is known as a decoction: single, double or, triple, depending upon how many times it is performed. Decoction-mashed lagers often have a malt character that is especially aromatic, rich and soft. (Jackson, 1998)

3.5.3 The brew

The simplest brew house layout has two principal vessels. The first one is the mash ton which made the infusion of grains. The second one is the brew kettle where the infusion of grains is boiled with the hops.

The act of brewing takes about 90 minutes, but some breweries can do it in an hour and some strong beers can demand several hours. The main function of the boil is to introduce into the sweet worth the aromas and flavours of the hops. Boil also sterilizes the brew, killing any unwanted microorganisms in the worth. Most brew kettles are heated by steam coils, but some sit over gas or oil burners.

In the large breweries the hops are also often added by hand. Because the hop is a condiment, it is used in small amounts. Very small variations in the quantities of hops affect the aroma, flavour and bitterness of the beer. (Jackson, 1998)

3.5.4   The art of hopping

Some beers are made with only one addition of hops, but most have more. Brewers especially in Germany, sometimes refer to these additions as "gifts", the hops are given to the beer as thought they were "present". A lot of master brewers love hops and they would like to use more hops for beer but they are afraid of making their beers too assertive for the consumers. Hops do not contribute alcohol to the beer, but they do make for aromas and flavours. Varieties of hop intended to impact dryness or bitterness are added early in the boil. When the brewing is completed, the hop leaves and protein sediment may be removed by centrifugal force. Another method is to run the brewed wort through a strainer. Some brewers add more hops to form a bed in the strainer, causing more aromatic hop oils to be added to the filtering wort. (Jackson, 1998)

3.5.5   Fermentation and maturation

All beer is fully brewed. The ads are really referring to fermentation or maturation. Fermentation takes only three or four days, the most it is one week. On the other hand these days more time is given many lager beers in Germany and the Czech Republic. The have two weeks fermentation and several months maturation. The oldest techniques of fermentation and maturation use wooden vessels, and some traditionalist brewers still prefer open fermenters to closed ones. Top fermenting beers develop more of their characteristic fruity flavours in such vessels. Even those brewers who use closed vessels sometimes admit that a good flavour can be purged and maturation can be uneven if their vessels are built too tall. (Jackson, 1998)

3.6 Types of beer

There are countless different types of beer in the world which are characterised both by their differences but also by similarities. For example beer brewed in the "Czech Pilsner" style or lager beer is made all over the world. Broadly, however, beer can be divided into the categories below.

Top fermented beer:

- Ale (pale/mild/bitter/old ale/brown ale/barley wine/IPA)
- Porter Stout (dry/sweet/milk/oatmeal/imperial)
- Altbier, Kölsch Special (trappist/abbey/red/bieres de Garde/seasonal beer/Flemish brown)
- Wheat beers (blanche/weizen/weisse)

Bottom-fermented beers

- Lager beers (Pilsner/ortmunder/Malt/Liquor)
- Vienna, Märzen/Oktoberfestbier, Munich, dunkel, bock, dopple bock, smoke beer, dark beer

Spontaneously fermented beers

- Lambiek, gauze, faro, kriek

Types of beer in the Czech Republic

- Light beers with (7.99 $^\circ$)
- Draft beers (8 – 10.99 $^\circ$)
- Lager beers (11 – 12.99 $^\circ$)
- Special beers (over 13 $^\circ$)

The strength of beer represents the extract in the original hopped.

There are also more categories of beers for specific groups of people (drivers, diabetics, etc.).

- Beer with low alcohol (up to 1.2 % of alcohol)
- Non-alcoholic beer (up to 0.5 % of alcohol)
- Beer with low sugar – contains 7.5 grams of carbohydrates and 4 grams of proteins in one litre
- Yeast beer – it is a filtered beer with added yeast

- Non-filtered beer – a lager beer from a tank, not pasteurized nor filtered

- Herbal beer – made with added herbs or woods

- Wheat beer – contains more than 1/3 wheat malt extract

(Chládek, 2007)

3.7   Current situation of beer industry in the Czech Republic

Since the year 2009 beer industry in the Czech Republic is affected by economic-financial crisis. This crisis really influenced overall demand and brought some changes in the consumer behaviour. The consumption of beer also was influenced by excise duty which was placed on beer by government.

Regarding the Czech market for the first time in history, the proportion of bottled beer sold is higher than that in barrels. Steadily the share of barrelled beer is decreasing due to consumption of beer in restaurants, pubs and hotel's environment. Slightly but steadily is increasing consumption of canned beer.

On the other hand, while production of beer is decreasing the offer of beer types and brands is still increasing. In the Czech market there are about 450 brands in total. This trend is projected to continue in future years.

The expected future trends in the beer industry are that the economic-financial crisis will ease and the negative impact on consumers will diminish. With economic growth the beer consumption will also gradually increases partly due to the number of foreign visitors to the Czech Republic. (CSPAS [online])

3.8   Beer consumption in the Czech Republic

The Czech Republic is typically categorized as the biggest consumer of the beer in the world. According to the latest data of Czech Statistical Office (ČSÚ) the consumption of beer in the year 2009 was 150.7 litres per capita. The consumption of beer in the Czech Republic is recorded since 1948. In this year the consumption was on the absolute minimum (76.2 l per capita). On the other hand, the maximum was reached by the year 2005 when Czech inhabitant drank an average 163.5 litres of beer. Since the year 1971 the volume of 160 litres of beer per capita was reached 13 times. However

from the year 2009 until nowadays the consumption of beer is slightly decreasing. (CZSO [online])

Beer in the Czech society and the choice of beer among Czech consumers in 2012

In September 2012 the Public Opinion Research Centre (CVVM) which is supported by The Academy of Sciences of the Czech Republic. CVVM asked 1036 respondents some questions about beer which the organisation has been asking since 2004. The research project "Pub and Beer in Czech society" mapped basic results about the consumption of beer in the Czech Republic from the year 2004 to 2012, the status of non-alcoholic beer, attitudes towards the fact of the highest beer per capita consumption in the Czech Republic, expectations of the future of Czech beer and beer brewing industry, the preferences of particular beer brands, other preferences and the role of aspects like taste and price in case of choice. (CVVM [online])

From the research it was found out that the proportion of people who drink beer represents 90 % of men and 57 % of women in average. This means nine out of ten men in average in the focused period.

Graph 1: Beer consumption in the Czech Republic between the years 2004 - 2012

Source: CVVM, 2012

34
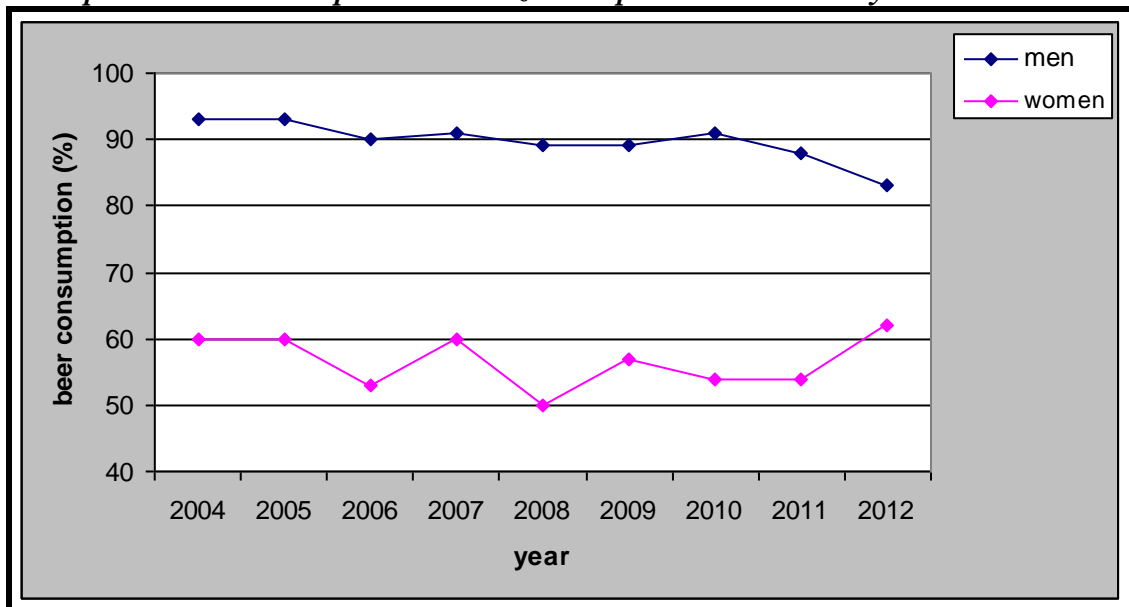
4   Own survey

4.1   Statistical Analysis of data and its assessment

The questionnaire used for the analysis of beer consumption preferences was created according to the rules of questionnaire survey. At the top of the questionnaire was a statement detailing what purposes the questionnaire will be used for. The questionnaire was anonymous. The survey was carried out in the period between 15th and 22nd February 2013.

The questionnaire was designed for respondents living, studying or working in the area of the capital city of Prague. It was compiled using the knowledge gained from the literature sources and under the supervision of the supervisor. The questionnaire was created using Google Docs application and was distributed to respondents by email and social media platforms.

At the beginning of the questionnaire easy-to-answer questions were placed. The first question had to divide respondents into two groups - consumers of beer and non-consumers of beer. According to this division, subsequently the respondents answered the next questions. At the end of the questionnaire there were demographic questions identifying sex, age, profession, highest achieved education and salary of the respondents. The questionnaire comprises of a mix of single choice, multiple choice and/or text boxes questions.

Data obtained by questionnaires through online application Google Docs were recorded in a prepared database and arranged into data matrix. The columns represented the questions and in the rows respondents' answers were recorded. Subsequently it was verified whether all required values and information were complete. In case they were not, the questionnaires were eliminated from the survey. Before processing the data, the data were recoded. Obtained data was analyzed using software IBM SPSS Statistics 20.0.

4.2 The socio-demographic characteristics of sample size

According to the identification questions at the end of the questionnaire, respondents were divided into specific groups or categories.

4.2.1 The structure of the respondents by gender

184 men (52.42 %) and 167 women (47.58 %) participated in the questionnaire survey. The pie chart below shows the near equal proportion of the respondents.

Graph 2: Structure of respondents by gender
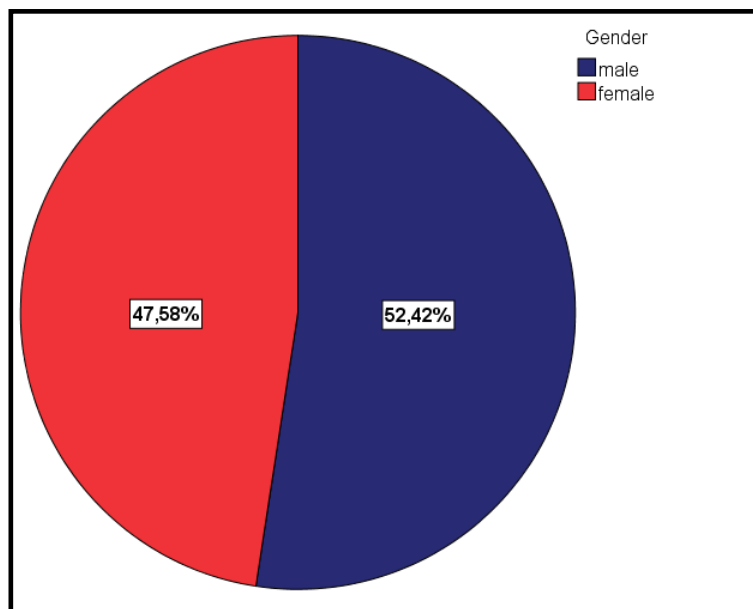
Source: Own research, 2013

4.2.2 The structure of the respondents by age group

The next characteristic of the respondents is the age that men and women filled in the questionnaire by number. After collecting all data the age was divided into four age groups to ascertain a better representation of the sample size. The table shows that the age group 27 – 40 years (40.47 %) was that most represented in the survey. Over one third of the respondents were represented by the age group 18 – 26 years. The group aged 41- 59 years were 16.24 % of respondents. The smallest percentage of the respondents was in the age group over 60 years. Slightly over two thirds are consisted of represents of the first two age groups from 18 – 40 years

Table 5: Age structure of respondents

Age group	Frequency	Relative frequency (%)	Cumulative relative Frequency (%)
18 – 26 years	121	34,47	34,47
26 – 40 years	143	40,74	75,21
41 - 59 years	57	16,24	91,45
over 60 years	30	8,55	100,00
Total	351	100,00	

Source: Own research, 2013

4.2.3 The structure of the respondents by highest achieved education

The following pie chart shows the distribution of the respondents by the highest achieved education.

Graph 3: Structure of respondents by highest achieved education
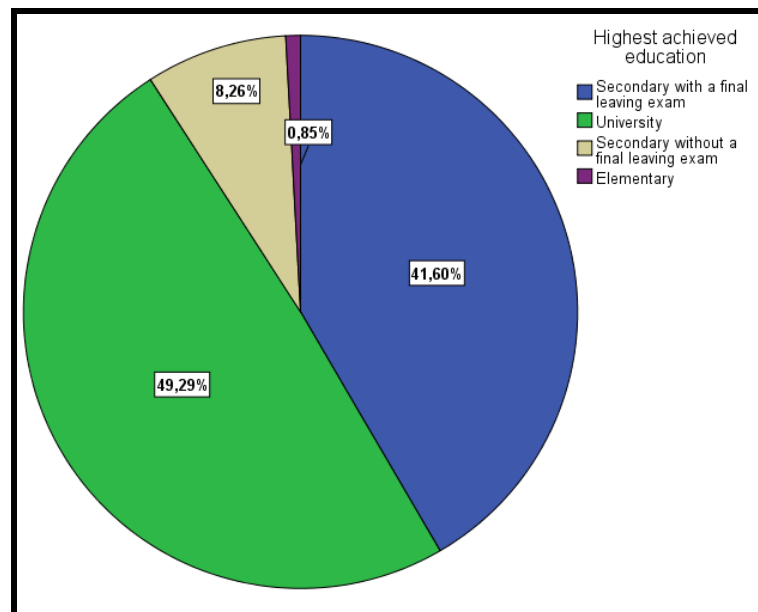
Source: Own research, 2013

Table 6: Structure of respondents by highest achieved education

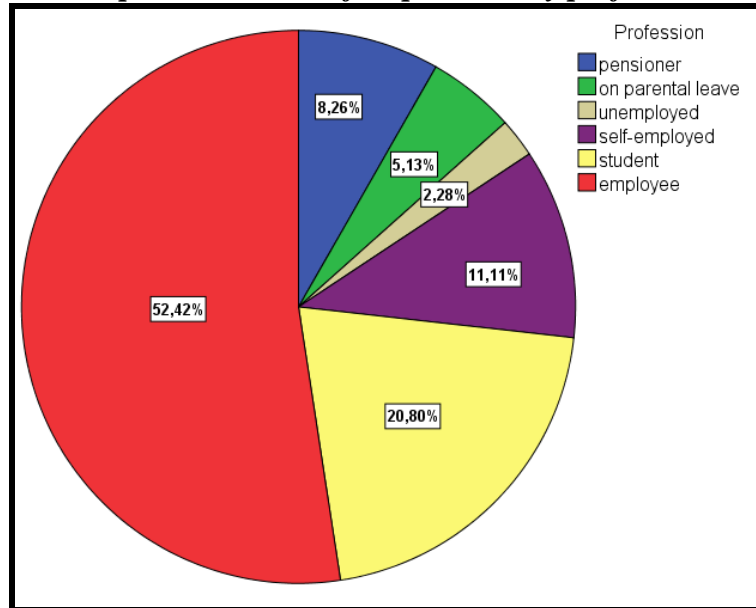| Highest Achieved Education	Frequency	Relative frequency (%)	Cumulative relative Frequency (%)
University	173	49.29	49.29
Secondary school with a final leave exam	146	41.60	90.88
Secondary school without a final leave exam	29	8.26	99.15
Elementary	3	0.85	100,00
Total	351	100.00	

Source: Own research, 2013

It is evident that all levels of education were represented. The biggest proportion of respondents represent respondents with university degrees (49.29 %). The second highest group of respondents was with 146 respondents (41.6 %) of secondary school with a final leaving exam. Less than 9 % was represented by secondary school without a final leaving exam. Only 3 persons (0.85 %) were with elementary education.

4.2.4 The structure of the respondents by profession

The highest proportion among the participants of the survey, 52.42 % were in the employment of firms. The second biggest group comprised students (20.8 %). The self-employed respondents were 11.11 %. Over 8 % of pensioners were participated in the questionnaire survey. The smallest proportions among professions of the respondents belong to the group of unemployed with only 2.28 % and on parental leave (5.13 %).

Graph 4: Structure of respondents by profession

Profession
- pensioner
- on parental leave
- unemployed
- self-employed
- student
- employee

8,26%
5,13%
2,28%
11,11%
52,42%
20,80%
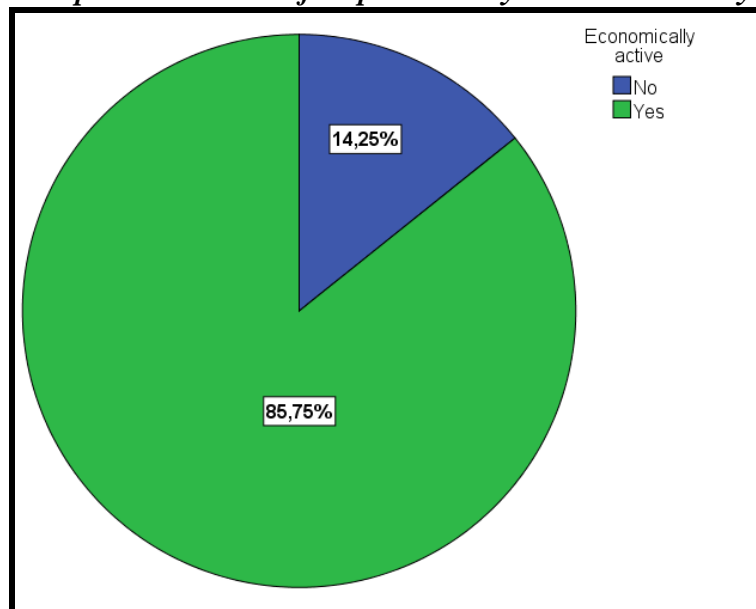
Source: Own research, 2013

4.2.5 The structure of the respondents by economic activity

From the total number of respondents which took part in the questionnaire survey 85.75 % of them were economically active while 14.25 % were inactive.

Graph 5: Structure of respondents by economic activity


Economically active
- No
- Yes

14,25%
85,75%

Source: Own research, 2013

4.2.6   The structure of the respondents by gross monthly salary

The highest percentage of economic active respondents (35.35 %) represented group with gross monthly salary 10,000 – 25,000 CZK. 30.56 % of respondent earned between 25,001 – 45,000 CZK per month. Over 18 % of respondent represent group with gross monthly salary – up to 10,000 CZK. In the group of salary over 45,001 CZK were 15.61 % of the respondents.

Graph 6: Structure of respondents by gross monthly salary
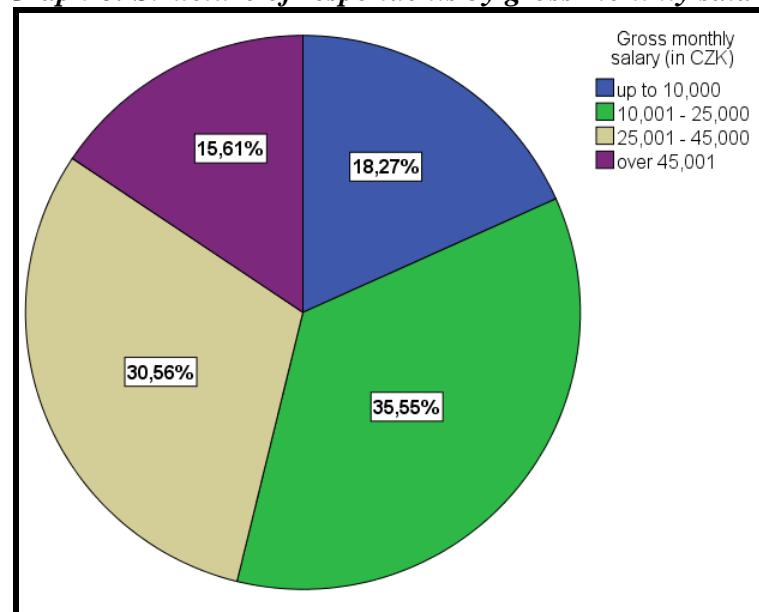
Source: Own research, 2013

4.3   Analysis of respondent's answers

The first question of the questionnaire survey had to divide the respondents into two groups – people who drink beer and people who do not drink beer. According to the respondent's first answer (option yes – no), subsequently the respondent answered other questions which were created for the selected group. The analysis was done according to the respondent's first answer. Also it was evaluated which factor influences the most non-beer activity (it will be shown in evaluation of question No. 2)

4.3.1   Evaluation of question No. 1 – Do you drink beer?

From the total amount of the respondents the significant majority drink beer. 313 (89.17 %) respondents answered that they drink beer and only 38 (10.83 %) responded the question with the option "no".

40

Graph 7: Structure of consumers of beer
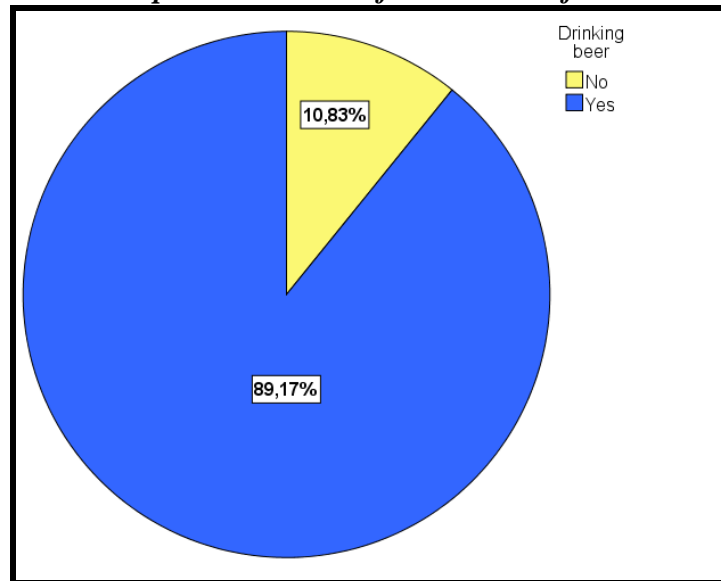
Source: Own research, 2013

Table 7: Consuming beer according to gender

Gender	Drinking beer				Total	Total Relative freq. (%)
	Yes	Relative frequency(%)	No	Rel. freq. (%)		
Male	176	95.65	8	4.35	184	100.00
Female	137	82.04	30	17.96	167	100.00
Total	313	89.17	38	10.83	351	100.00

Source: Own research, 2013

The evaluation of the outcomes according to gender from the total number of the respondents is as follows: 176 men (95.65 %) and 137 women (82.04 %) are consumers of beer while 30 women (17.96 %) and 8 men (4 %) are non-consumers of beer.

4.3.2 Evaluation of question No. 2 – Why don't you drink beer?

If the respondent answered the first question negatively it was found out what is the main determinant of their choice. From 38 non-consumers of beer simply 26 (68.42 %) of them answered that they do not like beer (the taste of beer). 7 respondents (18.42 %) do not drink alcoholic beverages at all. For five persons (13.16 %) health problems were the main reason of not consuming beer. Afterwards, the respondent continued on the questionnaire survey by question No. 20 due to non-beer activity.

Table 8: Reasons of not consuming beer

Reasons	Frequency	Relative frequency (%)	Cumulative relative Frequency (%)
I do not like it	26	68.42	68.42
I do not drink alcohol beverages at all	7	18.42	86.84
Health Problems	29	13.16	100.00
Other	0	0.00	100,00
Total	351	100.00	

Source: Own research, 2013

Further analysis is related to the respondents who drink beer. The questions are focused on preferred type of beer, beer packaging, the most important factors when buying beer etc. Further it is mentioned where and when the respondents mostly consume beer, their average monthly spend on beer, the drinking non-alcoholic beer and the influence of the advertisement and preferred criterions when buying beer.

4.3.3   Evaluation of question No. 3 – Why do you drink beer?

The main aim of question No. 3 was evaluated what is the main reason that respondent consume (drink) beer. Almost 90 % of respondents drink beer because they simply do like the taste of it. The other (6.71 %) prefer to drink beer due to cheaper price compare to non-alcoholic drinks (especially in the restaurant environment). The rest of the respondents (5 %) like drinking beer while they are having a good/heavy meal and the other believed that beer is good for their health.

Table 9: Reasons of consuming beer

Reasons	Frequency	Relative frequency (%)	Cumulative relative Frequency (%)
I like beer	276	88.18	88.18
Is cheaper than non-alcoholic drinks	21	6.71	94.89
Other	16	5.11	100,00
Total	351	100.00	

Source: Own research, 2013

4.3.4 Evaluation of question No. 4 – Where do you drink beer most often?

According to survey was found out that 77 % of respondents prefer to drink beer mostly in the restaurants, pubs or bars. Drinking beer at home is the most favorite for 18.5 % of the respondents. The rest of participants (4.5 %) prefer to drink beer while they are at sport matches or social events.

4.3.5 Evaluation of question No. 5 – When do you drink beer most often?

In the questionnaire survey the significant majority (66 %) of respondents responded that prefer to drink beer mostly when they are out with their friends. The second biggest activity while the people like drinking beer is to drink it during a meal (preferred by 18 % of respondents). Almost 6 % of the respondents prefer to have a beer after sport activity. 10 % of respondents enjoy to drink beer for no special reasons. This last choice of question was only chosen by men.

4.3.6 Evaluation of question No. 6 – Which type of beer do you prefer?

From the total amount of the respondents who drink beer (313), over two thirds (77.64 %) preferred light beers. The second mostly preferred type of beer is dark beer which was preferred by 10.54 % of the respondents. The mix of light and dark beer is a favourite drink for 7 % of the respondents. Other types of beer which respondents could choose by their own answer are represented mostly by flavoured beers (3 %).

Graph 8: Preferred types of beer
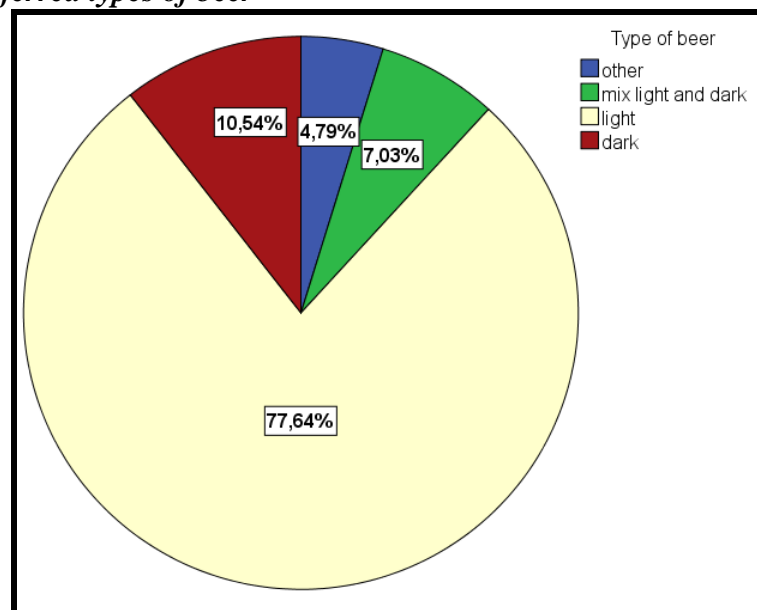
Source: Own research, 201

Figure 2: Preferred type of beer according to gender
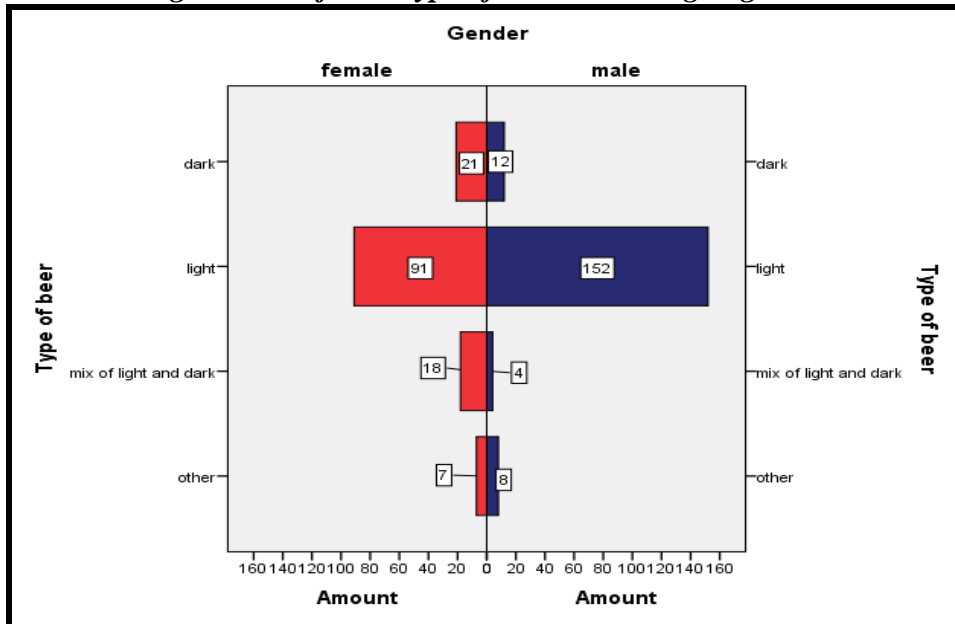
4.3.7   Evaluation of question No. 7 – What beer packaging do you prefer?

Respondents could choose up to three favourite beer packaging. Mostly they ticked only one or two options. The pie chart below shows that respondents prefer draught beers. Draught beer from tank (37.28 %) is the most preferred beer packaging of the respondents. The second preferred beer packaging is draught from barrel (34.81 %). Also bottled beer is one of the most favoured packaging options with a rating of 20.14 %. Canned and PET beer bottle got less than 8 %. These responses are in correspondence to question No. 4 because 77 % of respondents said they most prefer to drink beer in the restaurant and catering facilities, 18.5 % at home which is similar to percentage of bottled beer packaging.

Graph 9: Preferred packaging of beer
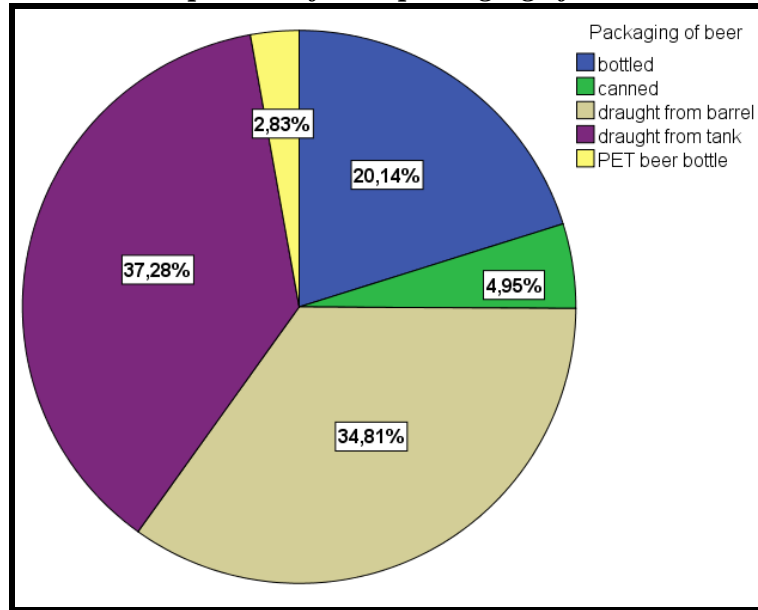
Source: Own research, 2013

4.3.8 Evaluation of question No. 8 – In which season do you drink beer the most?

The next question should find out in which season the consumers prefer to drink the most litres of beer. For 47 % of the respondents the season is not important and 51 % drink beer mostly in the spring or summer. On the other hand, over one percent of the respondents prefer to drink beer in autumn or winter time.

Graph 10: Preferred season of consuming beer

Source: Own research, 2013

45
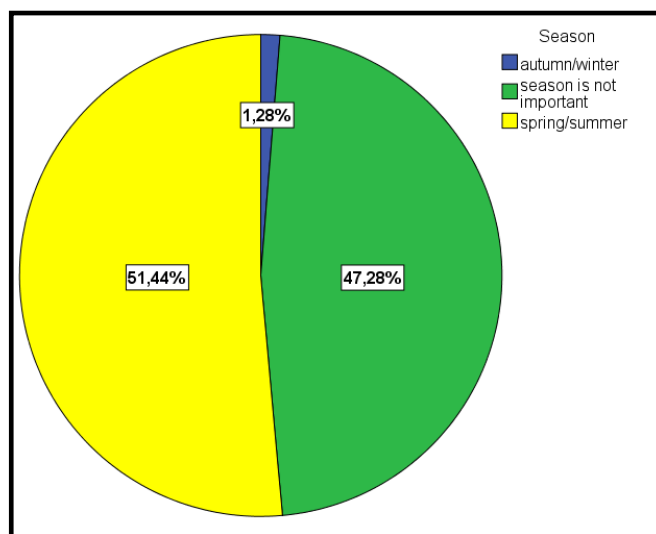
The amount of the respondents according to gender is shown in the table below. From the table is clear that 62 % of women drink beer in spring/summer and the rest of women responded that the season is not important for their beer consumption. Men consumers confirmed the fact that the season for their consumption is not important and drink beer equally during year. 55 % of them drink beer equally in different seasons. However 43.2 % of male respondents prefer to consume beer in spring or summer time. The period of autumn/season was excluded for testing hypotheses in next chapter, because this option chose only four respondents (men) and any women.

Table 10: Season of consuming beer according to gender

Season	Gender		Total
	male	female	
Spring/summer	76	96	172
is not important	85	52	137
Total	161	148	309

Source: Own research, 2013

4.3.9 Evaluation of question No. 9 – Do you choose beer by a brand?

Respondents were asked if they choose beer by a brand. They could choose only one answer. It was devised that consumers tend to choose by preferred brand when buying beer. The current situation can described as follows: almost half of men (46.59 %) and over half of women (51.09 %) choose mostly beer by brand. Always and almost always buying beer by brand prefer over a quarter of women (27 %) and 4 out of ten males consumers. One man and two women out of ten do mostly not choose beer according to brand. Only around 2 % of men and women do not choose beer by brand never or almost never. For the majority of respondents (82.7 %) the brand is very important factor when choosing beer. The results of survey are similar to the research which was done by CVVM where 77 % of their survey choosing beer by brand. It is proved if consumer drink beer very often, he/she chooses beer by brand more often.

Graph 11: Choosing beer by brand according to gender
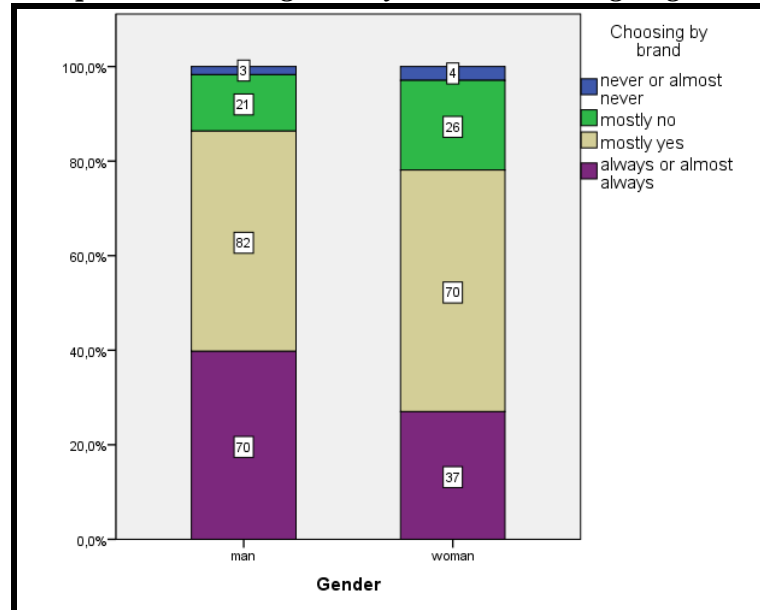
Source: Own research, 2013

4.3.10 Evaluation of question No. 10 – Are you influenced by advertisement when buying a specific brand of beer?

The question number 10 had to analyze if respondents are influenced by advertisements or promotions when choosing preferred brand of beer. The assessment says that consumers of any age group are not influenced by advertisement of the specific brand. The proportion in the three age groups (18 – 59 years) is around 7.5 %. The oldest age group (over 60 years) is influenced only by 4.5 %. From the results is evident that consumers are not influenced by brand and they choose beer mostly by their preferred brand and taste without any advertisement etc.

Table 11: Influence of advertisement according to age

Age group	Influence of advertisement		Total
	Yes	**No**	
18 - 26 years	8	98	106
27 – 40 years	10	124	134
41 – 59 years	4	47	51
Over 60 years	1	21	22
Total	23	290	313

Source: Own research, 2013

4.3.11 Evaluation of question No. 11 – What is important to you when buying beer?

In this question respondents chose important criterions when purchasing beer. By every selected criteria (price, taste, brand, advertisement, strength) respondents chose one of the option (yes – no). For all participants (100 %) of survey the taste of beer is very important criterion. Brand of beer is also important but not important as the taste of beer. However brand is important for three out of four consumers of this survey. Respondents also choose beer by the strength. Option "yes" was chosen by 62 % of the respondents. The aspect of advertisement is very low – only 4.47 % of respondents rated the advertisement as an important criterion. Price is important criterion by 33 % of the respondents. From the survey is evident that consumers prefer taste of beer to price of beer.

If these results compare to results of the research which was done by The Public Opinion Research Centre (CVVM) in September 2012, it is evident that aspect of price is very similar. In this thesis 100 % respondents chose this criterion and 97 % of respondents which took part in the survey by CVVM. The difference between other aspects of the results by diploma thesis compare to CVVM may differ due to higher sample size and the different financial abilities.

4.3.12 Evaluation of question No. 12 – Have you tasted any Czech flavoured beer yet?

This question had to find out if consumers like trying new products. The question asked respondents if they tasted any Czech flavoured beer yet. It was given the examples of flavoured beer for better orientation (e.g., Staropramen Cool Lemon/Grep, Frisco etc.). From the age groups 18 – 26 years and 27 – 40 years significant majority tasted that kind of beer. The proportions of these groups were around 90 %. In the age group 41 – 59 years two out of three respondents have tried the flavoured beer while only 14 % of respondents over 60 years. This means that younger generation like to experiment and try new and innovative products while the older generation tends to choose recognised and established products.

4.3.13 Evaluation of question No. 13 - Estimate your monthly beer consumption in litres

The next question asked respondents to estimate their monthly beer consumption in litres. They filled in their estimated value by number to the questionnaire. The average monthly beer consumption of the respondents is 12.39 litres of beer which represents the annual average consumption of 148.73 litres per capita. Beer consumption of men compare to women is much higher. Women consume 5.33 litres of beer per month while men consume 17.88 litres. Average annual beer consumption of women is 63.94 litres and for men is 214.53 litres per year. According to the Czech Statistical Office the last data collection on beer consumption is from the year 2008 when the consumption was over 150 litres per year and since that time the consumption is slightly decreasing. It is evident that annual beer consumption of the respondents is similar to the data produced by the Czech Statistical Office.

4.3.14 Evaluation of question No. 14 - If the price of beer increases by 10 %, will your beer consumption decrease?

It was also inquired if the respondent's beer consumption decreases due to increasing price by 10 %. 210 respondents (67 %) answered that their consumption will not change. For only 7 % of the respondents the increasing of price would reduce their consumption. The rest of the respondents (26 %) do not know yet, if the price of beer would influence their beer consumption. These responses should be really optimistic for local breweries in a time of prevailing financial-economic crisis.

Graph 12: Decrease of consumption according to gender
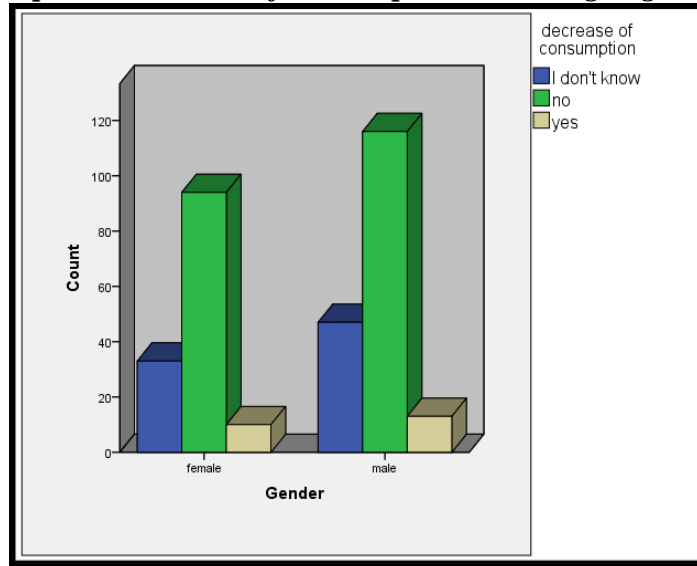
Source: Own research, 2013

4.3.15 Evaluation of question No. 15 - Do you sometimes drink non-alcoholic beer?

The outcomes from the following graph show that most respondents occasionally drink non-alcoholic beer. From the total amount of the respondents, over half (56.55 %) consume non-alcoholic beer. 114 men (64.77 %) and 63 women (45.99 %) are consumers of non-alcoholic beer. In total proportion of gender it means that more men drink non-alcoholic beer compared to women – less than half of female respondents are consumers of non-alcoholic beer. The results of the survey are not surprising, because according to several surveys non-alcoholic beer is a favourite non-alcoholic beverage by a lot of beer consumers.

Graph 13: Consumption of non-alcoholic beer according to gender
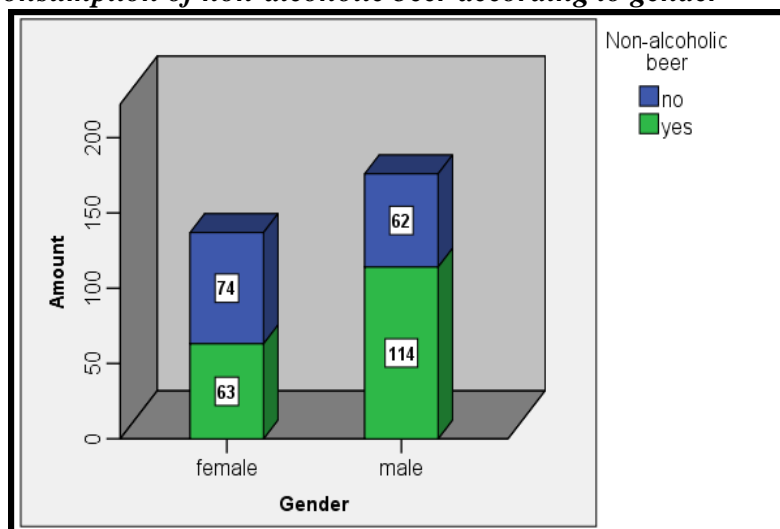
Source: Own research, 2013

Table 12: Consumption of non-alcoholic beer according to gender

Gender	Consumption of non-alcoholic beer				Total	Total Relative freq. (%)
	Yes	Relative frequency(%)	No	Rel. freq. (%)		
Male	114	64.77	62	35.23	176	100.00
Female	63	45.99	74	54.01	137	100.00
Total	177	56.55	136	43.55	313	100.00

Source: Own research, 2013

4.3.16 Evaluation of question No. 16 - Why do you drink non-alcoholic beer?

The following question was related to the previous question and analysed the reasons why respondents mostly drink non-alcoholic beer. The outcomes from the following table show that respondents prefer non-alcoholic beer mostly in the situation when they cannot drink alcoholic beer, e.g. driving a car. This option was chosen by 80.7 % of male and 55.6 % of female respondents. For 71.75 % of respondents the reason of consuming non-alcoholic beer is driving. 29 respondents (16.38 %) consume non-alcoholic beer due to taste of the beer and for 11.86 % of them is non-alcoholic beer substitute of ordinary beer.

Table 13: Reasons of consumption of non-alcoholic beer according to gender

Reason of consumption	Gender		Total
	Male	Female	
Driving car	92	35	127
Substitute	10	11	21
Taste	12	17	29
Total	114	63	177

Source: Own research, 2013

4.3.17 Evaluation of question No. 17 - If you can't drink beer, e.g. when driving a car, at work, etc., what would you prefer?

The outcomes from the following graph show that respondents prefer non-alcoholic beer in the situation when they cannot drink beer, e.g. driving a car, at work etc. Over half of respondents (57 %) prefer non-alcoholic beer to other non-alcoholic drinks. In this situation 67 % of men will drink non-alcoholic beer as a substitute of an ordinary beer. On the other hand, over one half of women (54 %) would prefer other non-alcoholic drinks. These answers can be interpreted as quite positive for beer industry.

4.3.18 Evaluation of question No. 18 - How much money do you spend for a beer per month in average?

It was also found out how much money consumers spend on beer per month. From the histogram chart is clear that over one half of the respondents spend for beer less than 400 CZK. More than one quarter spend between 401 – 1,000 CZK. Over 1,001 CZK is spent by 11 % of respondents which are mainly men. 81 % of women spend up to 400 CZK while only 42 % of men spend the same amount. Around 40 % of the total number of men (175) answered that their monthly average spending are between 401-1,000 CZK. The spending over 1,001 CZK per month are mainly spent by men by 89 %. From the histogram is seen that women spend less money in average comparing to men.

Graph 14: Average monthly spending of beer consumption according to gender
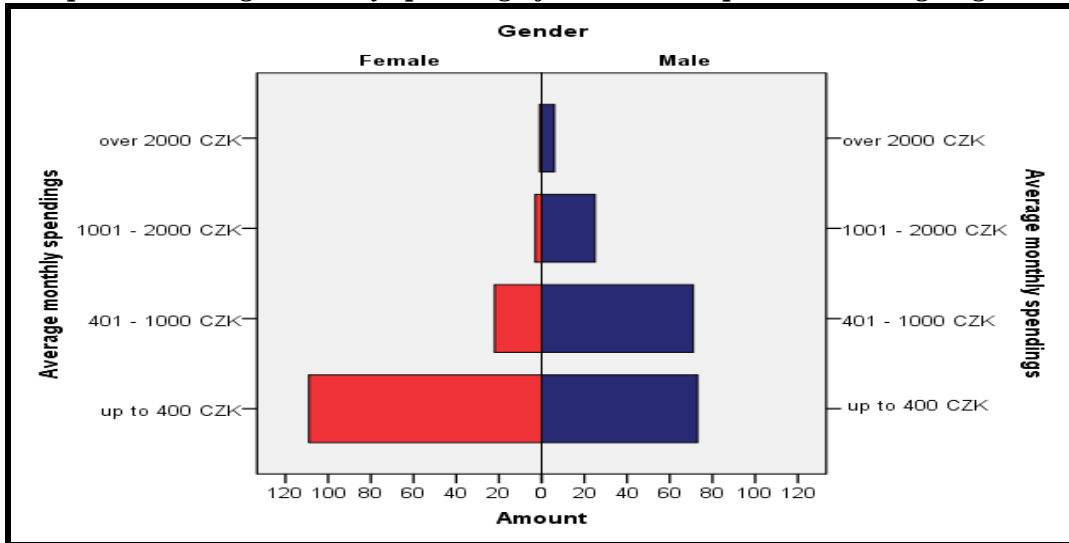
Source: Own research, 2013

4.3.19 Evaluation of question No. 19 – How do you spend your free time?

The last question for consumers of beer was linked to lifestyle. It had to find out how respondents spend their free time. 66 % of them spend their free time actively and nearly 34 % passively. This question was asked for better orientation if consumers prefer to have an active or passive lifestyle and through this responses it could be planned the marketing strategy for the advertisements and promotions.

Graph 15: Lifestyle of consumers of beer
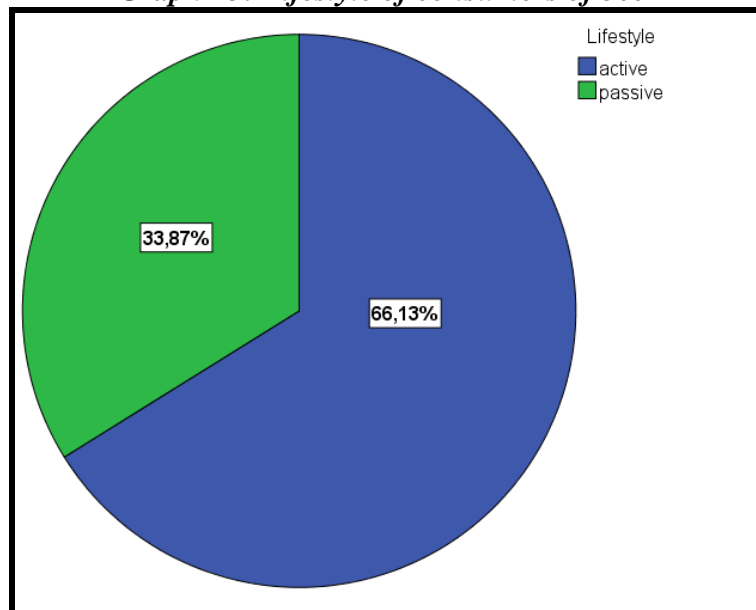
Source: Own research, 2013

53

4.4 Categorical data testing

For testing dependence between qualitative variables was used chi-square test of independence. Its using is assumed from the null hypothesis H_0 that assumes independence between two variables. If the existence between two variables will be proven, it will be measured its intensity of dependence.

4.4.1 Hypothesis testing related to beer consumption

Determination of the null hypothesis:
- Variables of beer consumption and gender are independent of each other.

- Variables of beer consumption and age are independent of each other.

- Variables of beer consumption and education are independent of each other.

- Variables of beer consumption and profession are independent of each other.

Expected (theoretical) frequencies of these variables are added in Appendix No. 2.

Table 14: Results of categorical data testing related to beer consumption

Relationship	Test criterion χ^2	Degrees of freedom	p-value	Cramer's V /Phi	Result
Beer consumption and gender	16.812	1	<0.001	0.219	H_0 is rejected
Beer consumption and age	11.115	3	0.011	0.178	H_0 is rejected
Beer consumption and education	3.015	2	0.221	x	H_0 is valid
Beer consumption and profession	*	*	*	*	*

Source: Own research, 2013
x – Intensity of dependence was not calculated because null hypothesis was valid.
* - Hypothesis could not be tested.

Firstly, it should be mentioned that beer consumption (in this thesis) refers to if a respondent drinks beer or not. From the four hypotheses which are set above, two dependences of variables can be statistically proven. At the significance level $\alpha = 0.05$, both p-values were less than significance levels therefore the null hypotheses were valid. The relationships are between variables of beer consumption and gender, and between variables of beer consumption and age. However, according to coefficient

Cramer V both intensities of dependence of variables are characterized as weak dependencies.

The relationship between age and beer consumption is shown below. As it is seen from the graph beer consumption is the highest by younger people. Two thirds of respondents over 60 years consume beer while age groups from 18 to 59 have the proportions of non-consumers of beer very low.

Graph 16: Beer consumption according to age
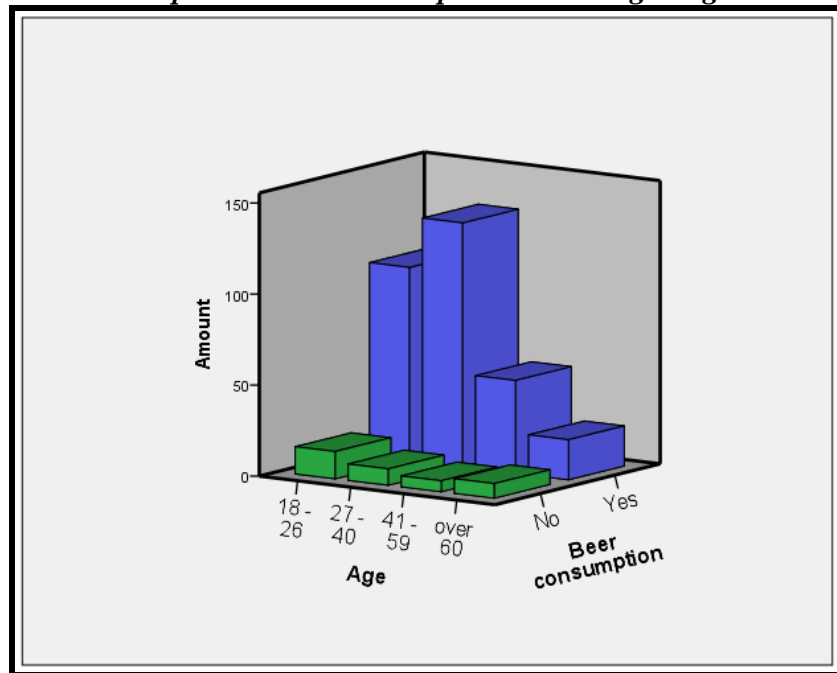
Source: Own research, 2013

The fact that the factor gender tend to influence beer consumption is shown in the graph below. It is evident that beer is consumed more by men (95.5 %) than women (82 %). However the proportion of consuming beer is high by both genders, also the intensity of dependence is weak (0.219) so the breweries should take this fact into account when choosing and planning marketing strategies.

The relationship between these two variables will be analyzed using relative risk in the next section 4.4.5.

Graph 17: Beer consumption according to gender
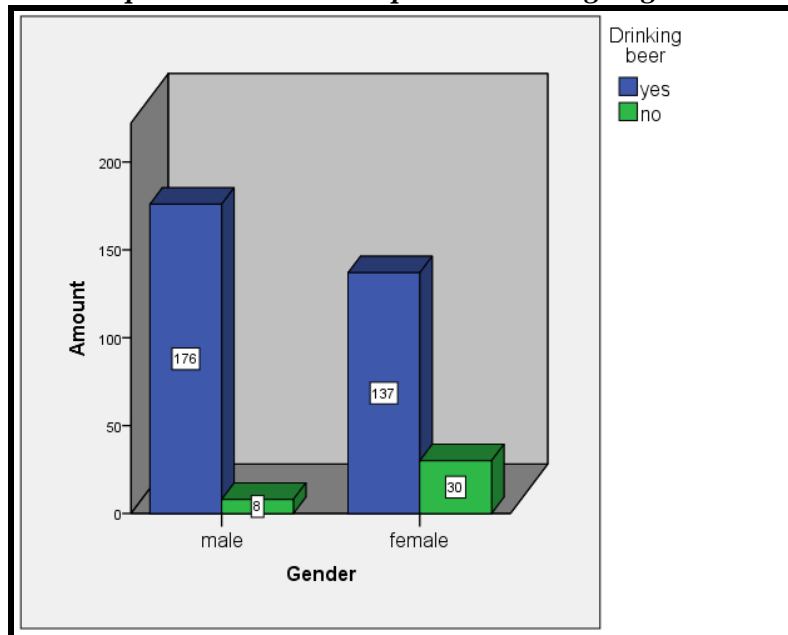
Before hypothesis testing of the relationship between beer consumption and education, it was needed to exclude primary education because theoretical frequencies exceeded 20 %. After excluding just three respondents, the conditions for test criterion χ^2 could be done. Hypothesis testing of relationship between beer consumption and education was not proven because of its calculated p-value. P-value was higher than 0.5, and at the five percent significance level it was proven that education does not influence beer consumption.

The hypothesis of relationship between the beer consumption and profession could not be tested because the ratio of the expected frequencies which were less than 5, exceeding 20 % in the contingency table, and provide logical merging of categories of profession was not possible.

4.4.2 Hypothesis testing related to gender

Determination of the null hypothesis:

- Variables gender and type of beer are independent of each other.
- Variables gender and non-alcoholic beer are independent of each other.
- Variables gender and place of beer consumption are independent of each other.
- Variables gender and season are independent of each other.
- Variables gender and period of beer consumption are independent of each other.

Expected (theoretical) frequencies of these variables are added in Appendix No. 3.

Table 15: Results of categorical data testing related to gender

Relationship	Test criterion χ^2	Degrees of freedom	p-value	Cramer's V /Phi	Result
Gender and type of beer	22.229	3	<0.001	0.266	H_0 is rejected
Gender and non-alcoholic beer	11.066	1	0.001	0.188	H_0 is rejected
Gender and the place of beer consumption	3.513	2	0.173	x	H_0 is valid
Gender and season	*	*	*	*	*
Gender and period of beer consumption	25.707	3	<0.001	0.287	H_0 is rejected

Source: Own research, 2013
x – Intensity of dependence was not calculated because null hypothesis was not rejected.
* - Hypothesis could not be tested.

For testing hypotheses, the significance level was set up again 0.05. Calculated p-values of three tested hypotheses were less than the significance level and their null hypotheses of independent variables were rejected.

It was proven that factor gender plays quite important role in beer industry. Gender of consumers has influence on buying and choosing beer by preferred type. Also variable gender influences if consumer drinks non-alcoholic beer and in which place the consumers prefer to drink beer. However the intensity of dependence between the variables according to Cramer's Coefficient V represents relationships between variable as a weak. As it was mentioned in evaluation of question No. 6, majority of men (86 %) prefer to consume light beers. Half of women consume light beer and also prefer dark and the mix of light and dark beer.

Validity of the null hypothesis was proven by the relationship between gender and the place of beer consumption. So this means gender does not influence the place in which beer is mostly drunk. Both gender like consuming beer mostly in the restaurants, pubs or at the bars as it was mentioned in the evaluation of question No. 4.

The last null hypothesis of the relationship between gender and season could not be tested due to values less than five in the cells by over 20 % of theoretical frequencies.

4.4.3 Hypothesis testing related to age

Determination of the null hypothesis:

- Variables of age and monthly average spending are independent of each other.
- Variables of age and increasing of price are independent of each other.
- Variables of age and flavoured beer are independent of each other.
- Variables of age and advertisement are independent of each other

Expected (theoretical) frequencies of these variables are added in Appendix No. 4.

Table 16: Results of categorical data testing related to age

Relationship	Test criterion χ^2	Degrees of freedom	p-value	Cramer's V /Phi	Result
Age and monthly average spending	2.355	3	0.502	x	H_0 is valid
Age and increasing of price	4.539	6	0.604	x	H_0 is valid
Age and flavoured beer	85.825	3	<0.001	0.524	H_0 is rejected
Age and advertisement	0.035	1	0.852	x	H_0 is valid

Source: Own research, 2013
x – Intensity of dependence was not calculated because null hypothesis was valid.

Only one relationship of the predetermined hypotheses was proven at the 5% significance level. The relationship is between age and flavoured beer. The intensity of dependence according to Cramer's V can be characterized as a moderate dependence. The amount of respondents who tasted flavoured beer is shown in table 16. From the table is evident that young generation does not mind tasting new types of beer. On the other hand older respondents do not like innovations and prefer to consume their old and tested types of beer. With the increasing age, the tasting of this kind of beer is decreasing. This should be good indications for marketing departments of beer industry when they choose marketing strategies for specific segments.

Table 17: Tasting of flavoured beer according to age

Age group	Flavoured beer		Total
	Yes	No	
18 - 26 years	99	7	106
27 – 40 years	118	16	134
41 – 59 years	38	13	51
Over 60 years	3	19	22
Total	258	55	313

Source: Own research, 2013

Three out of four relationships between age and monthly average spending; age and price, and the last relationship between age and advertisement, their hypotheses were not rejected therefore the intensities of dependence was not calculated. All p-values of these relations were higher than 0.5 so at significance level $\alpha = 0.05$ was proven that age does not have influence on monthly average spending, increasing price and advertisement.

According to hypothesis testing by variable of gender, it was found out that this factor influences beer industry partially in regard to tasting of flavoured beer.

4.4.4 Hypothesis testing related to amount of beer consumption

Determination of the null hypothesis:

- Variables of amount of beer consumption and lifestyle are independent of each other.
- Variables of amount of beer consumption and gender are independent of each other.
- Variables of amount of beer consumption and gross monthly salary are independent of each other.
- Variables of amount of beer consumption and development salary are independent of each other.

Expected (theoretical) frequencies of these variables are added in Appendix No. 5.

Table 18: Results of categorical data testing related to amount of beer consumption

Relationship	Test criterion χ^2	Degrees of freedom	p-value	Cramer's V /Phi	Result
Amount of beer consumption and lifestyle	0.556	1	0.456	x	H_0 is valid
Amount of beer consumption and gender	57.306	1	<0.001	0.428	H_0 is rejected
Amount of beer consumption and salary	2.934	3	0.402	x	H_0 is valid
Amount of beer consumption and development salary	0.777	2	0.678	x	H_0 is valid

Source: Own research, 2013
x – Intensity of dependence was not calculated because null hypothesis was valid.

Before hypothesis testing related to amount of beer consumption, the amount of beer consumption was divided into two groups. These groups were set up as $0 - 10$ litres and 10.1 litres and more. The first category should represent occasional consumers of beer and the second one consumer who drink beer regularly.

Only one null hypothesis of the hypotheses related to amount of beer consumption was rejected at the five percent significance level. The intensity of dependence of this relationship is 0.428 which is represented as a moderate dependence. For this relationship will be calculated the relative risk later.

It was proven that amount of beer consumption is influenced by gender. In the evaluation of question No. 13 is clear that men's amount of beer consumption is much higher than women's amount of consumption of beer.

The figure below shows that majority of women (92.7 %) belong to the group of occasional consumers. Male consumers were separated into these two groups quite equally, in the ratio 53:47.

Graph 18: Amount of beer consumption according to gender
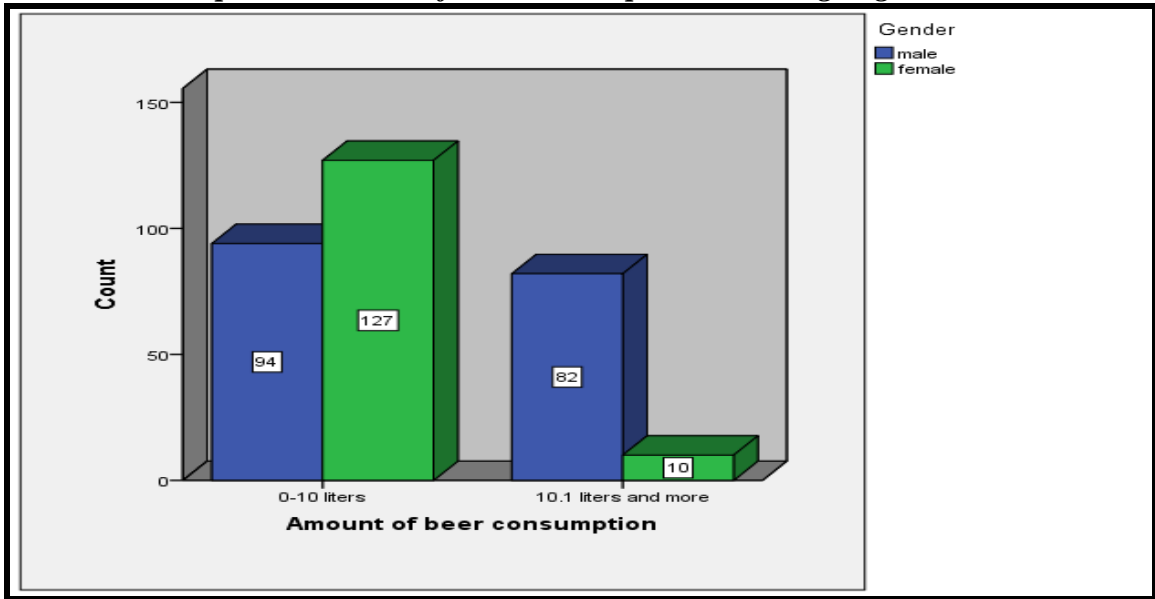
Source: Own research, 2013

Other null hypotheses cannot be rejected due to p-values which were much higher than the significance level α= 0.05. This can be attributed to the relationship between these variables being unproven.

4.4.5   Chances and risks

For the relationships in which null hypothesis was rejected according to Chi-square test, were calculated relative risks.

Firstly, characteristic χ^2 was calculated for the relationship between gender and non-alcoholic beer.

Table 19: Consuming non-alcoholic beer according to gender

		Consuming non-alcoholic beer		Total
		Yes	No	
Gender	Male	114	62	176
	Female	63	74	137
Total		177	136	313

Source: Own research, 2013

Table 20: Relative Risk for relationship of gender and consuming non-alcoholic beer

	Value
Relative Risk$_1$ (Consuming non-alcoholic beer = no)	1.533
Total	313

Source: Own research, 2013

The calculated value RR$_1$ says that the probability of not consuming non-alcoholic beer is 1.5 times higher for women than for men.

Next proven relationship was between beer consumption (drinking beer) and gender. For better orientation the number of consumers of beer is shown in the table.

Table 21: Beer consumption according to gender

		Beer consumption		Total
		Yes	No	
Gender	Male	176	8	184
	Female	137	30	167
Total		313	38	351

Source: Own research, 2013

Table 22: Relative Risk for relationship of beer consumption and gender

	Value
Relative Risk$_1$ (Beer consumption = yes)	1.166
Total	184

Source: Own research, 2013

The calculated value RR$_1$ says that the probability of beer consumption is 1.2 times higher for men than for women.

The relationship between amount of beer consumption and gender was proven. The structure of respondent's answers is shown in the following table.

Table 23: Amount of beer consumption according to gender

		Amount of beer consumption		Total
		0 – 10 litres	10.1 litres and more	
Gender	Male	94	82	176
	Female	127	10	137
Total		221	92	313

Source: Own research, 2013

Table 24: Relative Risk for relationship of amount of beer consumption and gender

	Value
Relative Risk$_1$ (Amount of Beer consumption = 0 − 10 litres)	0.576
Total	313

Source: Own research, 2013

The calculated value RR_1 says that the probability of amount of beer consumption (i.e., 0 − 10 litres) is 0.6 times higher for men than for women.

5   Conclusion

The aim of thesis was statistical analysis of beer consumption preferences. One of the objectives of the survey was monitoring possible factors affecting consumer behaviour when purchasing beer.

Data were obtained by questionnaire survey. Firstly, the questionnaire was created for the realisation of the survey. The questionnaire consisted of 26 questions. Obtained data were recoded and processed through using the statistical software IBM SPSS Statistics 20.0. The questionnaire survey was conducted by participants who are living, studying or working in the capital city of Prague. Since the survey was related primary to alcoholic beverages, questionnaires were distributed only among participants older 18 years and over. The questionnaire survey was carried out on $15^{th} - 22^{nd}$ February 2013. 351 respondents took part in this survey. The structure of respondents of the survey was 52 % of men and 48 % of women.

The initial question of the statistical analysis for beer consumption was to find out if the respondent consumes beer or not. Subsequently, questions related to beer consumption preferences, and were only focused on consumers of beer. It was determined that 89 % of respondents drink beer.

The questionnaire survey contained questions on; preferred type of beer, beer packaging, place and season when is beer mostly consumed, preferred criterions when purchasing beer, period in which is beer mostly drunk, etc. The results of consumers' preferences are, respectively; light beer (78 %), draught beer from tank and barrel (72 %), purchasing beer by brand (83 %). The important preferred criterions when purchasing beer are taste of beer (100 %), brand (75 %), strength of beer (62 %) and price (34 %).

In the situation when respondents cannot drink alcoholic beer, 57 % of respondents would prefer non-alcoholic beer to soft drinks. Majority of respondents (77 %) prefer to

consume beer in the restaurant environment. Most respondents (66 %) consume beer while they are out with their friends.

Furthermore, respondents were asked to estimate their monthly consumption in litres. The average annual beer consumption of the respondents is 148.73 litres per capita which is almost identical with the data of the Czech Statistical Office.

Within the statistical analysis were tested predetermined hypotheses. The hypotheses analysed dependence between two variables. Based on the obtained results, it was evident that the highest influencing variables in the area of beer consumption are the factors of gender and age. The relationships between variables of "beer consumption and gender" and "beer consumption and age", both relationships are represented by weak dependence of its intensity of dependence.

The factor of age also influences younger age groups to be willing to taste and experiment with new products produced by beer industry. The intensity of this relationship is moderate dependence. Factor of gender partially influences on purchasing type of beer, consuming non-alcoholic beer, period during beer is consumed, amount of beer consumption. Only the intensity of dependency by relationship "gender and amount of beer consumption" is denoted by moderate dependence of its intensity. The intensity of other relationships are weak dependences.

The study revealed that two factors – age and gender – significantly influence beer consumption. Most beer consumers of the survey were in these two age groups 18 – 26, and 27 – 40 years. Compared to other age groups, these respondents showed interest in experimenting and trying new innovative products.

Men represent a large consumer group, as in the survey 96 % of male respondents stated they drink beer. On monthly basis men spend considerably more on beer than women. Men prefer light beers, in the form of draught and bottled beers. Such preference links with another finding; men enjoy drinking beer not only in the pub/bar/ restaurant environment but also at home.

Beer is a popular beverage among females as well; 82% of the survey's female respondents drink beer. While their affinity to light beers is similar to men's preferences, a significant proportion of women enjoy darker, sweeter draught beers. Women tend to drink beer within certain settings. The survey showed women consume beer at social events. Seasonality is another factor, as women drink more beer in spring and summer months.

Recommendations to beer industry following the results of the survey in order to maintain existing customers and attract new consumers are as follows:

- To offer benefits for loyal customers
- To increase a choice of products
- To use online platforms to promote beer

In conclusion, obtained results of the statistical analysis of this thesis might be utilized by the marketing and sales departments of companies in beer industry. The knowledge of consumer behaviour regarding their beer consumption preferences could be beneficial when planning and implementing its marketing strategies.

6 Bibliography

Adamec, V.: *Applied statistics: Statistics I*. Brno: Kamil Mařík – Mendelova univerzita, 2010, ISBN 978-80-7375-455-6.

Agarwal, B.L.: *Basic Statistics*. New Delhi: New Age International Ltd., 2006, ISBN 81-224-1814-7.

Agresti, A.: *Categorical Data Analysis*. New Jersey: John Wiley & Sons, Inc., 2002, ISBN 0-417-36093-7.

Bártová, H., Bárta, V., Koudelka, J: *Chování spotřebitele a výzkum trhu*. Praha: VŠE, 2004, ISBN 80-245-0778-1.

Foret, M.: *Marketingový průzkum: poznáváme svoje zákazníky.* Brno: Computer Press, 2008, ISBN 978-80-2512183-2.

Hendl, J.: *Přehled statistických metod: analýza a metaanalýza dat*. Praha: Portál, s.r.o., 2009, ISBN 978-80-7367-482-3.

Hes, A.: *Chování spotřebitele při nákupu potravin*. Praha: Alfa Nakladatelství, 2008, ISBN 978-80-87197-20-2.

Chládek, L.: *Pivovarnictví.* Praha: Grada, 2007. ISBN 978-80-247-1616-9.

Jackson, M.: *Beer.* London: Dorling Kindersley Limited, 1998. ISBN 0-7513-0591-X.

Jackson, M.: *The New World Guide to Beer*. Philadelphia, Pennsylvania: Running Press, 1989. ISBN 0-89471-649-2.

Kinnear , T., C., Taylor, J.R.: *Marketing Research: An Applied Approach.* New York: McGraw-Hill, Inc., 1991, ISBN 0-07-034757-3.

Klímek, P.: *Applied statistics for economics*. Bučovice: Martin Stříž, 2010, ISBN 978-80-87106-32-7.

Kotler, P., Armstrong, G.: *Principles of Marketing.* Scarborough: Pearson Prentice Hall, 1999, ISBN 0-13-679267-7.

Llozed, J., Ch.: *Statistical Analysis of Categorical Data*. USA, New Yersey: John Wiley & Sons, Inc., 1999, ISBN 0-471-29008-4.

McClave, J., T., Benson, G., P., Sincich, J..: *Statistics for Business and Economics.* London: Prentice Hall International, 2001, ISBN 0-13-028276-6.

McDaniel, C., Gates, R.: *Marketing Research Essentials.* Cincinati, Ohio, 1998, ISBN 0-538-87669-7.

Přibová, M. a kol.: *Marketingový výzkum v praxi.* Praha: Grada Publishing, 1996. ISBN 80-7169-299-9.

Řezanková, H.: *Analýza dat z dotazníkových šetření.* Praha: Kamil Mařík – Professional Publishing, 2011, ISBN 978-80-7431-062-1.

Smith, S., Albaum, G.,S.: *Fundamentals of Marketing Research.* California: Sage Publications, 1995, ISBN 0-7619-8852-1.

Svatošová, L., Kába, B.: *Statistické metody II.* Praha: ČZU, 2009, ISBN 978-80-213-1736-9.

Verhoef, B.: *Encyklopedie piva.* Praha: Rebo Productions, 1998, ISBN 80-7234-012-3.

Internet resources

Czech Statistical Office: *Trendy ve spotřebě potravin.[online]*. 2013, [quoted 2013-01-6]. Available at WWW:
<http://www.czso.cz/csu/tz.nsf/i/trendy_ve_spotrebe_potravin20110216 >.

CVVM: *Pivo v české společnosti v roce 2012. [online]*. 2013, [quoted 2013-01-10]. Available at WWW: < http://cvvm.soc.cas.cz/ostatni-ruzne/pivo-v-ceske-spolecnosti-v-roce-2012 >.

Český svaz pivovarů a sladoven: *Pivovarství a sladařství v českých zemí. [online]*. 2012, [quoted 2012-12-11]. Available at WWW:
< http://www.cspas.cz/pivo.asp?lang=1>.

ICC/ESOMAR: *ICC/ESOMAR International Code of Marketing and Social Research Practice [online]*. 2012, [quoted 2012-11-15]. Available at WWW:
< http://www.icc.se/reklam/english/engresearch.pdf >

University of Strathclyde: *Use of Questionnaires. [online]*. 2013, [quoted 2013-01-8]. Available at WWW:
<http://www.strath.ac.uk/aer/materials/3datacollection/unit2/useofquestionnaires/>.

7   List of graphs and tables

Figure:

Graph:

Table:

8   Appendices

Appendix No. 1 - Questionnaire

Dear Sir/Madam,

I am a Masters degree student at the Faculty of Economics and Management at the Czech University of Life Sciences in Prague. I would like to ask you to fill in a questionnaire, which will be used for my Diploma thesis "Statistical analysis of beer consumption preferences". The questionnaire is anonymous and will be used only for my thesis. If you are interested, I will send you the results of my survey.

Thank you very much for your help.
Kristyna Vanova

Contact e-mail: kristyna.vanova@yahoo.co.uk

1) Do you drink beer?
  a) yes (Please go to question No. 3)
  b) no (Please go to question No. 2)

2) Why don't you drink beer?

  (Please go to question No. 20)

  a) I don't drink alcoholic beverages
  b) I don't like beer
  c) Because of health problems
  d) Other:………………………………

3) Why do you drink beer?
  a) I like beer
  b) Beer is cheaper than non-alcoholic beverages
  c) Other:………………………………

4) Where do you drink beer most often?
  a) at home
  b) in the restaurant, pub, bar
  c) at the sport matches/social events
  d) other:………………………….

5) When do you drink beer most often?
      a) during a meal
      b) after sport
      c) with friends/at the social events
      d) no special reason

6) Which type of beer do you prefer?
      a) light beer
      b) dark beer
      c) mix of light and dark beer
      d) other:………………………

7) What beer packaging do you prefer?
   (you can choose up to 3 options)
      a) bottled
      b) draught from barrel
      c) draught from tank
      d) canned
      d) PET beer bottle

8) In which season do you drink beer the most?
      a) spring/summer
      b) autumn/winter
      c) season is not important

9) Do you choose beer by a brand?
      a) always or almost always
      b) mostly yes
      c) mostly no
      d) never or almost never

10) Are you influenced by advertisement when buying a specific brand of beer?
      a) yes
      b) no

11) What is important to you when buying beer?
      a) price   yes - no
      b) taste   yes - no
      c) strength   yes - no
      d) brand   yes – no
      e) advertisement   yes – no

12) Have you tasted flavoured Czech beer yet? (i.e. Frisco, Staropramen Cool Lemon/Grep etc.)

    a) yes

    b) no

13) Estimate your monthly beer consumption in litres:

    Please write a number:……

14) If the price of beer increases by 10 %, will your beer consumption decrease?

    a) yes

    b) no

    c) I don't know

15) Do you sometimes drink non-alcoholic beer?

    a) yes

    b) no (Go to question No. 17)

16) Why do you drink non-alcoholic beer?

    a) driving a motor vehicle

    b) other:………………….

17) If you can't drink beer, e.g. when driving a car, at work, etc., what would you prefer?

    a) non-alcoholic beer

    b) other non-alcoholic beverage

18) How much money do you spend for a beer per month in average?

    a) up to 400 CZK

    b) 401 – 1,000 CZK

    c) 1,001 – 2,000 CZK

    d) 2,001 and more CZK

19) How do you spend your free time?

    a) actively (i.e. sport, hiking, walking etc.)

    b) passively (i.e. TV, reading, chess etc.)

20) Sex:

    a) male

    b) female

21) Age:

Please write by number:……

22) Highest achieved education:

a) Elementary

b) Secondary school without a final leaving exam

c) Secondary school with a final leaving exam

d) University degree

23) Profession:

a) employee

b) self-employed

c) student

d) pensioner

e) on parental leave

f) unemployed

24) Are you economically active in recent years?

a) yes (Please go to question No. 25)

b) no

25) What is your gross monthly salary?

a) up to 10,000 CZK

b) 10,001 – 25,000 CZK

c) 25,001 – 45,000 CZK

d) 45,001 and more

26) In the last three years your salary:

a) increased

b) decreased

c) hasn't changed

Appendix No. 2 - Contingency tables of expected (theoretical) frequencies of hypotheses related to beer consumption

Beer consumption	Gender		Total
	Male	Female	
Yes	164.1	148.9	313.0
No	19.9	18.1	38.0
Total	184.0	167.0	351.0

Source: Own research, output SPSS, 2013

Beer consumption	Age group (in years)				Total
	18 – 26	27 - 40	41 - 59	60+	
Yes	107.9	127.5	50.8	26.8	313.0
No	13.1	15.5	6.2	3.2	38.0
Total	121.0	143.0	57.0	30.0	351.0

Source: Own research, output SPSS, 2013

Beer consumption	Education			Total
	Secondary school with final exam	University	Secondary school without final exam	
Yes	130.5	154.6	25.9	311.0
No	15.5	18.4	3.1	37.0
Total	146.0	173.0	29.0	348.0

Source: Own research, output SPSS, 2013

Beer consumption	Profession						Total
	Pensioner	On parental leave	Unemployed	Self-employed	Student	Employee	
Yes	25.9	16.1	7.1	37.5	62.4	164.1	313.0
No	3.1	1.9	0.9	4.5	7.6	19.9	38.0
Total	29.0	18.0	8.0	42.0	70.0	184.0	351.0

Source: Own research, output SPSS, 2013

Appendix No. 3 - Contingency tables of expected (theoretical) frequencies of hypotheses related to gender

Gender	Type of beer				Total
	Other	Light+dark	Light	Dark	
Male	8.4	12.4	136.6	18.6	176.0
Female	6.6	9.6	106.4	14.4	137.0
Total	15.0	22.0	243.0	33.0	313.0

Source: Own research, output SPSS, 2013

Gender	Non-alcoholic beer		Total
	Yes	No	
Male	123.7	52.3	176.0
Female	93.6	40.7	137.0
Total	220.0	93.0	313.0

Source: Own research, output SPSS, 2013

Gender	Place of consuming beer			Total
	At home	At the sport matches/at the social events	In the restaurant, pub, bar	
Male	34.3	6.7	135.0	176.0
Female	26.7	5.3	105.0	137.0
Total	61.0	12.0	240.0	313.0

Source: Own research, output SPSS, 2013

Gender	Season			Total
	Spring/ summer	s. is not important	autumn/winter	
Male	90,5	83,2	2,2	176,0
Female	70,5	64,8	1,8	137,0
Total	161,0	148,0	4,0	313,0

Source: Own research, output SPSS, 2013

Gender	Period when is beer mostly drunk				Total
	During a meal	No special reason	After sport	With friends/at the social event	
Male	32.1	17.4	10.1	116.4	176.0
Female	24.9	13.6	7.9	90.6	137.0
Total	57.0	31.0	18.0	207.0	313.0

Source: Own research, output SPSS, 2013

Appendix No. 4 – Contingency tables of expected (theoretical) frequencies of hypotheses related to age

Age group (in years)	Monthly average spending (CZK)		Total
	0 – 400	401 and more	
18 - 26	62,0	44,0	106,0
27 - 40	78,3	55,7	134,0
41 - 59	29,8	21,2	51,0
60+	12,9	9,1	22,0
Total	183,0	130,0	313,0

Source: Own research, output SPSS, 2013

Age group (in years)	Decrease of consumption by increasing price by 10 %			Total
	yes	no	I do not know	
18 - 26	7,8	71,1	27,1	106,0
27 - 40	9,8	89,9	34,2	134,0
41- 59	3,7	34,2	13,0	51,0
60+	1,6	14,8	5,6	22,0
Total	23,0	210,0	80,0	313,0

Source: Own research, output SPSS, 2013

Age group (in years)	Flavoured beer		Total
	No	Yes	
18 - 26	18.6	87.4	106.0
27 - 40	23.5	110.5	134.0
41 - 59	9.0	42.0	51.0
60+	3.9	18.1	22.0
Total	55.0	258.0	313.0

Source: Own research, output SPSS, 2013

Age group (in years)	Advertisement		Total
	yes	no	
18 - 26	8,8	97,2	106,0
27 - 40	11,1	122,9	134,0
41 - 59	4,2	46,8	51,0
60+	1,8	20,2	22,0
Total	26,0	287,0	313,0

Source: Own research, output SPSS, 2013

Appendix No. 5 - Contingency tables of expected (theoretical) frequencies of hypotheses related to amount of beer consumption

Amount of beer consumption (in litres)	Lifestyle		Total
	Actively	Passively	
0 - 10	146,2	74,8	221,0
10.1+	60,8	31,2	92,0
Total	207,0	106,0	313,0

Source: Own research, output SPSS, 2013

Amount of Beer Consumption (in litres)	Gender		Total
	Male	Female	
0 – 10	124,3	96,7	221,0
10.1+	51,7	40,3	92,0
Total	176,0	137,0	313,0

Source: Own research, output SPSS, 2013

Amount of beer consumption (in litres)	Gross monthly salary (CZK)				Total
	10,001 – 25,000	25,001 – 45,000	up to 10,000	over 45,001	
0 - 10	84.7	60.7	45.9	29.7	221.0
10.1+	35.3	25.3	19.1	12.3	92.0
Total	120.0	86.0	65.0	42.0	313.0

Source: Own research, output SPSS, 2013

Amount of beer consumption (in litres)	Development salary			Total
	Has not changed	Decreased	Increased	
0 – 10	82.6	30.4	108.0	221.0
10.1+	34.4	12.6	45.0	92.0
Total	117.0	43.0	153.0	313.0

Source: Own research, output SPSS, 2013