Czech University of Life Sciences Prague

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Diploma Thesis

Statistical Analysis of Beer Consumption Preferences of Selected Age Group in the Czech Republic

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DIPLOMA THESIS ASSIGNMENT

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Thesis title

Statistical analysis of beer consumption preferences of selected age group in the Czech Republic

Objectives of thesis

Diploma thesis deals with assessment of beer consumption preferences. The main sense is to find out and assess possible factors which affect consumer behaviour. The assessment will be carried out by own questionnaire survey which will be analyzed by SAS analytics software.

Methodology

The assessment of factors influencing consumer behaviour will be carried out by questionnaire survey. First will be determined hypotheses and will be created appropriate survey. The dataset will by analysed using categorical data analysis. If needed for detailed analysis will be used also methods for proportional reduction of error (PRE).

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Declaration

I declare that I have worked on my diploma thesis titled "Statistical Analysis of Beer Consumption Preferences of Selected Age Group in the Czech Republic" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any third person.

In Prague on 31. 3. 2015 ______________________________

Petr Vacek

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Statistická analýza preferencí ve spotřebě piva vybrané věkové skupiny v České republice

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Statistical analysis of beer consumption preferences of selected age group in the Czech Republic

Shrnutí: Tato práce je rozdělena na teoretickou a praktickou část. První část je věnována metodice a teoretické základy. Hlavní důraz je kladen na marketingový výzkum, pivo a chování spotřebitelů. Podkapitola marketingový výzkum zahrnuje pravidla tvorby dotazníkového šetření a tvorbu vzorku. Další podkapitola se zabývá pivem z různých úhlů pohledu. Je zde prozkoumána historie piva po celém světě, stejně tak jako v České republice. Tato část také analyzuje ovocné pivo. Praktická část je potom zaměřena na vyhodnocení průzkumu. Na základě výsledků, uvedené hypotézy jsou buď přijaty nebo zamítnuty. Stejně tak jsou zde zahrnuty výstupy ze SAS analytics software. Nejzajímavější výsledky jsou diskutovány v části výsledky a diskuse. Tyto výsledky jsou pak shrnuty a rovněž jsou zde uvedena doporučení. Posledními částmi jsou seznam zdrojů a přílohy. Přílohy obsahují především grafické vyhodnocení dotazníkového šetření.

Klíčová slova: Preference, pivo, spotřebitel, faktor, Česká republika, statistická analýza, hypotéza

Summary: This thesis is divided into theoretical and practical part. The first part is devoted to the methodology and theoretical foundation. The primary emphasis is placed on marketing research, beer and consumer behaviour. Subchapter marketing research involves the rules of questionnaire survey creation and sampling. The next subchapter examines beer from different points of view. The history worldwide, as well as in the Czech Republic is explored here, too. This part also analyses fruit beer. After that, the practical part is focused on the evaluation of the survey. Based on the results, the stated hypotheses are either failed to reject or rejected. SAS analytics software outputs are to be included, as well. Next, the most interesting results are discussed in the part results and discussion. These results are then concluded and some recommendations are given as well. Finally, last parts are the list of sources and appendices. Part references lists all used resources. Appendices include mainly the graphical evaluation of the questionnaire survey.

Keywords: Preference, beer, consumer, factor, the Czech Republic, statistical analysis, hypothesis

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1 Introduction

Beer in any form is an imperative product in the Czech Republic. We can see the worker with bottled beer in his hand during the lunch break, youngsters drinking can beer on the streets or upper class enjoying draft beer in the restaurants all day long. In addition to that, almost every beer drinker knows beer from Pilsen. The Czech Republic is also well-known for its highest beer consumption per capita.

However, in the last years the beer consumption dropped quite significantly in the Czech Republic. It peaked in 1995 with over 160 litres per capita. In contrary to this, it was only 134 litres per capita in 2013. Kozák (2013) believes that many factors caused such drop in consumption. Firstly, there is a change in lifestyles, in general. Beer is not that fancy as it used to be. Secondly, there are pressures from employers to be more efficient, i.e. not to drink at work. Moreover, lastly, the great beer-loving generation is aging.

Contrasting this, the data from last year slightly deviate from the long-term tendency of diminishing beer drinkers among men. There was a substantial annual increase in the proportion of drinkers in the youngest group of men, i.e. between 18 and 29 years (from 86 to 93 percent). At the moment, unfortunately, we cannot say whether this increase was due to measurement error, random fluctuation or it indicates a deeper change in the attitude of this group of respondents to the beer (Vinopal, 2014a). Furthermore, the Czech beer drinkers react more strongly to changes in price compared to the investments in advertising. Therefore, we can state the consumption is not dependent on advertisements (Castiglione et al., 2011).

Consequently, the knowledge of consumers' wants and needs and current trends plays a substantial role in the brewing industry. For instance, an introduction of the new flavour of fruit beer which satisfies the taste of any target group will probably bring a competitive advantage. Czech beer drinker is highly conservative. However, he or she is able to adopt the global trends slowly. This is supported by the fact that fruit beers are no longer considered as a matter of fashion (Vinopal, 2014a). Since there is a wide variety of beer styles and consumer has many options to choose from, each beer drinker is likely to prioritize one or two brands as time goes by. Moreover, of course, every brewing company wants to be the one.

Do price or taste mainly drive the consumers? Is the age the factor determining beer consumption? Is it gender or even education? Well, this thesis will hopefully answer these questions.

Finally, all the brewing companies ought to be aware of these factors. Moreover, they should probably supply different types of beer to different consumers and similarly, various kinds of beer in different seasons. This may help them to stay in business in today's tough market conditions.

2 Thesis Objectives and Methodology

2.1 Objectives

This diploma thesis deals with an assessment of beer consumption preferences. Specifically, attention is given to a chosen age group 18 - 29 with a particular focus on fruit beer. The assessment is carried out by own questionnaire survey. Moreover, SAS analytics software is used in order to analyse obtained data. The main sense is to find out and assess the factors influencing the chosen age group's consumer behaviour. This selected age group is to be compared to the other age group(s), as well. The partial aim is then to test the stated hypotheses statistically. Lastly, the random sample is compared to other research done in this field.

2.2 Methodology

The assessment of factors influencing consumer behaviour is carried out by own questionnaire survey. Firstly, the hypotheses are formulated. While testing hypothesis *H_0: there is no dependency between the observed characters*, two tests can be used: a χ^2 independence test and Fisher's factorial test. Then, an appropriate survey is to be constructed. The dataset is analysed using categorical data analysis. SAS analytics software is being implemented at this stage. Moreover, the methods for a proportional reduction of error (PRE) are also used for detailed and accurate analysis.

2.2.1 Statistical Hypothesis Testing

A hypothesis is often referred to as a glue of the thesis. Basically, it is an instrument used in a majority of researches. It is a statement which is suggested after relevant information is reached. It has three fundamental characteristics. Firstly, it is a presumption which is then tested. Secondly, there must be any relationship between observed variables. Lastly, these variables have to be measurable (Sálus, 2013). Moreover, such hypothesis ought to be clear, focused, concise, complex and arguable (Lenihan, 2014a).

As suggested by Kothari (2004, as cited in Vacek, 2013), *"when testing hypotheses we distinguish between a null and alternative hypothesis. A null hypothesis is symbolized by* H_0*, and it proceeds on the assumption that there is no relationship between variables. Contrasting this, we state alternative hypothesis symbolized by* H_1*"*. Then, the null hypothesis is to be either accepted or rejected. Therefore, the alternative hypothesis ought to be stated accurately, as well. There are three scenarios how the alternative hypothesis can reject the null hypothesis. They are described as follows:

1. $H_0 \neq H_1$
2. $H_0 > H_1$
3. $H_0 < H_1$ (Kothari, 2004 as cited in Vacek, 2013).

However, we can never be one hundred percent sure about our final decision. Thus, we always have to pick the level of significance. This level of significance is a crucial statistical concept. It is represented by a certain percentage, usually 5%. In this case, we are willing to take a risk of rejection the H_0 when it is true. This phenomenon is known as a Type I error. Regarding statistical testing, we can indeed make two kinds of error. The second one is a Type II error. A Type II error happens when accepting the null hypothesis which is, in fact, false. Talking about symbols, a Type I is devoted by α, and analytically, a Type II is symbolized as β. Of course, we want keep the probability of occurring these errors as little as possible. We can do so by choosing the lower rate of the level of significance, i.e. one percent (Kothari, 2004).

Table 1 - Type I and Type II Error

	Decision	
	Accept H_0	Reject H_0
H_0 (true)	Correct decision	Type I error
H_0 (false)	Type II error	Correct decision

Source: (Kothari, 2004), own processing

2.2.2 Types of Variables

There are many types of variables that the statistical analyses distinguish among. These variables are firstly **dependent** and **independent**. Dependent variables, also called as response ones, show us how they are influenced by changes in independent variables. For example, a dependent variable can be the consumer price of beer. Systematically, independent variables are to be for instance the consumer price of wine, the price of hops and so forth. These independent variables are also known as explanatory variables. Moreover, Agresti (2002) believes they can be of any kind.

Next, categorical variables can be of two types, too. Specifically, they are either **nominal** or **ordinal**. *"Variables having categories without a natural ordering are called nominal"* (Agresti, 2002). In addition to that, the order is not relevant for them. Examples are favourite type of beer (light, dark, mixed) and choice of packaging of beer (bottle, can, PET). On the other hand, some categorical variables do have ordered categories. These variables are known as ordinal. The example of ordinal variables includes assigning to social class (upper, middle, lower). However, the distances between those categories cannot be quantified, and we are not able to note how the variables differ. Proper methods for such variables use the category ordering (Agresti, 2002).

Lastly, we distinguish between **qualitative** and **quantitative** variables. Nominal variables are qualitatively distinct categories differing in quality only. Contrasting this, ordinal variables are not qualified so quickly. Generally they are understood as qualitative, too. In this case, the methods of analysis are the same as in the case of nominal variables. However, they often have some quantitative characteristics because the range of each category differs. Because of this, the researchers assign numerical scores to each class. This requires a certain knowledge and experience, as well as good judgement. After that, it is possible to test the dependency among variables precisely (Agresti, 2002). Generally those qualitative variables are either in two or in more forms. If they are in two forms, they are called the **alternative characters**. Analytically, such characters are the so-called **plural characters** if they are in more forms (Svatošová, Kába, 2008, as cited in Vacek, 2013).

2.2.3 Analysis of Dependency in Association Tables

Leaving aside the question of various types of variables, let us further probe alternative characters. The dependency between these characters is association, and thus, we analyse such dependency using **association tables**. In particular, *"an association table is used for observing two qualitative alternative statistical characters. The result of the classification is structured into the so-called association table 2 x 2. The internal table fields contain the associated frequencies, which fulfil the classification according to both characters. Marginal frequencies represent the results of the classification according to the observed characters"* (Svatošová, Kába, 2008, as cited in Vacek, 2013).

Basically, two tests may be used when testing hypothesis **H_0: there is no dependency between the observed characters**. Specifically, these tests are to be a χ^2 independence test and Fisher's factorial test. Their use depends on following rules:

- χ^2 independence test is used if the size of the sample is greater than 40
- Fisher's factorial test is used if the size of the sample is lower than 20
- If the size of the sample is between 20 and 40, the expression of expected frequencies a_0, b_0, c_0, d_0 is needed:

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

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

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

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

Chi-square independence test can be used only in case that all expected frequencies are greater than 5. If this requirement is not met and at least one of those expected frequencies is lower than 5, then Fisher's factorial test has to be used (Svatošová, Kába, 2008, as cited in Vacek, 2013).

2.2.4 χ^2 independence test

As stated above, the first way to analyse the dependency in the association table is done by the so-called χ^2 independence test. This test examines the hypothesis *H_0: there is no dependency between the observed characters.* Such hypothesis is then tested by the test criterion χ^2:

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

The meaning of letters used in the formula above is described in **table 2**.

Table 2 - Association Table 2 by 2

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

Source: (Svatošová, Kába, 2008 as cited in Vacek, 2013), own processing

When testing the null hypothesis, firstly, the critical values of $\chi^2_{\alpha(1)}$ are found in the tables for the χ^2 distribution. Next, a comparison between the result and table value has to be made. H_0 is rejected if $\chi^2 > \chi^2_{\alpha(1)}$. In addition to that, the null hypothesis is also rejected if p-value is lower than α (Svatošová, Kába, 2008, as cited in Vacek, 2013).

2.2.5 Fisher's factorial test

This test's approach is more straightforward compared to χ^2 independence test. Specifically, the probability of a Type I error or alpha is just the value which is calculated. Similarly to χ^2 independence test, the null hypothesis is again stated as H_0: There is no dependency between the observed characters.

As stated above, the Fisher's factorial test is used either if the size of sample is lower than 20 or if at least one of expected frequencies is lower than 5 when sample size is from 20 to 40. Firstly, we find the lowest associated frequency. Secondly, such frequency is gradually decreased to 0 in auxiliary tables when keeping the same marginal frequencies. Then, the probability p_i is calculated using **formula 6** separately for each table.

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

After plugging the numbers in, the sum of all p_is is the value of the test criterion. Next, it is compared to the level of significance alpha. Lastly, the null hypothesis is rejected in case that $\sum p_i < \alpha$ (Svatošová, Kába, 2008 as cited in Vacek, 2013).

2.2.6 Determining the Strength of Dependency in Association Table

If there does exist a significant dependency between observed characters, that is to say, the null hypothesis is rejected, this strength of dependency has to be quantified. As suggested by Svatošová and Kába (2008), there are many ways to do so. However, the coefficient of the association is used the most. It is denoted by V and calculated as follows:

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

The value of this coefficient of association V locates at the interval from -1 to +1. Similarly to coefficient of correlation, the greater this value is, of course in absolute terms, the greater the strength of dependency is. Furthermore, such strength of dependency may also be calculated using the test criterion χ^2. In this particular case, the approach is following:

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

(N.B.: V is in absolute value)

2.2.7 Analysis of Independence in Contingency Tables

Svatošová and Kába (2008), as cited in Vacek (2013) define contingency *"as the relationship of two or more qualitative statistical characters from which at least one is the plural character"*. These characters are generally integrated according to following scheme in **table 3**.

Table 3 - Scheme of Contingency Table

Character B Character A	b_1	b_2	…..	b_j	…..	b_m	Total
a_1	n_{11}	n_{12}	…..	n_{1j}	…..	n_{1m}	$n_{1.}$
a_2	n_{21}	n_{22}	…..	n_{2j}	…..	n_{2m}	$n_{2.}$
. .							
a_i			…..	n_{ij}	…..		$n_{i.}$
. .							
a_k	n_{k1}	n_{k2}	…..	n_{kj}	…..	n_{km}	$n_{k.}$
Total	$n_{.1}$	$n_{.2}$	…..	$n_{.j}$	…..	$n_{.m}$	n

Source: (Svatošová, Kába, 2008, as cited in Vacek, 2013), own processing

We use the χ^2 test when testing independence in a contingency table. Basically, this test is the generalized χ^2 test for association tables. Specifically, it is based on the difference between real (empirical) frequencies n_{ij} and theoretical (expected) frequencies n_{oj}. Theoretical frequencies are expressed as the multiplication of the proper marginal frequencies divided by the total sample size (Svatošová, Kába, 2008 as cited in Vacek, 2013).

$$\boldsymbol{n}_{\boldsymbol{oj}=}\frac{\boldsymbol{n_{i.}n_{.j}}}{\boldsymbol{n}} \qquad \text{(Formula 9)}$$

2.2.8 χ^2 independence test

Systematically to other tests, the null hypothesis is still the same. Notably, the claim is following - H_0: There is no dependency between the observed characters.

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

After plugging the numbers in, the value of test criterion is obtained. This value is then compared to the critical value of $\chi^2_{\alpha\,(k-1)\,(m-1)}$. In this particular formula, *k* represents the number of changes of the first character and *m* represents the number of changes of the second character. If $\chi^2 > \chi^2_{\alpha\,(k-1)\,(m-1)}$, the null hypothesis is rejected. Likewise, if p-value is lower than alpha, the null hypothesis is rejected (Svatošová, Kába, 2008, as cited in Vacek, 2013).

2.2.9 Conditions for using the χ^2 test:

There are specific conditions for the utilization of this test. In particular, the proportion of theoretical frequencies lower than five must not be greater than 20%, and none of those theoretical frequencies can be lower than 1. If these requirements are not met, the test may only be used after the synthesis into the so-called weak groups. In such case, the rows or columns are merged in a logical way. This requires real knowledge of the phenomenon. Moreover, the results are to be interpreted easily if the synthesis makes sense. The conditions mentioned above are then investigated again (Svatošová, Kába, 2008, as cited in Vacek, 2013).

2.2.10 Determining the Strength of Dependency in Contingency Table

Basically, there are two methods how to determine the strength of dependency in a contingency table. Firstly, we can use **Pearson contingency coefficient**:

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

Unfortunately, this coefficient does not approach the value of 1. This develops a need to use normalized value C_{max}. We find such value in appropriate statistical tables. The value of the normalized Pearson contingency coefficient is located in the interval from 0 to 1. Likewise the different tests, 0 indicates no dependency, on the other hand, 1 indicates absolute dependency. The formula is in following form:

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

Next, the second method determining the strength of dependency in a contingency table is **Cramér's contingency coefficient**. Such strength of dependency is then determined using the same principles like in other tests. It is denoted by V. Lastly, this V is calculated using the following formula:

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

2.2.11 Proportional Reduction of Error

These tests provide reliable information about the strength of dependency between observed characters, however, there are some weaknesses as well. Mainly it is their sensitivity to the size of given contingency table and marginal proportion of observed characters. Specifically, the greater weighting is on such rows and columns with lower marginal frequencies. Also, their interpretation remains quite uncertain. Only the extreme values such as 0 and 1 give no room to misinterpretation.

Because of this, new statistical techniques were recently developed. These characteristics are independent of the test criterion χ^2. Particularly, such characteristics are of the PRE type (Proportional Reduction of Error). Basically, we measure the reduction of probability of error prediction of character B when having knowledge about the A value, compared to the likelihood of error prediction B without knowledge of A (Svatošová, Kába, 2008).

Tests used for nominal characters are:

- Goodman lambda coefficient - If the value of this test equals to 0, then the knowledge of A does not bring any information for prediction of B. However, the characters do not have to be entirely independent. If it equals to 1, the knowledge of A undoubtedly determines the prediction of B.
- Symmetric lambda coefficient - Such test is used for assessment of mutual dependency.
- Proportional prediction coefficient – Goodman-Kruskal tau – Observed characters are independent if this coefficient equals to 0.
- Symmetrized coefficient of proportional prediction – This test is used in case of symmetric dependency.

Tests used for ordinal characters are:

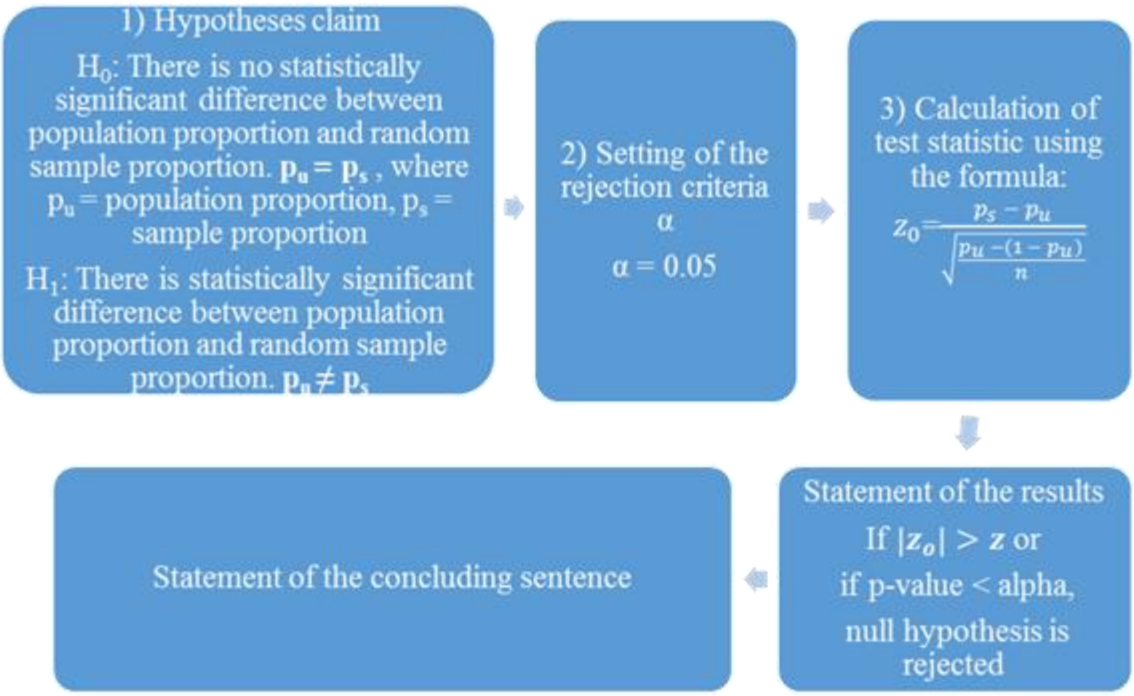
- Somers coefficient – Such coefficient is used when finding out whether the characters are organized identically or conversely.
- Gamma coefficient – We utilise this coefficient for symmetric dependent characters.
- Kendall coefficient of ordinal correlation – It represents the degree of correlation (Svatošová, Kába, 2008).

2.2.12 One Sample Test for Proportion (2-tailed test)

One sample test for proportion a statistical method which compares a proportion of a random sample to the population proportion. There is a requirement for large sample size. This large sample must include at least one hundred observations. A population proportion is symbolized as $\mathbf{p_u}$. This $\mathbf{p_u}$ is a number between 0 and 1. Next, the sample proportion is denoted by $\mathbf{p_s}$, and systematically, it is located in the interval from 0 to 1. Specifically, such sample proportion is the proportion of people in a sample with specific characteristics (Davis, 2007).

Firstly, the null and alternative hypotheses have to be claimed. Rejection criteria $\boldsymbol{\alpha}$ are then set as well. Next, test statistic is calculated according to appropriate formula. Lastly, the results as well as the concluding sentence are stated. This testing approach is described as following:

Table 4 – Z-test: Hypothesis Testing Approach



Source: Vacek, 2013, own processing

3 Theoretical Foundation

3.1 Marketing

Nowadays, marketing can be understood as both the philosophy and the function of any company. Specifically, the philosophy has the influence on corporate strategy, the way we do the business, the way we prioritize business objectives and the decision-making process. Next, marketing function is linked with the finance, human resources management and manufacturing functions (Horan, 2014).

Furthermore, marketing concept is *"the management philosophy that holds that achieving organisational goals depends on determining the needs and wants of target markets and delivering the desired satisfactions more effectively and efficiently than competitors do"* (Kotler and Armstrong, 2001, as cited in Horan, 2014). In other words, if the firm satisfies consumers' want and needs better than the competitor does, its reward will be profit.

Kotler and Armstrong (2001) define marketing as *"a social and managerial process whereby individuals and groups obtain what they need and want through creating and exchanging products and value with others."*

3.1.1. Inside-out Factors

In order to further examine marketing process, let us firstly mention the so-called 'inside-out' factors affecting it. These factors are stated as follows:

- Selecting target consumers
- Marketing mix
- Marketing process
- Marketing environment

Generally speaking, we **target consumers** through market segmentation. That is to say, we divide the market into smaller groups which *"have uniform response to marketing efforts"* (Kotler and Armstrong, 2001). These groups ought to be as large as possible so that the minimum of potential consumers is being lost. Then, each group is assessed and one or more segments are entered. Of course, these segments ought to be picked strategically. Simply said, company should pick the segment where it is able to generate the greatest value and thus, greatest profits. In order to do so, Kotler and Armstrong (2011) suggest the company to distinguish its product from the similar product made by competitors.

Next inside-out factor is a **marketing mix**. It is a *"set of controllable, tactical marketing tools which are used in various blends or mixes to produce the response the company wants in the target market"* (Kotler and Armstrong, 2001). In particular, the elements of the marketing mix are 4Ps (or 4Cs). 4Ps are product, price, place and promotion. Alternatively, 4Cs are represented by consumer, costs, convenience and communication. These elements are not discrete, and change in one of them will probably influence the others.

M**arketing process** is another inside-out factor. The central process comprises four parts: analysis, planning, implementation and control.

In **marketing analysis,** we analyse markets and its marketing environments. The frequent tool is SWOT analysis which basically examines internal and external factors influencing the business. Internal factors are strengths and weaknesses; external factors are opportunities and threats. However, this tool is considered as too subjective to make any big conclusions based on it (Lenihan, 2014b).

The second step in the marketing process is **marketing planning**. Though this planning, we can achieve strategic goals. Things like current marketing situation, marketing strategy and budgets are carefully examined in this stage. Of these, marketing strategy is probably the most important. Kotler and Armstrong (2001) claim that it is a *"marketing logic whereby the company hopes to achieve its marketing objectives"*. Moreover, they believe that such marketing plan should be done for each product or brand separately.

The third stage is **marketing implementation**. It actually depends on many factors such as skills, action programs, culture, or reward systems. Moreover, the work becomes decentralised and thus, there should be *"responsible people for each relevant market"* (Kotler and Armstrong, 2001).

The final stage of the marketing process is **marketing control**. We must be able to measure and assess the results. Corrective action should be taken if needed. A major tool for such control is a marketing audit. It is represented by outside party, and it is *"comprehensive, systematic, independent and periodic"* (Kotler and Armstrong, 2001).

The last inside-out factor which has influence on doing business is **marketing environment**. It includes all actors outside business that affect the interconnection between a company and its customers. External factors like threats and opportunities are taken into account here, too. The ultimate goal is to avoid the threats and seize the opportunities. Quite useful tool is PEST analysis. This tool explores political, economic, social and technological factors (Kotler and Armstrong, 2001).

3.1.2 Marketing Research and Information Systems

Valuable information about optimizing market success, as well as high costs of wrong information, are general motives of constructing the marketing research process (Kotler and Armstrong, 2001).

3.1.3 Marketing Information System

Marketing information system (MIS) plays a significant role in companies all over the world. MIS consist of *"people, equipment, and procedures to gather, sort, analyse, evaluate, and distribute needed, timely, and accurate information to marketing decision makers"* (Kotler and Armstrong, 2001). Furthermore, marketing research, which investigates specific marketing situations, is a great part of it.

3.1.4 Marketing Research Process

The whole process of marketing research is quite crucial since successful modern companies are customer-oriented and research-driven. This process involves four stages:

- Define problem and research objectives
- Develop the research plan for collecting information
- Implement the research plan, collect and analyse data
- Interpret and report findings (Kotler and Armstrong, 2001).

3.1.5 Defining the Problem and Research Objectives

Appropriate defining usually is the most difficult stage of the process. It should be clear, focused, concise and complex (Lenihan, 2014a). In order to meet these requirements, manager must understand the phenomenon well. Moreover, researcher must understand marketing research process and obtained information, too. Lastly, both must agree on the same research objectives.

Next, it is crucial to know what the firm exactly desires. Someone wants to increase sales, someone else might have an interest in increasing market share. However, there should be applied the golden rule that the customer is always correct. Thus, what he or she wants ought to drive the research objectives.

Research objectives also differ with the type of research. We distinguish among three types of research. The first type is **exploratory research**. We conduct this kind of research when we are not skilled in the phenomenon. In order to obtain knowledge, we collect preliminary information which will help us to state hypotheses. The second type is **descriptive research**. It is also called passive research. This research primarily probes market variables such as consumers and market potential. Mainly it describes consumer buying behaviour. The last type is **causal research.** This study explores cause-and-effect relationship. That is to say, it examines the sensitivity to changes in price and it analyses a situation arises from that place (Kotler and Armstrong, 2001).

3.1.6 Developing the Research Plan

After the research objectives are set, we have to transfer them to particular information needs. We can either gather secondary or primary information. **Secondary information** is an ”*information that has already been collected but usually for some other purpose”* (Kotler and Armstrong, 2001). Such information is way cheaper in comparison to the primary one. It is easier to obtain it as well. However, in some cases information is not directly available. Furthermore, desired information may not exist in online databases or commercial data sources. Next disadvantage is that it does not have to fit our issue. Therefore, the researcher must spend some time on the analysis of secondary information. Afterwards, he or she realizes whether it is relevant, accurate, objective and up-to-the-minute (Kotler and Armstrong, 2011).

If there arises any problem with secondary information, we have to use **primary information**. This information is more expensive but more precise. The researchers themselves collect it. There are many tools to obtain the primary information.

3.1.7 Research Approaches

We distinguish among several research approaches. These approaches are either **quantitative** or **qualitative**. Example of quantitative research is a questionnaire survey; on the other hand, examples of qualitative research include document study, observation or focus group interviewing. Interview is used in both quantitative and qualitative research; the primary distinction is the level of standardization. Interviews in quantitative research are highly standardized, and there is usually no room for respondent’s own answer. In contrary to this, qualitative research interview is characterized by almost none standardization, the questions can be asked in a different order, etc. (Bailey, 1994).

3.1.8 Questionnaire Survey

A questionnaire is one of the most commonly used tools for collecting information when doing research. It is usually mailed or handed out to the respondent with no need of interviewer’s help when filling it out (Bailey, 1994). Thus, the questions must be clear with no room for interpretation. These questions must also be listed in logical order. Furthermore, easier questions ought to be followed by more comprehensive ones.

As reported by Bailey (1994), a good way to start constructing the questionnaire is to list the reasons why people could give false information. Firstly, the respondent might feel that provided information will be used against him or her. Then, the respondent might be smart enough to know what the interviewer wants to be answered. Contrasting this, the respondent does not wish to cooperate because he or she feels being ‘a guinea pig’, and suggests the interviewer to investigate richer and more sophisticated people. Lastly, the respondent might perceive his or her time being too precious to fill in the questionnaire.

Next, there are common mistakes in questionnaire constructions. These errors are listed as follows:

- Use of **ambiguous questions** and **foreign words**. Questions should always be clear to everyone.
- Use of **leading questions**. Questions leading to biasing respondent's answer should not be included in the questionnaire.
- Use of **sensitive** and **threatening questions**. This type of questions covers sensitive topics such as sex or taboo subjects such as suicide.
- Use of **double-barrelled questions**. Questions should be concise and should not touch two or more problems when allowing for one answer only (Bailey, 1994).

Finally, we distinguish among numerous types of questions. Each type is suitable for a specific purpose. Firstly, we have to mention **close questions**. Such questions are the cornerstones of every questionnaire. In this case, the respondent has to mark one or more options which suit the best. The advantage of usage of close questions is their easy assessment. The biggest challenge for the researcher is to state all possible answers, including ‘I do not know’ and ‘Others’.

Secondly, every sound questionnaire comprises **open questions**. Respondent is not constrained by any given options. He or she gives information into the blank space. In such case, the interviewer receives the wider range of answers. The advantage of use of open questions is greater validity of answers. However, the assessment is fairly complicated, and it requires both skills and patience of the researcher.

The other frequently used type of questions are the so-called **identification questions**. We can find them in every questionnaire. These questions are paramount because subsequent classification into categories is based on them. For instance, they include information about age, gender, attained education, size of the settlement, etc. They are usually situated at the beginning of the questionnaire.

The next category is represented by **contact** and **training questions**. Such questions are not to be found in every questionnaire. However, they are the necessary reminder for the respondents. They are used in lengthy questionnaires not to forget what the researcher actually wants to know. There is no need to assess them.

The last type of questions of greater importance is **filter questions**. They enable to exclude such respondents, whose next questioning would be meaningless. The main sense is to save both researcher’s and respondent’s time (Svatošová, Kába, 2008 as cited in Vacek, 2013).

3.1.9 Sampling

In practise, researchers are not willing to cover the whole population. Thus, when doing research, such researcher works with smaller representative unit, called a sample. This sample is an approximation of the population. Obviously, there are many advantages of sampling. Among others, it is very cheap way to conduct research. Then, considerable attention is paid to participants. In the case of quantitative research, the sampling frame has to be constructed in advance. However, there are some risks. The main problem is biased representation of the sampling frame. Such bias must be avoided. Otherwise, the final results are biased, too (Bailey, 1994, Kothari, 2004).

3.1.10 Sample Size

The appropriate size of the sample is a major issue faced by the researcher. For instance, Kothari (2004) defines an optimal sample as *"one which fulfils the requirements of efficiency, representativeness, reliability and flexibility"*. Furthermore, budgetary constraints have to be taken into account, too. Considering that, the sample size should neither be too small nor way large. Generally speaking, if the size of the sample does up, the accuracy is likely to increase as well. The accurate number of sample size is usually not stated. Nevertheless, as claimed by Svatošová and Kába (2008), if we require the confidence level to be 95 percent and probability of sampling error occurrence to be 10 percent, the sample ought to have 99 units. Talking about the type of research, quantitative research's sample size is much greater compared to qualitative one, and the results are, therefore, more reliable. Qualitative research is, on the other hand, characterized by small sample size. Nevertheless, the results tend to be more valid (Bailey, 1994).

3.1.11 Probability Sampling

Probability sampling, which is also called **random sampling**, means that each unit of population has the same chance to be selected for the sample. In such case, the bias is minimized. Next kind of probability sampling is **systematic sampling**. This is a method, which takes every k^{th} unit from a sampling frame. Then, we can mention **stratified random sampling**. Here the population is divided into subparts, also called strata, such as gender, for example. After that, researcher produces a random sample for each stratum. The last method of probability sampling is **cluster sampling**. Simply said, this is a random sampling collected from more samples. It is cheap. However, sampling error can occur in each sample (Bailey, 1994).

3.1.12 Non-probability Sampling

In contrary to probability sampling, the chance of being selected into the sample is not known in case of non-probability sampling. Therefore, researcher cannot consider his or her sample to be representative. However, it is way cheaper compared to probability sampling. The first method of non-probability sampling is **convenience sampling**. In this sampling, the researcher picks closest respondents such as friends, family or neighbours only. The second method is **quota sampling**. Similarly to stratified sampling, the researcher firstly divides population into subgroups. Then, he or she sets quota relevant to proportion of representation in the whole population for each of those subgroups. The next method is called **purposive sampling**. This sampling places the emphasis on specific features of a population of researcher's interest. He or she usually uses the skills to pick the members of this research. Finally, the fourth method of non-probability sampling is **snow-ball sampling**. In the beginning, there is a small number of research members. These members then nominate other participants (Bailey, 1994).

3.1.13 Qualitative Research

As stated above, there are various types of qualitative researches. Let us explore them in more detail in this section.

The first type is **document study**. This type of research mainly uses the content analysis as a tool for research. In such case, the researcher studies a class of subjects made by a human being of cultural interest, that is to say, the artefacts. These artefacts can be of different characteristics. For example, magazines, songs, images, letters and even graffiti can be analysed. The biggest advantage of this study is that it saves money. However, it is limited to the number of those artefacts. Existing statistics is the next type of document study. To conclude this part, the researcher makes a determined effort to discover similar patterns occurring at a particular time on a particular place (Bailey, 1994).

The next type of qualitative research is the **observation**. This method is the primary technique for data gathering, based on non-verbal behaviour. It includes data collection through senses such as eyesight, hearing, touch, smell and taste. Moreover, we differentiate between participant and non-participant observers. The participant observer participates in life of observed people on a daily basis. Contrasting this, the non-participant observer is not a member of observed people everyday lives. The natural environment can be stated as the main advantage of this method. On the other hand, disadvantages are to be the small size of the sample, necessarily permission and lack of anonymity. Additionally, the coding of observed phenomena has to be done in advance (Bailey, 1994).

The last type of qualitative research mentioned in this part is the so-called **focus group interviewing**. This method can be described as a group interview comprising a small number of people, usually six to ten, and a facilitator. The main sense is to collect the data through discussion. Therefore, the facilitator must be well-skilled to avoid, for example, the dominance of some people. At the same time, he or she shall encourage shy members to participate in the discussion. He or she asks open questions either in systematic order or randomly. Once again, it depends on his or her skills and experience. Focus group interviewing is considered as very costly, because both the facilitator and the members have to be paid (Bailey, 1994).

3.1.14 Implementing the Research Plan

This part of the research process is the most difficult. Basically, the researcher has two options. Either he or she can collect the data on his or her own, or he or she can use outsourcing. The outsourcing is quicker and cheaper. However, there is a risk of negligence in the process of data collection. This part is also most *"subject to error"* (Kotler and Armstrong, 2011). There ought to be no room for ambiguity. In the case of quantitative research, either the whole population or a representative sample is examined (Bailey, 1994).

3.1.15 Interpreting and Reporting Findings

In this part, we usually employ statistical software to facilitate the process and save time. We have to avoid bias in interpretation. Moreover, only statistically significant and meaningful results should be reported to the manager. Both the manager and the researcher cooperate once again, and the manager might have some additional questions for the research. Finally, *"raw data should be made available to manager and other stakeholders, so further analysis can be easily done"* (Kotler and Armstrong, 2011).

3.2 Beer

3.2.1 History of Beer Worldwide

Beer is considered as one the oldest beverages made by mankind. It is an ancient beverage which was originally produced by the Sumerians in the fourth millennium BC. There is evidence that the art, as well as the science of the brewing of beer, is as old as the baking of bread. Both practices include similar ingredients like grain, water and yeast (Yenne, 2014).

Surprisingly, the early written documents give quite interesting insights, stressing beer's key role. For instance, *"in the Epic of Gilgamesh, king of Ur, the savage Enkidu is civilized by a woman teaching him to eat bread and to drink beer"* (Eblinger, 2009). The beer and brewing were definitely one of the cornerstones of early societies. Moreover, the truly happy man had to have *"his mouth full of beer"* (Eblinger, 2009).

Next, the Sumerians passed their experience to the Babylonians. In that times, even some literary texts were written. One of them was called the 'Hymn to Ninkasi' and it provided the detailed knowledge of the brewing process. This poem, which comes from the eighteenth century BC, examines all essential ingredients of the great drink. In particular, it mainly describes a fermented mixture of leaven and aromatic herbs, some malted grains, honey and wine. In order to improve beer's taste, the Old Babylonians started to add the fruits to the beer. They could have hardly imagined how successful their experiment is nowadays (Eblinger, 2009).

Then, the Babylonians began to export the beer to Egypt. It became the national drink and even something more, something like the interconnection between all social classes. Such beer was served in the pubs where the people met in the evenings. It also had the numerous utilisation. Amongst many others, it was being used in medicine and as the part of medical therapy by the Egyptians. Furthermore, certain types of beer were brewed for religious purposes only. The beer in Egypt was brewed in huge vats, and it usually contained barley as the principal grain. Occasionally, some types were produced from emmer. Over the years, the technology has changed and the Egyptians, moreover, adapted the market trends. There is the evidence that the type of barley and thus, the brewing process differed in different parts of Egypt. Therefore, we can say the beer was not the same in there, and it has changed significantly over the centuries (Eblinger, 2009).

The dramatic change occurred in 331 BC as the Greeks conquered Egypt. The Ptolemeian rulers introduced wine which divided the social classes once again. Wine became popular for upper classes, in contrary to this, beer's production was regulated, and even a tax was imposed. This act took place basically due to cultural reasons. The Greeks were drinkers of wine, and they believed that beer was the so-called 'cold' drink suiting the principle of female. On the other hand, the 'hot' drinks like wine were matching the principle of male (Eblinger, 2009).

Moving to Northern Europe, the cultivation of grain started approximately 6,000 years ago. The beer manufacturing was significantly different from practices in Mediterranean. The tribe of Celts, which had occupied the huge area in Central and Southern Europe since 700 BC, had developed the brewing in there. Especially the population of South Western Europe produced a liquid made from water and grain. The purpose of this fluid was to intoxicate the people. Then, particularly in Central Europe, the early German tribes pushed out the Celts. These German tribes drank the beverage from barley or wheat in vast quantities. To paint the whole picture, the sources also state that approximately 200 types of beer have been brewed by the first century in Europe (Eblinger, 2014, Yenne, 2014).

3.2.2History of Beer in the Czech Republic

When talking about brewing, the Czech Republic has a paramount position in continental Europe. It basically consists of three parts – Bohemia, Moravia and Silesia. Especially the Bohemian lands have great properties for brewing, and the documents say that the beer has been produced in local breweries since the tenth century. These days, the triangle comprising three Bohemian cities – Prague, Pilsen (Plzeň) and České Budějovice, plays the most important role. Of these, Pilsen has the most international importance (Yenne, 2014).

The Pilsener type of beer is known all around the world, in particular, with its gold label Pilsner Urquell. This beer style came into fashion in the middle of 19th century. It is a heavily hopped lager made with bottom fermenting yeast, and the volume of alcohol is 4.4 percent. The aromatic hops come from the city of Saaz. Another essential ingredient is the soft water. Such Pilsner Urquell "*quickly attained attention throughout Europe*" (Eblinger, 2009).

The second largest Czech brewery is located in Prague. It is called 'Pivovary Staropramen'. The beer was firstly produced there in 1871. More than one hundred years later, in 1992, "*it joined with the Branik and Mestan Breweries to form Prague Breweries*

Group" (Yenne, 2014). It was then acquired by Bass from the UK in 1996. Then in 2000, Bass was bought by Interbrew. Staropramen in Prague produces pilsner-style beers, as well as dark lagers.

The third flagship of Czech beer manufacturing is the city of České Budějovice. The beer of the local brewery is known as Budweiser. This brand has a global importance. However, many people do not connect such Budweiser with beer from the Czech Republic. This is mainly due to the fact that in 1876, Adolphus Busch chose the beer from this region as the guide for the brand he set up in the United States. He called it Budweiser, too (Yenne, 2014).

3.2.3 Czech Beer Drinker

Czech beer drinker is highly conservative. However, he or she is able to adopt the global trends slowly. This is supported by the fact that fruit beers are no longer considered as a matter of fashion (Vinopal, 2014a). Generally speaking, the lower classes tend to drink the light ten-degree beers, whereas upper classes enjoy lagers. Likewise, men prefer a light type of beer while women like a dark one. The demand is very inelastic. Specifically, the Czech beer drinkers react more strongly to changes in price in comparison to the investment into advertising. Therefore, we can state the consumption is not dependent on advertisements (Castiglione et al., 2011).

In the last years, the beer consumption dropped quite significantly in the Czech Republic. It peaked in 1995 with over 160 litres per capita, nevertheless, in 2013 it was only 134 litres per capita. Many factors caused such drop in consumption. Firstly, there is a change in lifestyles, in general. Beer is not that fancy as it used to be. Secondly, there are pressures from employers to be more efficient, i.e. not to drink at work. Moreover, lastly, the great beer-loving generation is aging (Kozák, 2013).

Contrasting this, the data from last year slightly deviate from the long-term tendency of diminishing beer drinkers among men. There was a substantial annual increase in the proportion of drinkers in the youngest group of men, i.e. between 18 and 29 years (from 86 to 93%). At the moment, unfortunately, we cannot say whether this increase was due to measurement error, random fluctuation or it indicates a deeper change in the relationship of this group of respondents to the beer (Vinopal, 2014a).

3.2.4 Fruit Beer

Yenne (2014) states *"beer is a beverage originating with grain, in which the flavour of the grain is balanced through the addition of other flavourings"*. Those flavourings have originally been hops. Nevertheless, the Babylonians and the Egyptians have used flavours such as honey and fruit. Similarly, set up on this basis, certain modern beers contain just fruits (Yenne, 2014). Therefore, the fruit-flavoured beer is not just a marketing trend, but a traditional brewing procedure which has been recently refreshed.

Traditionally, beers were flavoured with all kinds of things. For example, the scale from juniper berries to various herbs can be stated. Later on, the hops became the main means of flavouring. Their preserving properties altogether with the complementary flavours balancing barley malt's sweetness created a great mix full of taste (Pinhey, 2008).

As reported by Price and Saunders (2004), you can add many ingredients to the beer and still call it beer. Alternatively, you can call it something else. A malt liquor, which is to say, beer, with an addition of any fruit flavouring can be called hard lemonade, Shandy, Radler, etc. Furthermore, you can call it Zima or whatever. However, "*Zima is not beer, nor does it claim to be (nor want to be). It is based on a malt-fermented product, but that is where the similarities end "*(Price, Saunders, 2004).

Wright (2007) provides quite complex characteristics of fruit-flavoured beers. For instance, he states that the particular smell is associated with the particular fruits. Some fruits like raspberries or cherries have more intensive aromas and thus, they are more suitable for the final product. On the other hand, it should not be prominent as to ruin the overall balance between fruit and beer. The same applies to flavours. Moreover, the fruit character must not be artificial and overpowering. If it did, we could have drunk just a fruit juice beverage.

Fruit beer can be seen as the refreshing antidote to a hot summer day. The particular focus should be placed on choosing a suitable brand. Some of them are way too sweet, and this would not help to quench any thirst. A good fruit beer always balances that sweetness with the tartness. However, not all fruit beers are flavoured with fresh fruits or juice. Instead of such fruits or juice, some breweries use 'artificial' fruit syrup (Pringle, 2009).

Among other countries, the fruit beer is to be the most significant for Belgium. It is usual to balance a traditional sourness of beer with a real fruit in there. The Belgian beers like Kriek (flavoured with cherries), Framboise (raspberries), Cassis (black currant), Peche (peach) and Druvien (Muscat grape) are a few of many traditional brewed beverages that use fruits for flavourings. As stated above, the origins of brews with fruits came from Egypt. However, the fruit beer tradition approaches Peru as well. The local Quechua women host an annual ancient brewing festival called Fruitilada. One of the significant features of those drinks brewed from corn and strawberries is a 2- inch-tall head of foam. Nowadays, the brewers and brewmasters all around the world "*experiment with traditional fruit flavours and formerly unheard-of concoctions, including cranberry, kiwi and mango*" (Price, Saunders, 2004).

3.3 Consumer Behaviour

Consumer behaviour is affected by many factors. This chapter analyses them from different points of view. Firstly, probably the most communicated characteristics such as price, quality, brand, advertisement and the age of consumer are examined. Secondly, the factors that are closely associated with beer consumption are investigated. Specifically, these factors are the size of the company, social status, season and the passion of beer drinkers.

Table 5 - Factors Influencing Consumer Behaviour

General	Beer connected
Quality	The size of the company
Price	Social status
Brand	Season
Advertisement	Passion
Age	

Source: own processing

Quality is probably the most common feature in the differentiation of any product. Many beer producers state that they use the best quality ingredients only. Trademarks like organic food may be listed here as well. The distinctive message from the brands offering greater quality is to drink better beer. Therefore, it is not the price what floats these brands' boats. The consumers looking for better quality are characterized by the appreciation for the brewing process and its history. There exists a link between consumption and education, too. Better educated consumers tend to consume the products with higher quality. However, the consumers that are open to trying new beer styles and flavours are also, at least partially, quality driven. Factors such as season or convenience play a great role for them (Carpenter et al., 2013).

Traditionally, **the price** of a particular product plays a critical role. Simply said, the lower price evokes higher demand. The other thing is the perception of these prices. As reported by Asamoah and Chovancová (2011), approximately two-thirds of advertisements display decimal endings. In this case, the consumers usually feel they are paying less. In particular, these endings are '.90' (e.g. CZK 15.90). This so-called odd pricing is considered as very effective. Such phenomenon is even multiplied in the Czech Republic because this country does not use hellers anymore, and the final sum is rounded up. On the other hand, the premium pricing brings a state of greater quality to consumer's mind. Pilsner Urquell quite successfully uses this strategy. Although its 'power-to-price' ratio is one of the lowest in the Czech Republic, the brand itself is very popular (Maier, 2013).

Next very influential factor is a **brand**. The keyword is the brand's credibility. Erdem et al. (2002) argues *"that the impact of price on consumer utility may be moderated by brand credibility when there is consumer uncertainty about brands and asymmetric information in the market place"*. In other words, brands with greater credibility generate greater profits. Strong brands are associated with credibility and they enable to build loyalty as consumers trust the quality. When the credibility is high enough, the brand becomes an automatic option for the majority of consumers when purchasing goods. As stated by Horan (2014), this ought to be an ultimate goal of every good brand.

Advertisement makes every effort to influence consumers. These days, everyone is flooded with hundreds of ads on a daily basis. According to Kumar and Raju (2013), the consumers are *"more likely to associate with advertisements of those brands, which have emotional values and messages"*. The ads can be delivered through various media such as television, radio, billboards, prints, internet or word of mouth.

The social media advertising should be examined in more detail because of its growing importance. Vinerean et al. argues that (2013) *"social media, especially social networking sites, provide a virtual space for people to communicate through the Internet,* *which also might be an important agent of consumer socialization"*. The main companies' focus is to engage new customers using ads on Facebook, Twitter, LinkedIn and other social networks. Furthermore, the technology companies monitor the potential customers across the web all the time. Thus, every time we connect to Facebook, we see the ads for products we are most likely to buy (Yevensky, 2014). In addition to that, the firms having profile on Facebook use relevant information from customers' profiles. If they receive 'like' from them, they can target them both more easily and accurately.

The age of consumer has a considerable influence. Buying behaviours fluctuate with every generation. It is imperative to understand what the purchasing habits of particular age groups are. However, the fundamental traits of each group are shifting. Moreover, particular phenomena such as down-aging can be seen quite often. The term down-aging refers to consumers in a given age group acting "*in ways that would be expected of their younger counterparts"* (Agriculture and Agri-Food Canada, 2012).

The age group 18 - 34 is mainly defined by its curiosity of trying the new things and high demand for luxury products. This age group also looks for the design, value and to some extent the social responsibility. On the other hand, these young adults find it very difficult to have steady jobs, especially in western countries. It means they like purchasing luxury goods, but they cannot afford them on a regular basis. Next, in terms of food and beverages, the young consumers like trying new things and following international trends. They also believe they consume healthier products than their parents. In contrary to this, they enjoy eating at takeaway at least once a week (Agriculture and Agri-Food Canada, 2012).

The next group is 35 - 54 years old. This age group is generally willing to spend more. It actually spends a lot, but carefully. The price is not major issue for them, the most important factor is to be quality. These consumers usually have higher disposable income and they are becoming more experience-oriented. However, many of them financially support children or other relatives. Thus, the amount spent on purchasing the goods depends on the size of their families (Rence, 2006, Agriculture and Agri-Food Canada, 2012).

The last group 55+ is the generation looking towards retirement. This generation is characterized by low openness to changes. These consumers are "*giving marketers opportunities in the areas of financial, hospitality, and wellness products and services"*

(Rence, 2006). In terms of food and beverages, they demand easy-open packaging. The same applies to the labels, where they prefer capital letters (Mintel Group, 2010, as cited in Agriculture and Agri-Food Canada, 2012).

The size of the company can play a marginal role for consumer when selecting beer. It should not be overlooked though. The brewery's scale may entirely differentiate itself from the competitors. And of course, to be either smaller or bigger has both pros and cons. To be the bigger brewery is being considered as an advantage by calling these breweries the so-called market leaders. Such market leader is perceived as a brand with the greatest know-how and the largest number of employees. The consumers that do not effort to find out something new will probably buy their beer from the larger breweries. However, each coin has a flip side. This flip side is represented by the pride of being small and doing the things in an unusual and unique way (Carpenter et al., 2013).

The next influential factor is **social status**. The lower social status, associated with the lower level of education, indicates the greater probability of consumption of alcoholic beverages. This educational status also determines the choice of alcoholic beverage. For instance, women with lower education tend to drink significantly more wine in comparison with their more educated peers. In contrary to this, there exists a positive relationship between socio-economic status and alcohol consumption (Dias, Oliveira, Lopes, 2011).

The season has the influence on buying behaviour, too. Murray et al. (2010) claim that nice weather has a positive effect on consumer spending. Specifically, as the sunlight increases, the negative effects influencing the consumer are diminishing, and he or she spends considerably more. At the same time, the willingness to pay, especially for a cold beverage, significantly increases when people are exposed to the sun. Therefore, the consumption of beer is usually greater during summertime.

The passion of beer drinkers is not mentioned quite often. Neither the producers nor the consumers do realize that. Bus this is a mistake. Brewer passion plays a large part in beer brand distinction. After all, the beer produced with passion always tastes better. Such passion can be demonstrated by the communication between the brewery and its consumers. Particularly, providing various information is very appreciated by the beer drinkers that are passionate about brewing quality. Moreover, such beer drinkers feel they are the part of the whole process. All in all, this may create a good experience, as well as loyalty (Carpenter et al., 2013).

4 Actual Work

4.1 Assessment of Survey

The questionnaire survey took place at the beginning of March, 2015. In total, 420 respondents participated in the survey and did fill out the questionnaire. The questionnaire was carefully constructed in advance, and it comprised 26 questions of various type, including both close and open questions. Firstly, there were identification questions providing information about respondents’ gender, age, nationality and so forth. Next, there were also some filter questions. Therefore, no single respondent was allowed to answer all the questions. For instance, the first major question ‘Do you at least sometimes drink beer?’ divided the sample into two groups. Of course, these groups faced the different questions.

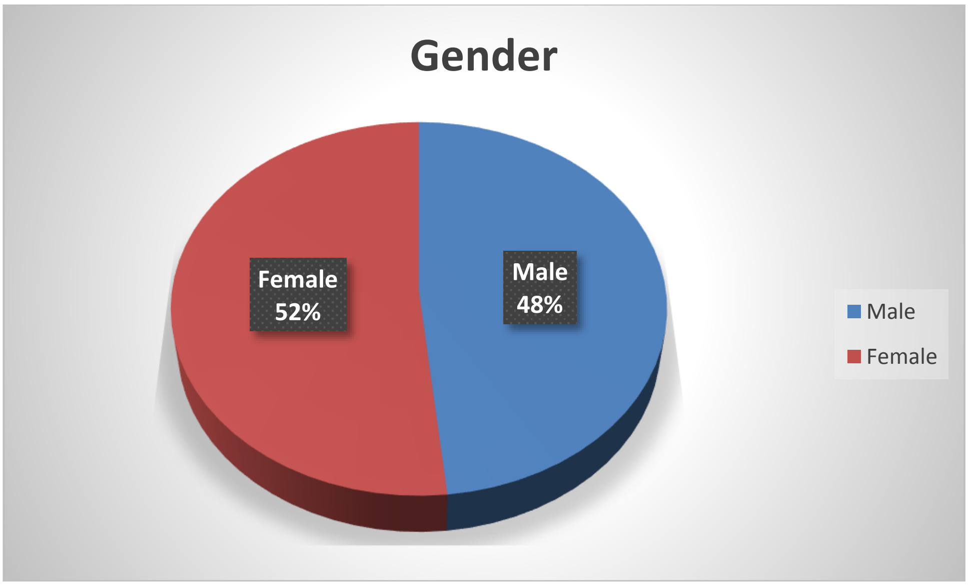
The questionnaire itself was distributed mainly through social network Facebook. However, a significant amount of respondents received a direct mail. Finally, some respondents were asked to fill out the paper form. Snow-ball sampling technique was used in order to reach the greater amount of respondents. This survey was constructed at website ‘vyplnto.cz’. The questions were displayed all at once and thus, every single person could have easily seen the type of questions and then contributed to such piece of research.

The first part of assessment deals with information about the sample. In other words, the identification questions are being evaluated firstly. Then, the rest of questions is assessed using the same manner. Lastly, the selected age group 18 – 29 is analysed more deeply. Graphical evaluation is prepared in Microsoft Excel 2013.

4.1.1 Characteristics of the Sample

As stated above, the identification questions were situated at the beginning of the survey. The first one was focused on the gender of respondents. In total, 217 females and 203 males were able to share their beer preferences. This counts for 52 percent of women and 48 percent of men which is actually shown in the **graph 1**.

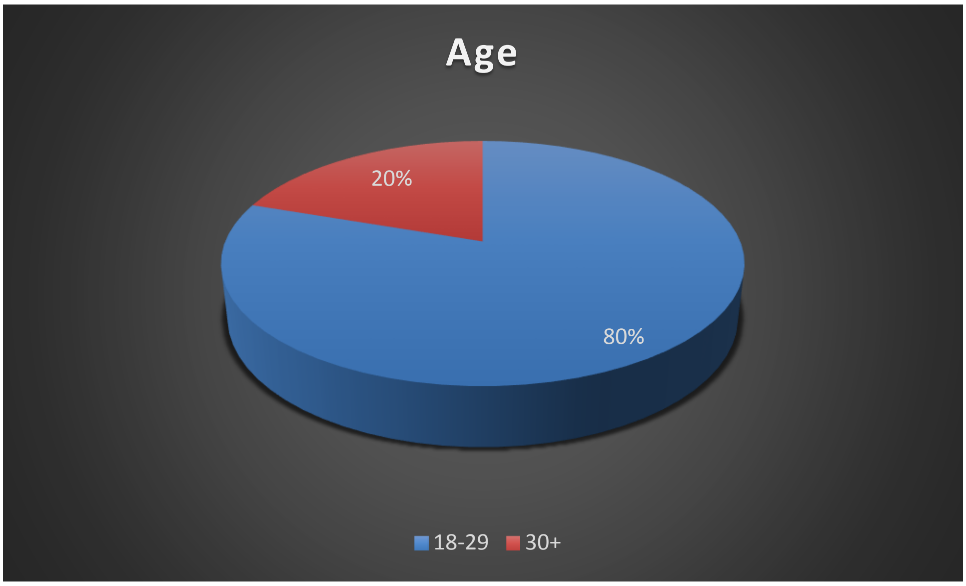
Graph 1 - Gender



Source: own processing

Next question relates to the age of members of this survey. These members were asked to fill their age, and the age groups were created later on. As it is apparent from the data, the majority of participating people belongs to selected age group 18 – 29. It actually is 80 percent of all respondents (see **graph 2**). Looking at their socio-economic background, these people are usually studying, and a significant number of them is already building up the career. Because the primary aim of this research is to examine the consumption preferences of this group, the rest of respondents with the age different from 18 – 29 was simply put into the group 30+. The answers of people younger than 18 were not taken into account due to a legal limit of alcoholic consumption in the Czech Republic. The oldest respondent was 69.

Graph 2 - Age

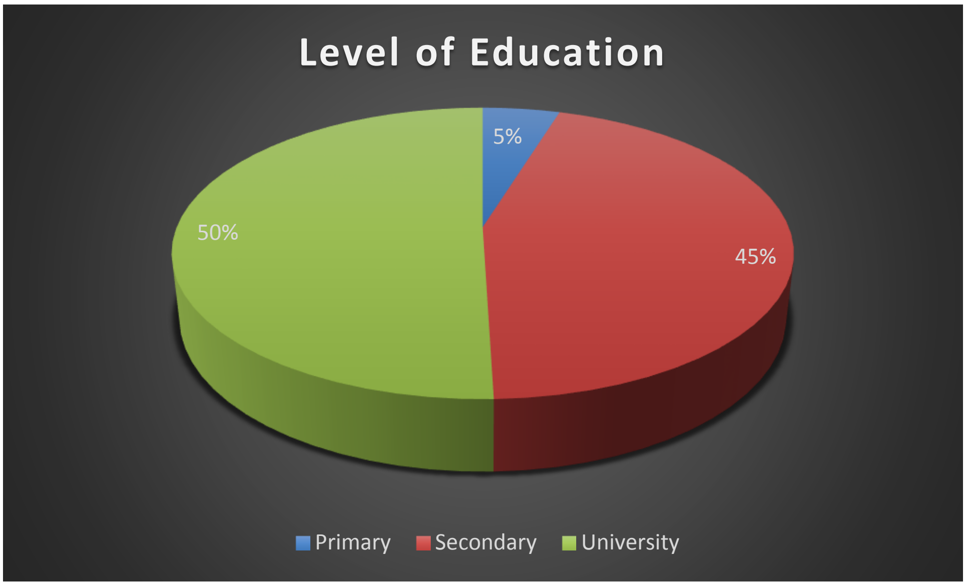


Source: own processing

This questionnaire survey's next question put emphasis on the highest level of respondents' education. To make it simple, only three options were available: primary, secondary and university.

Firstly, only 5 percent reached just the primary education. Next, the strong group, comprising 45 percent of respondents, accounts for secondary education, no matter if they passed graduation or they just have apprenticeship certificate. Finally, the half of participants of the survey reached university education. Once again, any deeper distinction between bachelor, master or even higher degrees has not been done.

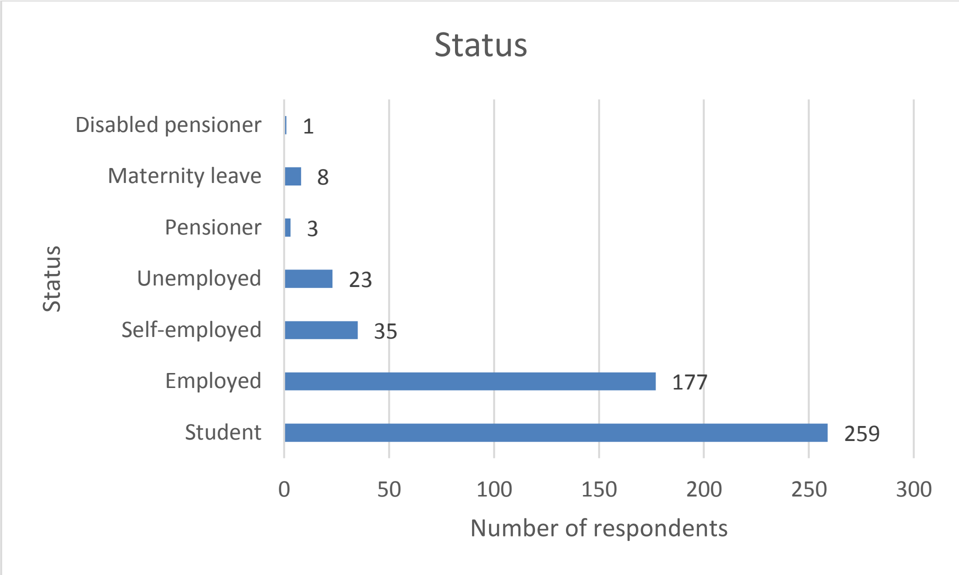
Graph 3 - Education



Source: own processing

Next, the questionnaire also included a question about the economic status of respondents. As stated above, the majority of this survey participants belongs to age group 18 – 29. This fact implies that the most of them are still studying. However, a significant percentage is employed or self-employed. 23 people out of 420, which is about 5 percent, stated that they were unemployed. Only a marginal number chose the option ‘pensioner’ and ‘maternity leave’. Moreover, just one person marked the option ‘other’. Particularly, he or she was a disabled pensioner. Detailed evaluation can be seen in the **graph 4**.

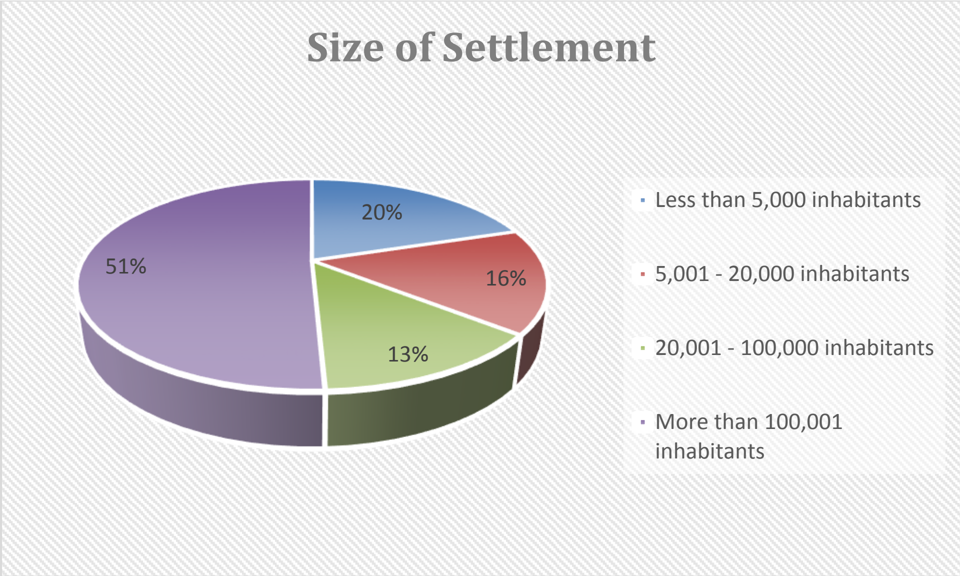
Graph 4 - Education



Source: own processing

Then, the members of this survey answered the question which was focused on the size of their settlement, that is to say, the population of the city they lived. A majority (51 percent) selected the answer ‘more than 100,101 inhabitants’. The other options were being picked with similar frequency. 20 percent of respondents lived in the villages with less than 5,000 inhabitants. The towns with 5,001 – 20,000 and 20,001 – 100,000 inhabitants accounted for 16 and 13 percent, respectively (see **graph 5**).

Graph 5 - Size of Settlement

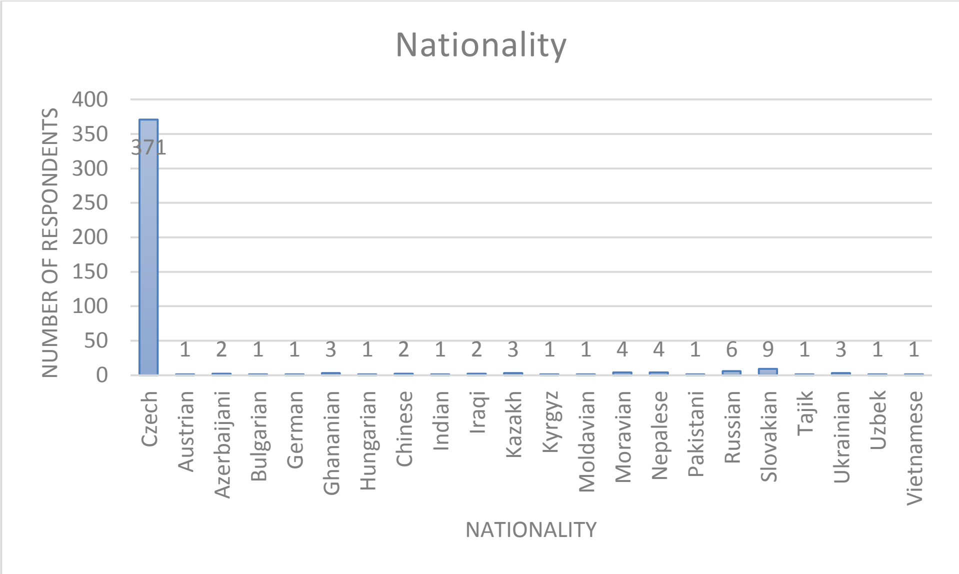


Source: own processing

The last identification question was asked in order to distinguish the nationality of the participants of this beer-connected survey. According to Yenne (2014), the nationality can play a major role in beer consumption.

After all, people from 22 different countries expressed their opinions. Unsurprisingly, the majority were Czechs. However, 49 respondents marked the option ‘other’. These foreigners mostly came from Slovakia (9) and Russia (6). Among others, the people of Azerbaijani, Uzbek or Ghanaian citizenship participated in the survey, too. Furthermore, 4 people that did not choose the alternative ‘Czech’ felt the pride of being Moravian (see **graph 6**).

Graph 6 - Nationality



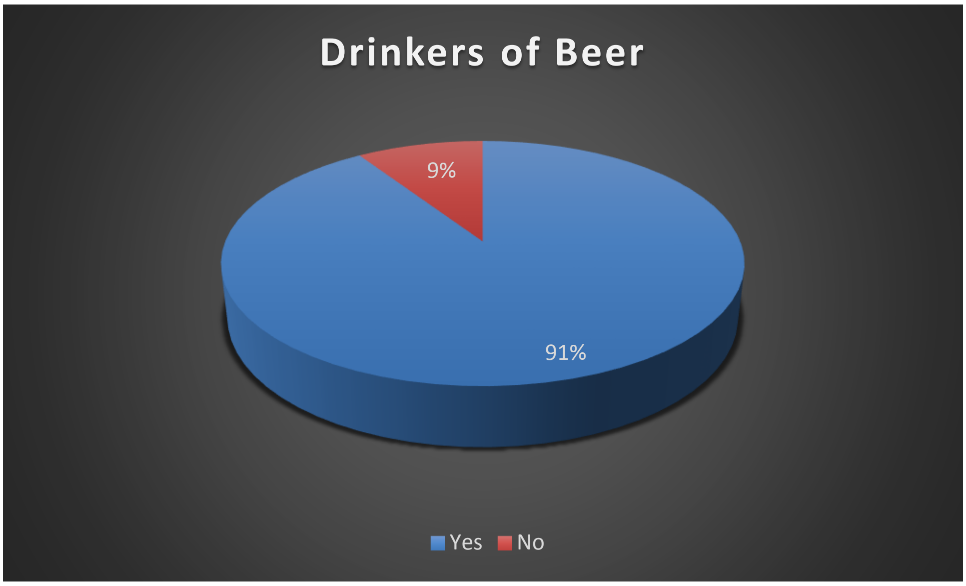
Source: own processing

4.1.2 Evaluation of the Rest of the Questions

The rest of the questions was directly focused on beer consumption preferences. First of these questions divided the sample into beer drinkers and people who did not drink beer at all. Firstly, we will deal with beer drinkers.

As it might be seen from the **graph 7**, the liquid bread is at least sometimes drunk by 91 percent of people in the sample. Only 9 percent of respondents did not drink beer at the time and thus, they were excluded from the questions probing beer consumption preferences. In absolute terms, 381 people did mark answer ‘yes’, whereas only 39 answered negatively. Speaking about gender distinction, 94 percent of males and 87 of females were not be shy and responded positively. These percentages are very important for further comparison to other research, which will be made later on. The comprehensive graphical assessment may be seen in the **appendix 1**.

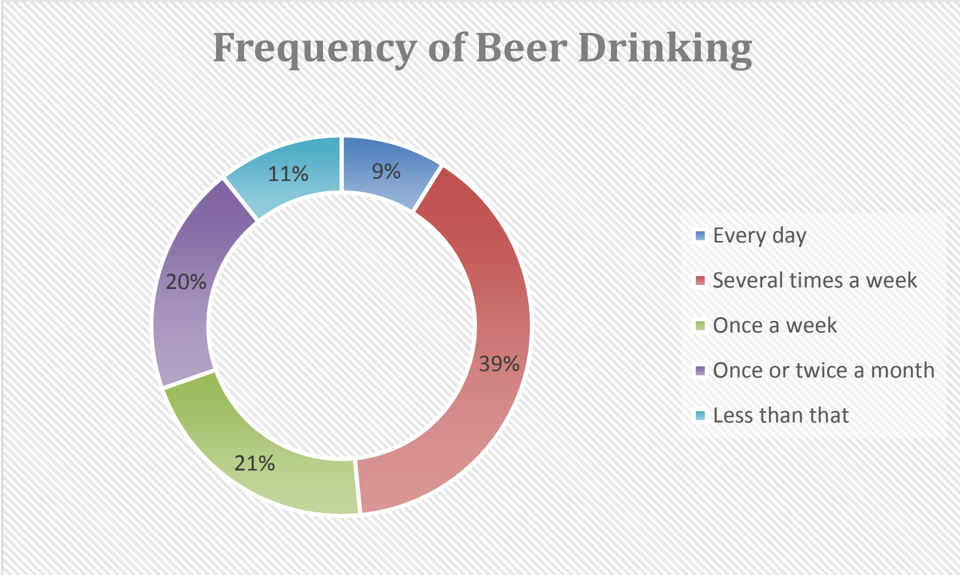
Graph 7 - Drinkers of Beer



Source: own processing

To know that 91 percent of respondents sometimes drink beer is not sufficient. To paint the whole picture, we have to discover how often they do so. The answer to this particular issue is processed on the **graph 8**. Basically, it states that just 9 percent of the people participating in the survey drink beer on a daily basis. Next, 39 percent consume it on a regular basis, too. However, this 39 percent of respondents do so just several times a week. Then, 21 percent of interviewees treat themselves to beer once a week. Another 20 percent consume this bitter beverage only once or twice a month. Finally, 11 percent consume beer once in a blue moon. In other words, these people do drink beer, but less than once a month and on a very irregular basis.

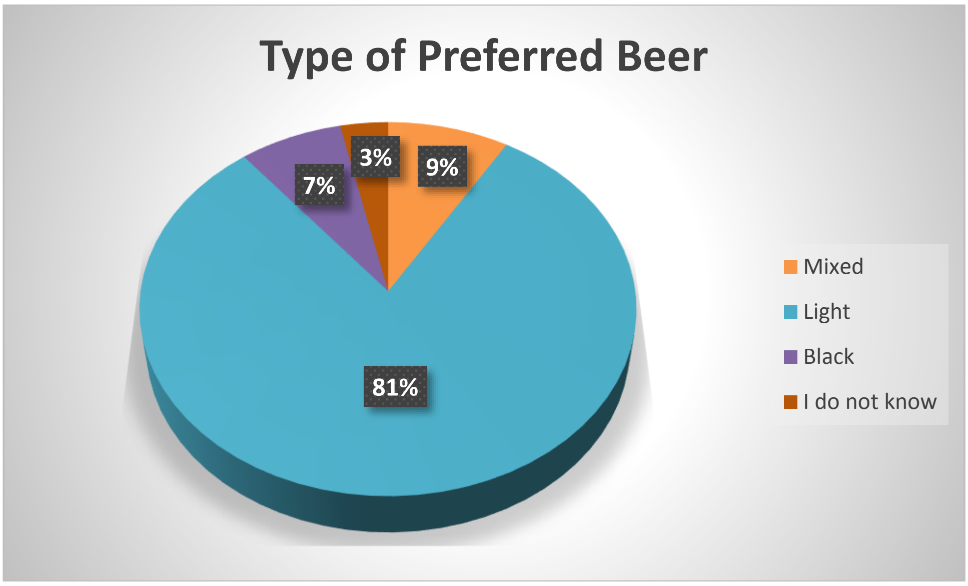
Graph 8 - Frequency of Beer Drinking



Source: own processing

The light beer can be referred to as the most favourite type. 81 percent respondents did state so. Next, 9 percent of the people that filled out the questionnaire claimed that their favourite type of beer was the mixed type. Only 7 percent preferred black beer. Lastly, 3 percent of respondents were not entirely sure and chose the answer 'I do not know' (see **graph 9**).

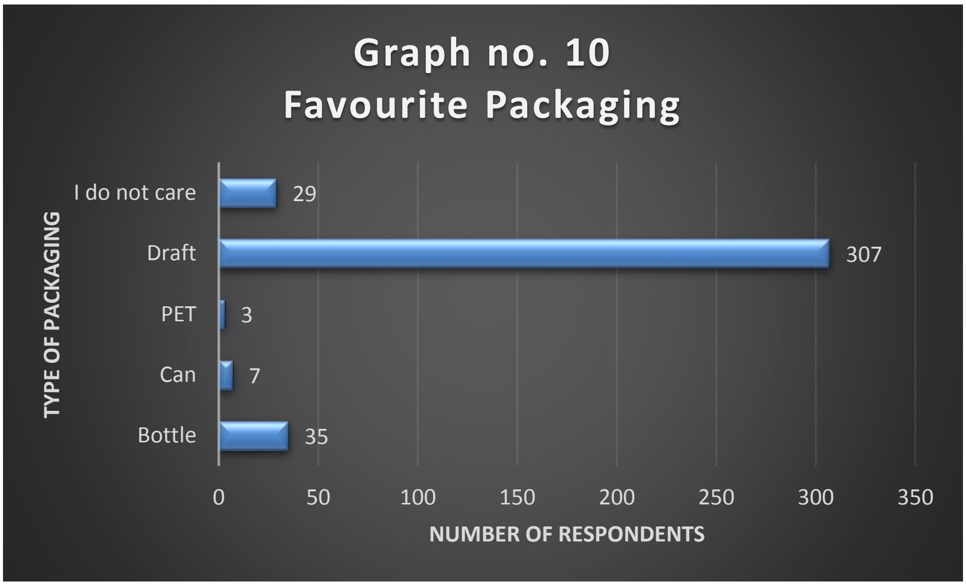
Graph 9 - Type of Preferred Beer



Source: own processing

A huge amount of people does prefer beer in its draft form. Specifically, it was 307 respondents. This counts for almost three-fourths. The second most frequent option was the beer in a bottle. However, this option was marked by a mere 35 respondents. There was a vast gap between those two forms of serving. The other options such as a can and PET were selected even less. In particular, these answers were picked in 7 and 3 cases, respectively. In fact, the variant 'I do not care' was being chosen more often than those two options altogether. All in all, 29 people genuinely did not care if they actually consumed draft beer, bottled beer or whatever.

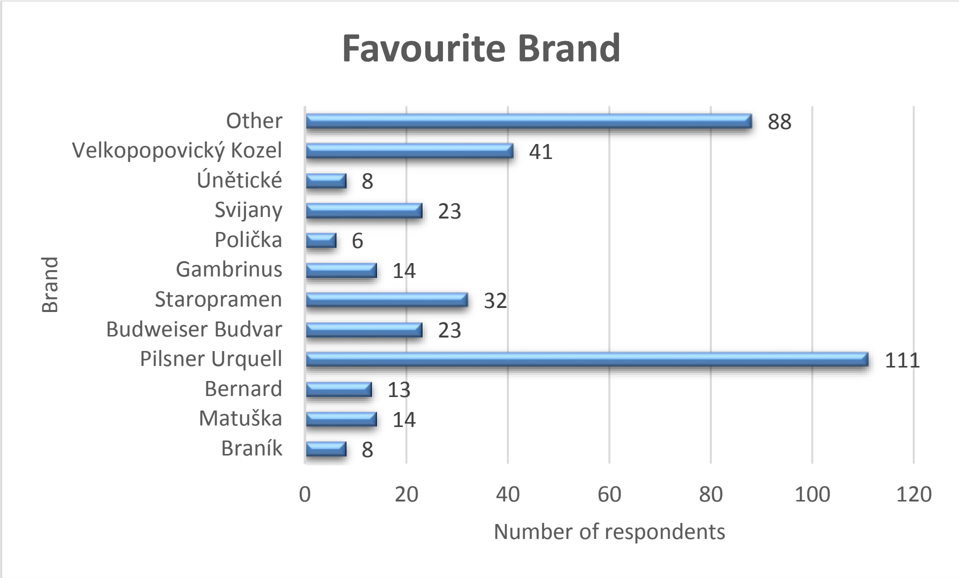
Graph 10 - Favourite Packaging



Source: own processing

Next, the favourite brand was being chosen by the beer drinkers. The brand Pilsner Urquell sits at the top with 111 answers. The other popular brands are Velkopopovický Kozel and Staropramen. In total, over 40 brands were being mentioned. Moreover, what is even more interesting is the fact that over 30 respondents stated that their favourite brand was a microbrewery brand. This is quite a new trend. It will be definitely exciting to observe this particular phenomenon in the future. The whole question is examined in the **graph 11**.

Graph 11 - Favourite Brand 1



Source: own processing

A seasonality is a well-known phenomenon for all beverages. Two-thirds of respondents did state so. Specifically, they claimed that they drank different amounts of beer in different seasons. Of these, 93 percent said that the season they consumed beer the most was the summer. Contrasting this, a mere 3 percent stated the opposite, that is to say, the winter. Also, 2 percent of respondents believed that their greatest beer consumption took place in spring and autumn, respectively (see **appendix 2**)

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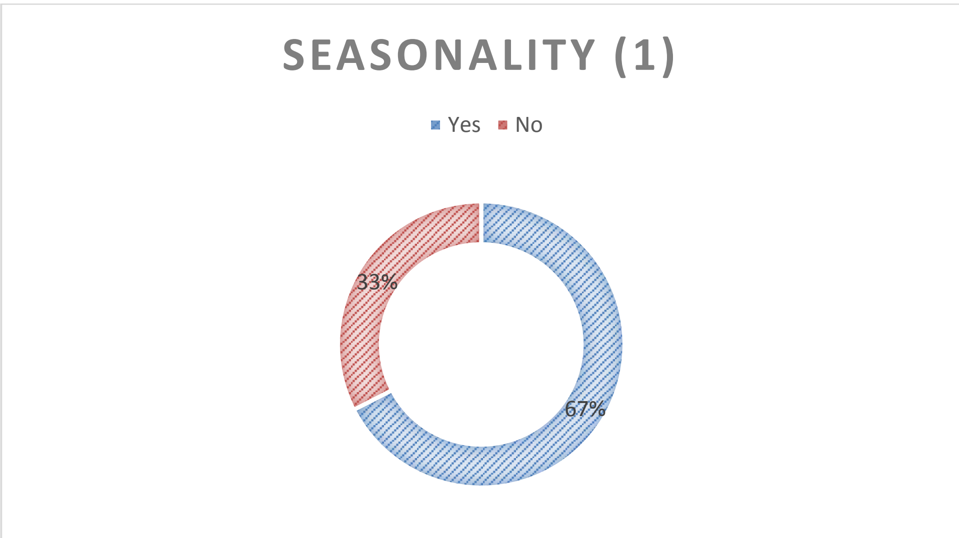
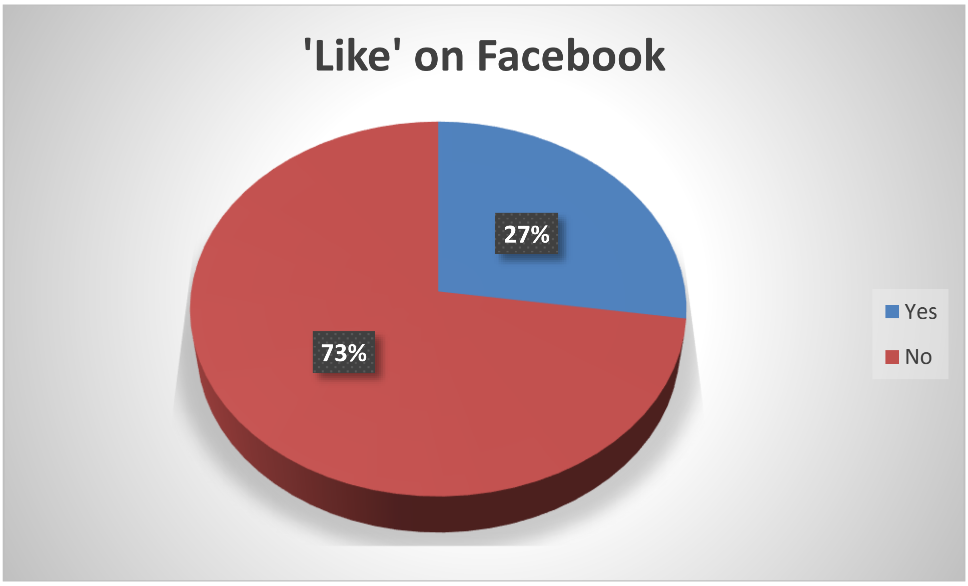
Graph 12 - Seasonality (1)



Source: own processing

Nowadays, the firms use Social Media Marketing as one of their targeting tools. Next question was focused on such issue. Firstly, the respondents were filtered according to the use of social network Facebook. In case they used Facebook, they were facing another question concerning ‘like’ on Facebook. However, only 27 percent of Facebook users give such ‘like’ to their favourite beer brand. 73 percent answered negatively. This may be because this targeting tool is quite new, and beer drinkers in the Czech Republic are being considered as very conservative.

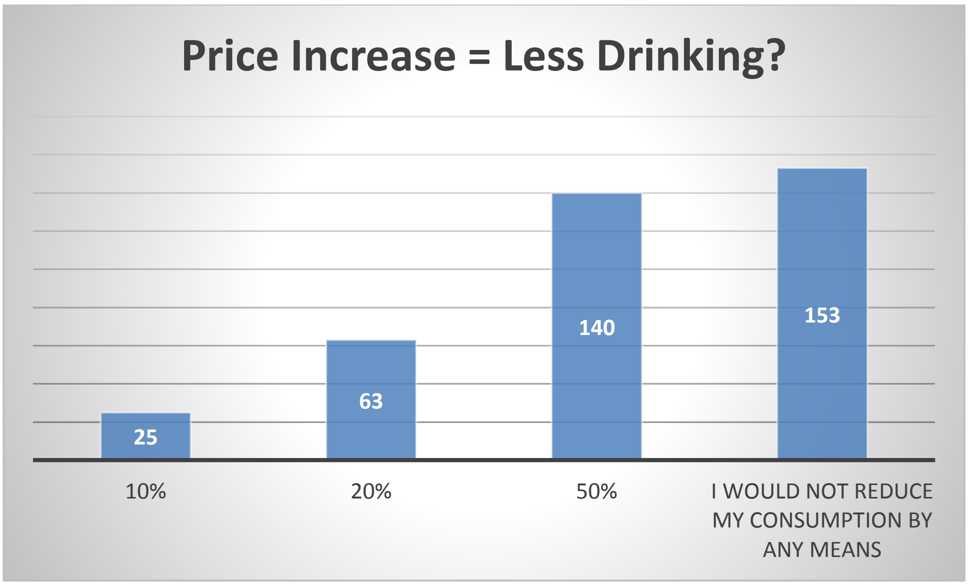
Graph 13 – Social Media Marketing



Source: own processing

It is quite important to test the sensitivity to changes in price because beer is being considered as price insensitive. In other words, increase of price should not discourage people to consume it. However, basic microeconomic theory says that the increase of price evokes decrease in demand and thus, in consumption. The first belief proved to be right. Almost a half of people stated that they would not reduce their consumption by any means. Moreover, 140 people out of 381 argued that 50 percent increase in price would evoke the reduction of their beer consumption. In contrary to this, 63 respondents claimed that 20 percent increase in price would mean less beer for them. The **graph 14** graphically processes this question.

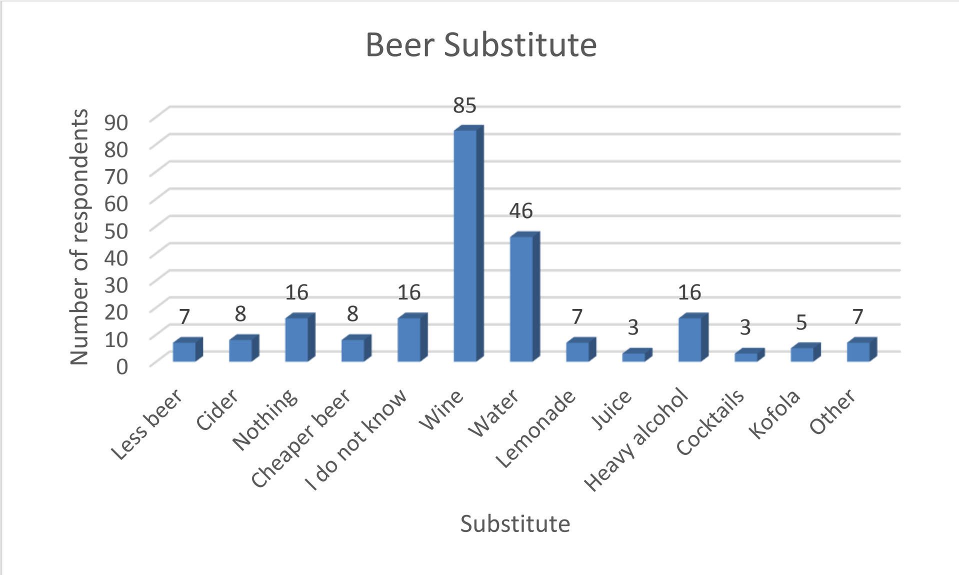
Graph 14 - Price Increase = Less Drinking?



Source: own processing

The next question was the only open question in the whole questionnaire. In fact, it was a complementary question to the previous one. Is was displayed only by those respondents who stated that they would reduce their consumption if the price had gone up. They were then asked to write what would be their substitute for that ‘missing’ beer consumption. Next, similar patterns were observed. The most repeating answer was wine, mentioned by 85 people. Water was on the second place with 46 answers. Options such as heavy alcohol, cheaper beer, cider or lemonade were mentioned quite often, too. It is quite interesting to observe that 16 people stated ‘I do not know’ and other 16 people argued ‘nothing’ (see **graph 15**).

Graph 15 - Beer Substitute

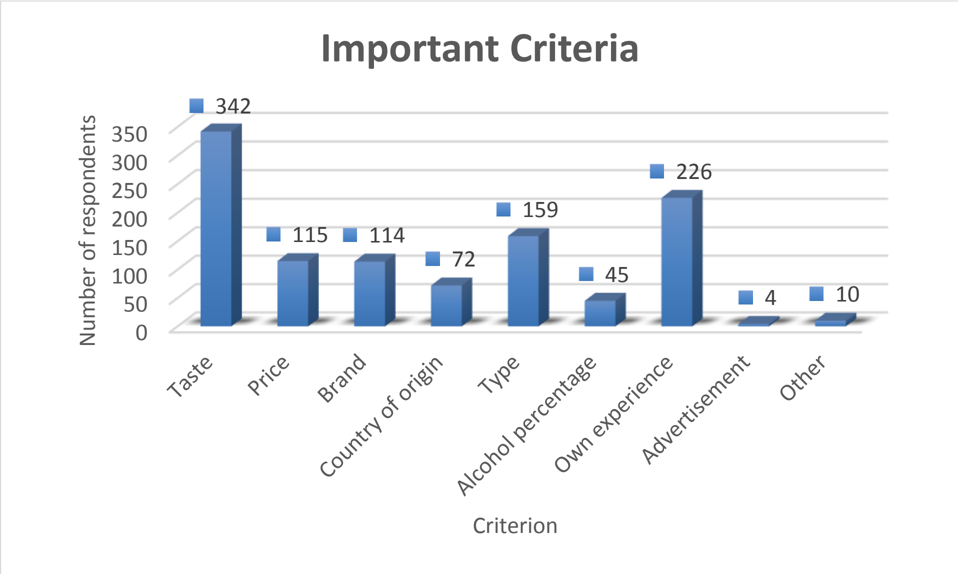


Source: own processing

Another graph, specifically the **graph 16**, explores the most important criteria when selecting beer. In this case, the respondents could have marked more options, in other words, all that fit.

As it is evident from this data, the taste was the most notable criterion. 342 people out of 381, which accounts for approximately 90 percent, did state so. After that, the second place was held by the option ‘own experience’. Next, for more than four-tenth of respondents the type of beer determined their choice. Price and brand were then marked with similar frequency. Lastly, only four people said that the advertisement was important for them. Moreover, ten people picked the option ‘other’. For instance, these people claimed that smell or temperature of beer did float their boats.

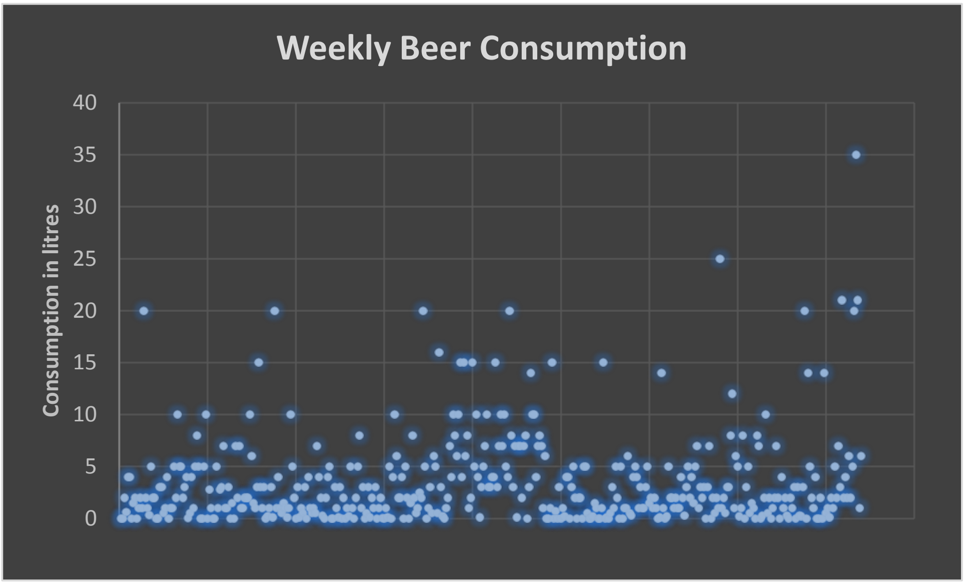
Graph 16 - Important Criteria



Source: own processing

The next question was included in order to calculate the average sample beer consumption. Participants were asked to estimate their weekly consumption in litres. Next, the total sum was calculated. This sum was then divided by sample size and then by number of days in the week. We got the average consumption per day per capita. Such result must have been multiplied by 365 in order to obtain the average consumption per year per capita. The final result was 179 litres. As reported by Kozák (2013), the average beer consumption per year per capita dropped to 134 liters in the Czech Republic. Therefore, people from the sample consumed much more beer than the average was. This can be partially explained by the fact that beer drinkers could have found it more attractive to participate in the research. Moreover, people under the age of 18 were excluded from this survey.

Graph 17 - Beer Consumption per Week

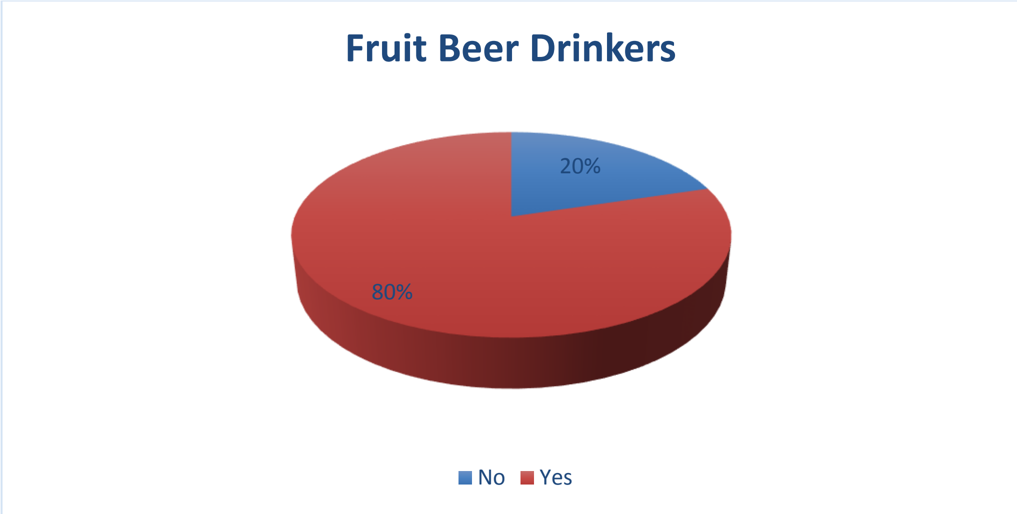


Source: own processing

Beer drinkers were also asked about their fruit beer consumption. As seen from the **graph 18**, 80 percent of people stated that they had tried the fruit beer. Particularly, this accounted for 80 percent of males as well as 80 percent of females. Once again, these percentages are crucial for further comparison to other research.

However, just 5 percent of respondents argued that they drank such mixture of beer and lemonade on a regular basis. 52 percent of people sometimes consume this fruit beer, while 41 percent of survey's participants have tried it a couple of times. Furthermore, 2 percent of people simply do not know how often they drink this particular type of beer. These answers are comprehensively processed in the **appendix 3**.

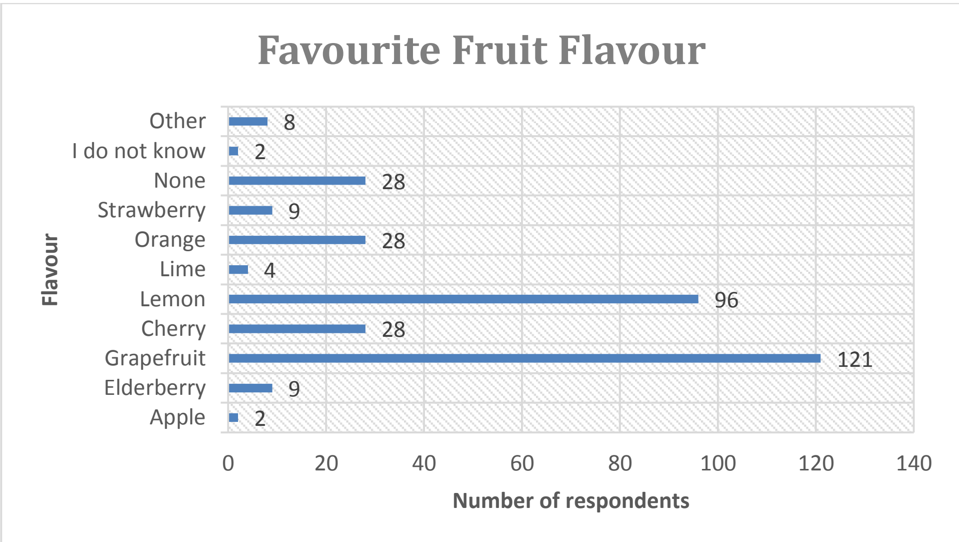
Graph 18 - Fruit Beer Drinkers



Source: own processing

Next, the favourite fruit flavour was analysed. Of these who answered that they had tried fruit beer, grapefruit flavour was the most common choice. Generally taken, citrus flavours were the most preferred ones. Basically, these sour flavours quite nicely complement the bitter taste of beer. Contrasting this, sweet tones such as cherry and strawberry were not so popular. Not negligible amount of people, specifically 28 of them, marked the answer ‘none’. Moreover, eight respondents answered ‘other’. Of these, one person said that all flavours tasted the same to him or her.

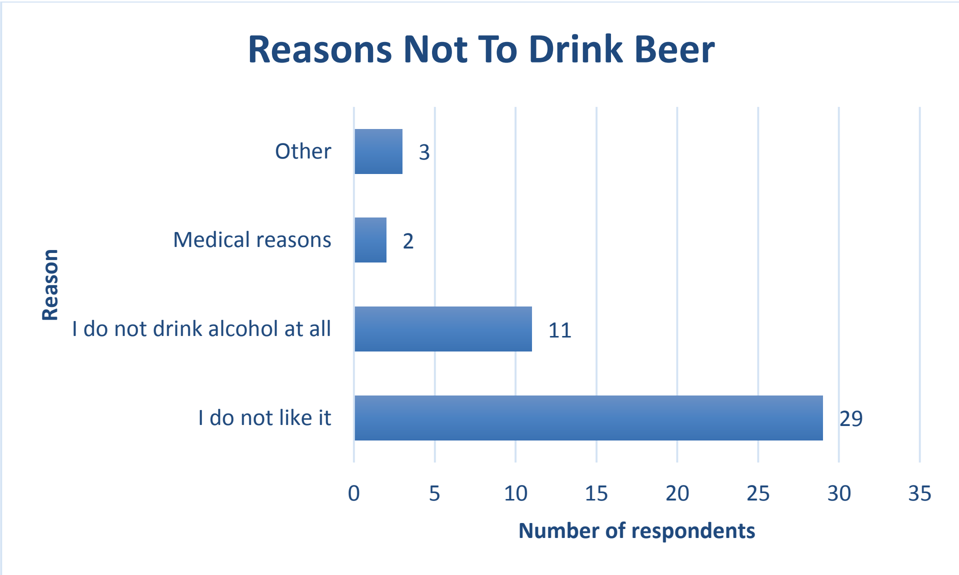
Graph 19 - Favourite Fruit Flavour



Source: own processing

Now we come back to those 9 percent of respondents that do not consume beer. As stated above, beer consumption declined in the last years, and it is interesting to observe the reasons behind. In other words, it is important to find out why these people do not consume the bitter beverage. 29 out of those 39 not drinking participants simply do not like it. Next, 11 of them are abstainers, that is to say, they do not consume any alcohol at all. Among other reasons, the respondents stated, for example, the fact that beer was so bitter for them. Lastly, quite witty reason was that the respondent had already drunk so much in his or her youth.

Graph 20 - Reason Not To Drink Beer



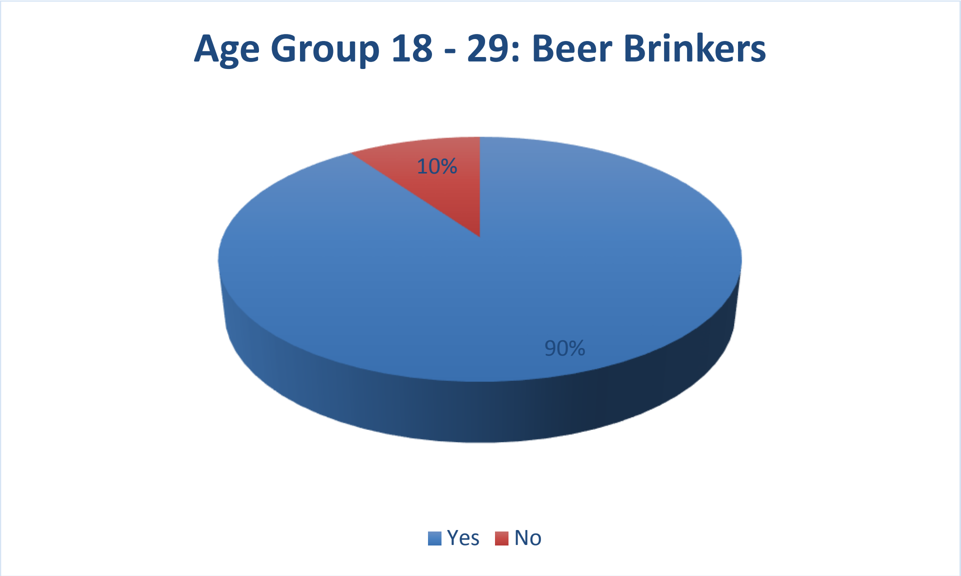
Source: own processing

Mixed beverages or cocktails are then the most prioritised alcoholic beverages of beer non-drinkers. Over a half of them consume such cocktails. 17 people also state that they drink wine, whereas 15 of them prefer heavy alcohol. Finally, 15 respondents do not drink any other alcoholic beverage. **Appendix 4** provides a graphical processing.

4.1.3 Evaluation of Selected Age Group 18 - 29

One of the objectives of this research is to examine beer consumption preferences of selected age group 18 – 29. Firstly, **graph 21** states that beer is consumed by 90 percent of respondents in this age group. This percentage is slightly lower than the whole sample percentage (91%). However, this difference is not significant. Similarly to the entire sample, the greater portion of men consumes more in comparison to women. Although there is the lower percentage of beer drinkers in this age group, their average consumption per year per capita is much greater – remarkable 222 litres. The same approach like in the case of the whole sample was used in order to obtain this number.

Graph 21 - Selected Age Group 18 - 29: Beer Drinkers



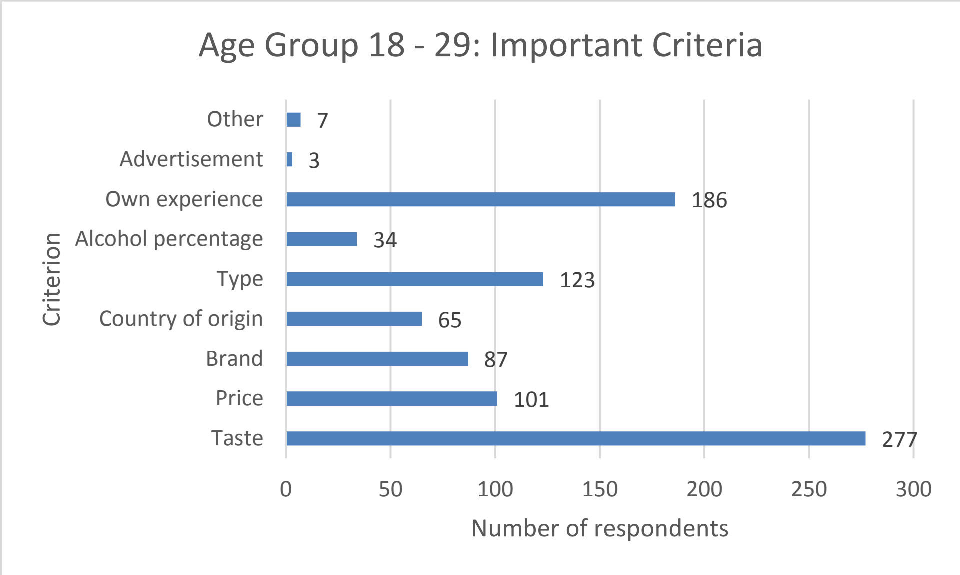
Source: own processing

The frequency of drinking beer of this age group is quite different in comparison to the whole sample. It is processed in the **appendix 5**. It says that mere 3 percent of people in this age group consume beer on a daily basis. This is the main difference. Next, 40 percent of respondents treat themselves to beer several times a week. Then, 23 percent drink it just once a week. 22 percent consume such amber nectar only once or twice a month. Finally, 12 percent of people do drink beer less than once or twice a month. These frequencies are very similar to the whole sample.

Also, such age group consume light beer the most, as well. **Appendix 6** analyses this particular issue. Moreover, black and mixed types of beer are preferred by 23 and 25 respondents, respectively. Lastly, only 10 out of 337 people in this age group do not know their favourite type of beer.

The most important criteria when choosing beer for age group 18 – 29 are shown in the **graph 22**. These factors are very similar as in the case of the whole sample. The most important ones are taste and own experience. The only difference between this age group and the entire sample is the factor of price. In real terms, the price was marked more often in selected age group. The reason for this might be the fact that this age group is covered mainly by students with lower disposable income.

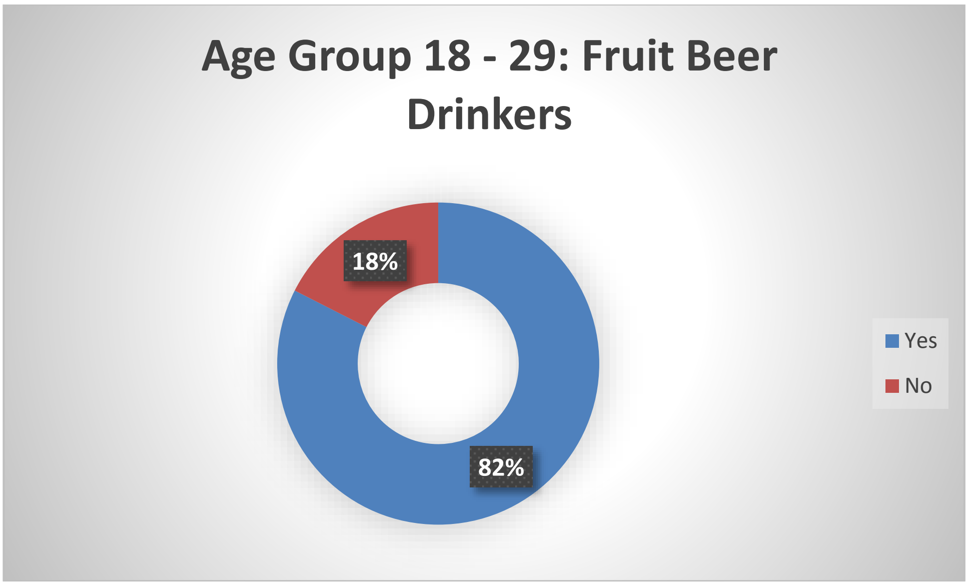
Graph 22 - Selected Age Group 18 - 29: Important Criteria



Source: own processing

As stated by Vinopal (2014a), increase of beer drinkers within the age group 18 – 29 can be caused by many reasons. One of them might be the expansion of the so-called radlers on the Czech market in the last years. However, the difference between selected age group and the whole sample is not very significant. 80 percent of the whole sample have tried fruit beer while 82 percent of age group 18 – 29 have done so. As stated above, this difference is quite slight. Nevertheless, a hypothesis of the relationship between age and fruit beer consumption will be tested later on.

Graph 23 - Selected Age Group 18 - 29: Fruit Beer Drinkers



Source: own processing

4.2 Statistical Hypotheses Testing

Firstly, the working hypotheses are to be stated. Their formulation is based on general knowledge gained from literature. Next, the actual statistical hypotheses are stated in conventional form (null hypothesis expects no dependency between observed characters). Thus, working hypotheses are stated as follows:

- *There is a dependency between age and fruit beer consumption.*
- *There is a dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*
- *There is a dependency between age of beer consumer and his or her preferred serving of beer.*
- *There is a dependency between gender and beer consumption.*
- *There is a dependency between gender and fruit beer consumption.*
- *There is a dependency between nationality and beer consumption.*
- *There is a dependency between economic status and beer consumption.*
- *There is a dependency between gender and beer consumption of a certain type.*
- *There is a dependency between change in income and change in beer consumption.*

Then, the statistical hypotheses are stated as follows:

- *H_0: It is expected, that there is no dependency between age and beer consumption.*
- *H_0: It is expected, that there is no dependency between age and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*
- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her preferred form of serving of beer.*
- *H_0: It is expected, that there is no dependency between gender and beer consumption.*
- *H_0: It is expected, that there is no dependency between gender and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between level of education and beer consumption.*
- *H_0: It is expected, that there is no dependency between level of education and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between nationality and beer consumption.*
- *H_0: It is expected, that there is no dependency between nationality and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between economic status and beer consumption.*
- *H_0: It is expected, that there is no dependency between economic status and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between the size of settlement and beer consumption.*
- *H_0: It is expected, that there is no dependency between the size of settlement and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between gender and beer consumption of a certain type.*
- *H_0: It is expected, that there is no dependency between change in income and change in beer consumption.*

- *H_0: There is no statistically significant difference between a population proportion of males drinking beer and a random sample proportion of males drinking beer.*
- *H_0: There is no statistically significant difference between a population proportion of females drinking beer and a random sample proportion of females drinking beer.*
- *H_0: There is no statistically significant difference between a population proportion of males drinking fruit beer and a random sample proportion of males drinking fruit beer.*
- *H_0: There is no statistically significant difference between a population proportion of females drinking fruit beer and a random sample proportion of females drinking fruit beer.*

These statistical hypotheses are then tested using $\chi 2$ test of independence, as well as asymmetric lambda C|R coefficient. All the results and statistics are processed by SAS Enterprise Guide 6.1. Next, the level of significance is 0.05. Both association and contingency tables are to be found in this section, too.

4.2.1 Hypotheses Concerning Age

As stated above, one the main objectives of this thesis is to examine selected age group and to assess their beer consumption preferences. Thus, such hypotheses with word ‘age’ in the statement are tested firstly.

Dependency between Age and Beer Consumption

- *H_0: It is expected, that there is no dependency between age and beer consumption.*
- *H_1: It is expected, that there is a dependency between age and beer consumption.*

Table 6 - Association Table: Age x Beer Consumption

Table number 6 – Association Table: Age x Beer Consumption				
		Do you at least sometimes drink beer?		
		No	Yes	Total
What is your age?				
18 - 29	Frequency	33	304	337
	Expected	31.293	305.71	
30+	Frequency	6	77	83
	Expected	7.7071	75.293	
Total	Frequency	39	381	420

Source: SAS output, own processing

Table 7 - Statistics: Age x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	0.5195	0.4711
Phi Coefficient		0.0352	
Contingency Coefficient		0.0351	
Cramer's V		0.0352	

Source: SAS output, own processing

Table 8 - PRE Values: Age x Beer Consumption

Statistic	Value	ASE
Gamma	0.1643	0.2247
Kendall's Tau-b	0.0352	0.0447
Somers' D C|R	0.0256	0.0327
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

As it is apparent from the **table 6**, we are allowed to use χ^2 test since all expected frequencies exceed 5. There are two ways to make a decision, in other words to either accept or reject the null hypothesis. Both of them lead to the same conclusion. Firstly, we can compare the value of test criterion to the critical value $\chi^2_{\alpha\ (DF)}$. If then $\chi^2 < \chi^2_{\alpha\ (1)}$, the null hypothesis is accepted. Likewise, $\chi^2 > \chi^2_{\alpha\ (1)}$ means the rejection of the null hypothesis. Having alpha equal to 0.05 and just one degree of freedom, such critical value equals to 3.84. From the **table 7**we can see that the value of test criterion is only 0.5195. Therefore, our value of test criterion is lower than the table value and the null hypothesis is failed to reject.

The second approach takes alpha and p- value into consideration. If p-value exceeds alpha, which is in our case 0.05, the null hypothesis is failed to reject, that is to say accepted. P-value is indeed greater than 0.05. Specifically, it is 0.4711. This can be seen in **table 7**, too. Thus, the null hypothesis is accepted. This is also supported by lambda which is equal to zero (see **table 8**). Lastly, **there is no dependency between age and beer consumption.**

Dependency between Age and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between age and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between age and fruit beer consumption.*

The rest of hypotheses is tested using the same procedure like in the previous case. Conditions for using χ^2 test are met. Next, we can see that p-value is even lower than 0.001. This indicates a dependency between observed characters. Thus, the null hypothesis is to be rejected. **There is a dependency between age and fruit beer consumption.** Now we need to realize how strong this dependency is. As seen from the **table 10**, Cramer's V equals to -0.21. Thus, such dependency is weak.

In contrary to this, lambda asymmetric C|R equals to zero. Thus, the knowledge of age does not bring any information for prediction about fruit beer consumption. This denies the claim about the relationship between age and fruit beer consumption to some extent. However, it does not mean that these variables are completely independent.

Table 9 – Association Table: Age x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your age?				
18-29	Frequency	26	278	304
	Expected	36.703	267.3	
30+	Frequency	20	57	77
	Expected	9.2966	67.703	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Table 10 – Statistics: Age x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	17.5652	<.0001
Phi Coefficient		-0.2147	
Contingency Coefficient		0.2099	
Cramer's V		-0.2147	

Source: SAS output, own processing

Table 11 – PRE Values: Age x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	-0.5791	0.1100
Kendall's Tau-b	-0.2147	0.0617
Somers' D C|R	-0.1742	0.0525
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Dependency between Age and Attitude to Social Media Marketing

- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*
- *H_1: It is expected, that there is a dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*

Table 12 - Association Table: Age x Attitude to Social Media Marketing

		Do you 'like' your favourite brand of beer on Facebook?		
		No	Yes	Total
What is your age?				
18-29	Frequency	224	74	298
	Expected	216.65	81.348	
30+	Frequency	37	24	61
	Expected	44.348	16.652	
Total	Frequency	261	98	359
Frequency Missing = 22				

Source: SAS output, own processing

Table 13 - Statistics: Age x Attitude to Social Media Marketing

Statistic	DF	Value	Prob
Chi-Square	1	5.3732	0.0204
Phi Coefficient		0.1223	
Contingency Coefficient		0.1214	
Cramer's V		0.1223	

Source: SAS output, own processing

Table 14 – PRE Values: Age x Attitude to Social Media Marketing

Statistic	Value	ASE
Gamma	0.3251	0.1316
Kendall's Tau-b	0.1223	0.0568
Somers' D C|R	0.1451	0.0674
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

The conditions of good approximation are fulfilled and thus, χ^2 test can be used. P-value is lower than alpha (see **table 13**). The null hypothesis is rejected. **There is a dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.** Low Cramer's V implies a weak dependency. Nevertheless, lambda asymmetric C|R is equal to zero. According to this, the knowledge of age does not bring any information for prediction of people's attitude to follow his or her favourite brand of beer on such social network.

Dependency between Age and Preferred Form of Serving

- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her preferred form of serving of beer.*
- *H_1: It is expected, that there is a dependency between age of beer consumer and his or her preferred form of serving of beer.*

Table 15 - Contingency Table: Age x Preferred Form of Serving

		Which of the following form of serving do you prefer?					Total
		PET	Bottle	Can	Draft	I do not care	
What is your age?							
18-29	Frequency	3	22	5	254	20	304
	Expected	2.3937	27.927	5.5853	244.96	23.139	
30+	Frequency	0	13	2	53	9	77
	Expected	0.6063	7.0735	1.4147	62.045	5.8609	
Total	Frequency	3	35	7	307	29	381

Source: SAS output, own processing

The conditions for using the chi-square test are not met in this case since one of the frequencies equals zero. Consequently, the synthesis into the so-called weak groups is needed. Such synthesis must be done in logical way. Due to a small amount of people prioritizing PET, can and bottled beer, these beer consumers are merged into one group. The updated results may be seen in the **pod 16**.

Table 16 - Contingency Table: Age x Preferred Form of Serving (2)

		Which of the following form of serving do you prefer?			Total
		Draft	I do not care	Other (PET, can, bottle)	
What is your age?					
18-29	Frequency	254	20	30	304
	Expected	244.96	23.139	35.906	
30+	Frequency	53	9	15	77
	Expected	62.045	5.8609	9.0945	
Total	Frequency	307	29	45	381
Frequency Missing = 39					

Source: SAS output, own processing

Table 17 - Statistics: Age x Preferred Form of Serving

Statistic	DF	Value	Prob
Chi-Square	2	8.5657	0.0138
Phi Coefficient		0.1499	
Contingency Coefficient		0.1483	
Cramer's V		0.1499	

Source: SAS output, own processing

Table 18 - PRE Values: Age x Preferred Form of Serving

Statistic	Value	ASE
Gamma	0.3731	0.1163
Kendall's Tau-b	0.1466	0.0560
Somers' D C|R	0.1485	0.0574
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

At this moment, some further analysis is possible since the conditions of good approximation are already met. The easiest way to be able to state the results is to compare p-value with alpha. P-value is lower than alpha, and thus, the null hypothesis is rejected. **There is a dependency between age of beer consumer and his or her preferred form of serving of beer**. This dependency can be classified as weak because Cramer’s V is equal to 0.1499. Moreover, zero value of lambda means that the knowledge of age does not bring any information for prediction about preferred form of serving of beer.

4.2.2 The Rest of Hypotheses

Dependency between Gender and Beer Consumption

- *H_0: It is expected, that there is no dependency between gender and beer consumption.*
- *H_1: It is expected, that there is a dependency between gender and beer consumption.*

Table 19 - Association Table: Gender x Beer Consumption

		Do you at least sometimes drink beer?		
		No	Yes	Total
What is your gender?				
Female	Frequency	27	190	217
	Expected	20.15	196.85	
Male	Frequency	12	191	203
	Expected	18.85	184.15	
Total	Frequency	39	381	420

Source: SAS output, own processing

Table 20 - Statistics: Gender x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	5.111	0.0212
Phi Coefficient		0.1125	
Contingency Coefficient		0.1117	
Cramer's V		0.1225	

Source: SAS output, own processing

Table 21 - PRE Values: Gender x Beer Consumption

Statistic	Value	ASE
Gamma	0.3868	0.1538
Kendall's Tau-b	0.1125	0.0461
Somers' D C|R	0.0653	0.0279
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

When we have a look on the **table 20**, we can see that the null hypothesis is not failed to reject. The value of test criterion is greater than the critical value. Systematically, p-value is lower than alpha (see **table 20**). The null hypothesis is thus rejected, and we can state that **there is a dependency between gender and beer consumption.** Once again, this dependency is weak (Cramer’s V=0.1225), and knowledge of gender does not bring any information for prediction about beer consumption (lambda asymmetric C|R=0).

Dependency between Gender and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between gender and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between gender and fruit beer consumption.*

Table 22 - Association Table: Gender x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your gender?				
Female	Frequency	17	173	190
	Expected	22.94	167.06	
Male	Frequency	29	162	191
	Expected	23.06	167.94	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Table 23 - Statistics: Gender x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	3.4890	0.0618
Phi Coefficient		-0.0957	
Contingency Coefficient		0.0953	
Cramer's V		-0.0957	

Source: SAS output, own processing

Table 24 - PRE Values: Gender x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	-0.2912	0.1485
Kendall's Tau-b	-0.0957	0.0500
Somers' D C|R	-0.0624	0.0332
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

This null hypothesis is very similar to the previous one. It takes into account variables such as gender and fruit beer consumption. Testing approach is thus the same. P-value is greater than alpha. We can then accept the null hypothesis of independence of variables. Therefore, **there is no dependency between gender and fruit beer consumption.** This statement is also supported by the fact that lambda is equal to zero.

Dependency between Education and Beer Consumption

- *H_0: It is expected, that there is no dependency between education and beer consumption.*
- *H_1: It is expected, that there is a dependency between education and beer consumption.*

Table 25 - Contingency Table: Education x Beer Consumption

		Do you at least sometimes drink beer?		Total
		No	Yes	
What is your highest reached education?				
Primary	Frequency	7	13	20
	Expected	1.8571	18.143	
Secondary	Frequency	16	172	188
	Expected	17.457	170.54	
University	Frequency	16	196	212
	Expected	19.686	192.31	
Total	Frequency	39	381	420

Source: SAS output, own processing

Table 26 - Statistics: Education x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	2	16.5944	0.0002
Phi Coefficient		0.1988	
Contingency Coefficient		0.1950	
Cramer's V		0.1988	

Source: SAS output, own processing

Table 27 - PRE Values: Education x Beer Consumption

Statistic	Value	ASE
Gamma	0.2865	0.1489
Kendall's Tau-b	0.0954	0.0529
Somers' D C|R	0.0532	0.0300
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

The proportion of theoretical frequencies lower than 5 does not exceed 20 percent, and none of them is lower than 1. Thus, the conditions for usage of the chi-square test in a contingency table are fulfilled.

P-value is much lower than alpha. We can then reject the null hypothesis of independence of variables. Therefore, **there is a dependency between education and beer consumption.** People with primary education tend to consume less. However, this relationship is not strong (Cramer's V=1.988). Lastly, due to zero value of lambda, the knowledge of education does not bring any information for prediction about beer consumption.

Dependency between Education and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between education and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between education and fruit beer consumption.*

Table 28 - Contingency Table: Education x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your highest reached education?				
Primary	Frequency	3	10	13
	Expected	1.5696	11.43	
Secondary	Frequency	24	148	172
	Expected	20.766	151.23	
University	Frequency	19	177	196
	Expected	23.664	172.34	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Table 29 - Statistics: Education x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	2	3.1008	0.2122
Phi Coefficient		0.0902	
Contingency Coefficient		0.0898	
Cramer's V		0.0902	

Source: SAS output, own processing

Table 30 - PRE Values: Education x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	0.2340	0.1419
Kendall's Tau-b	0.0813	0.0513
Somers' D C|R	0.0515	0.0328
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Similarly to the previous hypothesis, the proportion of theoretical frequencies that are lower than 5 does not exceed 20 percent. Furthermore, none of them is lower than 1. Consequently, the conditions for usage of the chi-square test in a contingency table are fulfilled.

Next, p-value exceeds alpha (see **table 29**). Thus, such null hypothesis is failed to reject, that is to say, it is to be accepted. Moreover, asymmetric lambda C|R equals to zero which indicates no information about prediction for variables such as education and fruit beer consumption. Lastly, **there is no dependency between education and fruit beer consumption.**

Dependency between Nationality and Beer Consumption

- *H_0: It is expected, that there is no dependency between nationality and beer consumption.*
- *H_1: It is expected, that there is a dependency between nationality and beer consumption.*

Table 31 - Association Table: Nationality x Beer Consumption

		Do you at least sometimes drink beer?		Total
		No	Yes	
What is your nationality?				
Czech	Frequency	33	338	371
	Expected	34.45	336.55	
Other	Frequency	6	43	49
	Expected	4.55	44.45	
Total	Frequency	39	381	420

Source: SAS output, own processing

Table 32 - Statistics: Nationality x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	0.5767	0.4476
Cramer's V		-0.0371	
WARNING: 25% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Source: SAS output, own processing

Table 33 - Statistics: Nationality x Beer Consumption (2)

Fisher's Exact Test	
Cell (1,1) Frequency (F)	33
Left-sided Pr <= F	0.2952
Right-sided Pr >= F	0.8470
Table Probability (P)	0.1422
Two-sided Pr <= P	0.4336

Source: SAS output, own processing

Table 34 - PRE Values: Nationality x Beer Consumption

Statistic	Value	ASE
Gamma	-0.1767	0.2288
Kendall's Tau-b	-0.0371	0.0542
Somers' D C|R	-0.0335	0.0491
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

As seen from the **table 31**, one of the expected frequencies is lower than 5. There is no room for any synthesis since such synthesis cannot be used in the association table. SAS also provides a warning that chi-square may not be a valid test. Therefore, we must use

Fisher's test. The null hypothesis is rejected in case that $p < \alpha$. As we can see from the **table 33**, p is greater than alpha. Therefore, the null hypothesis is failed to reject. Furthermore, asymmetric lambda C|R equals to zero which notes that the knowledge of nationality does not bring any information for prediction about beer consumption. Consequently, **there is no dependency between nationality and beer consumption.**

Dependency between Nationality and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between nationality and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between nationality and fruit beer consumption.*

Table 35 - Association Table: Nationality x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your nationality?				
Czech	Frequency	37	301	338
	Expected	40.808	297.19	
Other	Frequency	9	34	43
	Expected	5.1916	37.808	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Table 36 - Statistics: Nationality x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	1	3.5816	0.0584
Phi Coefficient		-0.0970	
Contingency Coefficient		0.0965	
Cramer's V		-0.0970	

Source: SAS output, own processing

Table 37 - PRE Values: Nationality x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	-0.3658	0.1790
Kendall's Tau-b	-0.0970	0.0620
Somers' D C|R	-0.0998	0.0643
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

The conditions for use of the chi-square test are met concerning this hypothesis. As it is apparent from the **table 36**, p-value is greater in comparison to alpha. Thus, we cannot reject the null hypothesis. Moreover, zero value of asymmetric lambda C|R also suggest no relationship between those observed characters. To sum up, **there is no dependency between nationality and fruit beer consumption.**

Dependency between Economic Status and Beer Consumption

- *H_0: It is expected, that there is no dependency between economic status and beer consumption.*
- *H_1: It is expected, that there is a dependency between economic status and beer consumption.*

As apparently seen from **appendix 7,** such null hypothesis cannot be tested using the chi-square test since the conditions of good approximation are not fulfilled. The reason is too many options concerning status. The synthesis is needed. For instance, we may logically merge options 'employed' and 'self-employed' into just 'employed (no matter how)'. Similarly, we can bring together options such as 'maternity leave', 'pensioner' and 'unemployed'. This new group is called 'non-employed'.

Right now, the null hypothesis stating no dependency between those variables can be tested. **Appendix 9** shows quite high p-value (0.4057). This means that this null hypothesis is failed to reject and thus, **there is no dependency between economic status and beer consumption.** In addition to that, asymmetric lambda C|R equals to zero which also suggest that there is no relationship between economic status and beer consumption.

Dependency between Economic Status and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between economic status and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between economic status and fruit beer consumption.*

For the purpose of testing this hypothesis, the synthesis into weak groups from the previous case is used. In this particular case, a pretty low p-value is put forward, specifically, it is 0.0077 (see **appendix 12**). Consequently, the null hypothesis suggesting no dependency between economic status and radler consumption is subject to rejection. **There is a dependency between economic status and fruit beer consumption.** When looking into the **pod**, it seems that students consume relatively more fruit beer compared to other statuses. However, low value of Cramer's V, which is shown in **appendix 12**, signifies weak dependency. Furthermore, zero value of lambda means that the knowledge of economic status does not bring any information for prediction about fruit beer consumption.

Dependency between the Size of Settlement and Beer Consumption

- *H_0: It is expected, that there is no dependency between the size of settlement and beer consumption.*
- *H_1: It is expected, that there is a dependency between the size of settlement and beer consumption.*

Firstly, chi-square test may be used because all expected frequencies exceed 5 (see **appendix 14**). However, p-value is extremely high and thus, the null hypothesis is failed to reject. Lastly, **there is no dependency between the size of settlement and beer consumption.**

Dependency between the Size of Settlement and Fruit Beer Consumption

- *H_0: It is expected, that there is no dependency between the size of settlement and fruit beer consumption.*
- *H_1: It is expected, that there is a dependency between the size of settlement and fruit beer consumption.*

Similarly, we can test the hypothesis of independence between the size of settlement and fruit beer consumption. The conditions for use of chi-square are met, too. Although p-value is lower than in the previous case, it is still significantly greater than alpha. Furthermore, lambda equals to zero. Thus, the null hypothesis is accepted. The concluding sentence is that **there is no dependency between the size of settlement and fruit beer consumption.**

Dependency between Gender and Beer Consumption of a Certain Type

- *H_0: It is expected, that there is no dependency between gender and beer consumption of a certain type.*
- *H_1: It is expected, that there is a dependency between gender and beer consumption of a certain type.*

Appendix 20 shows that all requirements for the use of the chi-square test are met. P-value is quite low (0.0336). Therefore, the null hypothesis is rejected. **There is a dependency between gender and beer consumption of a certain type.** Such dependency can be classified as weak since Cramer's V equals to 0.1511 (see **appendix 21**). Furthermore, the knowledge of gender does not bring any information for prediction of beer consumption of a certain type since asymmetric lambda C|R equals to zero. Nevertheless, it does not mean that these variables are entirely independent.

Dependency between Change in Income and Change in Beer Consumption

- *H_0: It is expected, that there is no dependency between change in income and change in beer consumption.*
- *H_1: It is expected, that there is a dependency between change in income and change in beer consumption.*

As shown in the **appendix 23**, the chi-square test can be used. All theoretical frequencies are greater than 5. P-value is then 0.0021 (see **appendix 24**). This means that the null hypothesis is rejected and thus, **there is a dependency between change in income and change in beer consumption.** Decrease in income implies decrease in beer consumption and likewise, increase in income evokes increase in beer consumption.

Low value of Cramer's V indicates a weak relationship between change in income and change in beer consumption. In this case, we cannot use asymmetric lambda as the measurement of proportional reduction of error because both changes in income and changes in beer consumption are ordinal variables. A good measure for ordinal variables is for example Kendall's Tau-b coefficient. This Kendall's Tau-b is equal to 0.0962 (see **appendix 25**). Consequently, these variables are correlated with approximately 10 percent.

4.2.3 Comparison to Other Research

- *H_0: There is no statistically significant difference between a population proportion of males drinking beer and a random sample proportion of males drinking beer.*
- *H_1: There is a statistically significant difference between a population proportion of males drinking beer and a random sample proportion of males drinking beer.*

As reported by Vinopal (2014b), the share of males drinking beer in the Czech Republic was 90 percent in 2014 (see **appendix 27**). Furthermore, 94 percent of men from the sample stated that they at least sometimes drank beer. Is this a statistically significant difference? **Table 38** brings the answer. Z-value (absolute) is much greater than the critical value. Therefore, the null hypothesis is rejected, and an alternative one is valid. **There is a statistically significant difference between a population proportion of males drinking beer and a random sample proportion of males drinking beer.** To be accurate, a random sample proportion of males consume significantly more.

Table 38 - Statistics: Z-test for males

Test of H0: Proportion = 0.9	
ASE under H0	0.0211
Z	-39.9360
One-sided Pr < Z	<.0001
Two-sided Pr > |Z|	<.0001

Source: SAS output, own processing

Next, the same hypothesis is also tested for women. The null and alternative hypotheses are stated as follows:

- *H_0: There is no statistically significant difference between a population proportion of females drinking beer and a random sample proportion of females drinking beer.*
- *H_1: There is a statistically significant difference between a population proportion of females drinking beer and a random sample proportion of females drinking beer.*

Vinopal (2014b) states that 56 percent of females consume amber nectar in the Czech Republic. In contrary to that, the random sample proportion of females drinking beer is 87 percent. As suggested by the **table 39**, this proportion is significantly higher. Z-value, in absolute terms, is greater than the critical value. Lastly, **there is a statistically significant difference between a population proportion of females drinking beer and a random sample proportion of females drinking beer.**

Table 39 – Statistics: Z-test for Females

Test of H0: Proportion = 0.56	
ASE under H0	0.0337
Z	-12.9263
One-sided Pr < Z	<.0001
Two-sided Pr > |Z|	<.0001

Source: SAS output, own processing

Then, the sample is compared to the population regarding fruit beer, too. The hypotheses are stated in this way:

- *H_0: There is no statistically significant difference between a population proportion of males drinking fruit beer and a random sample proportion of males drinking fruit beer.*
- *H_1: There is a statistically significant difference between a population proportion of males drinking fruit beer and a random sample proportion of males drinking fruit beer.*

These hypotheses take all fruit beer drinkers into account, that is say, all males that have tried this fruit beer. Vinopal (2014a) argues that this proportion has been 73 percent. As stated above, the sample proportion is 80 percent. According to the **table 40**, such proportion is significantly greater since z-value is larger than the critical value (3.6785>1.96). Thus, **there is a statistically significant difference between a population proportion of males drinking fruit beer and a random sample proportion of males drinking fruit beer.**

Table 40 - Statistics: Z-test for males (2)

Test of H0: Proportion = 0.73	
ASE under H0	0.0321
Z	3.6785

Test of H0: Proportion = 0.73	
One-sided Pr > Z	0.0001
Two-sided Pr > |Z|	0.0002

Source: SAS output, own processing

Similarly, these hypotheses are tested for females. They are formulated as follows:

- *H_0: There is no statistically significant difference between a population proportion of females drinking fruit beer and a random sample proportion of females drinking fruit beer.*
- *H_1: There is a statistically significant difference between a population proportion of females drinking fruit beer and a random sample proportion of females drinking fruit beer.*

According to Vinopal (2014a), the share of women that have tried fruit beer has been 66 percent. Contrasting this, 80 percent of females from the sample stated that they had tried such fruit beer. **Table 41** shows that z-value exceeds the critical value. Therefore, the null hypothesis is rejected. Lastly, **there is a statistically significant difference between a population proportion of females drinking fruit beer and a random sample proportion of females drinking fruit beer.**

Table 41 - Statistics: Z-test for females (2)

Test of H0: Proportion = 0.66	
ASE under H0	0.0344
Z	7.2899
One-sided Pr > Z	<.0001
Two-sided Pr > |Z|	<.0001

Source: SAS output, own processing

5 Results and Discussion

The results stated above indirectly proved that selected group 18 – 29 had different beer preferences in comparison to the population. The word indirectly is used due to weak dependency on age (Cramer’s V never exceeded 0.3 which is the edge of medium strong dependency). Moreover, the value of asymmetric lambda C|R was never different from zero. This fact indicates no information for prediction.

Specifically, the following hypotheses were rejected:

- *H_0: It is expected, that there is no dependency between age and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*
- *H_0: It is expected, that there is no dependency between age of beer consumer and his or her preferred serving of beer.*
- *H_0: It is expected, that there is no dependency between gender and beer consumption.*
- *H_0: It is expected, that there is no dependency between education and beer consumption.*
- *H_0: It is expected, that there is no dependency between economic status and fruit beer consumption.*
- *H_0: It is expected, that there is no dependency between gender and beer consumption of a certain type.*
- *H_0: It is expected, that there is no dependency between change in income and change in beer consumption.*

According to obtained results, we can state that selected age group 18 – 29 consume significantly more fruit beer. Next, this age group also follows their beer brand on social network. Whereas such age group highly prefer draft beer, the age group 30+ is not that picky which is surprising finding.

As expected, males consume considerably more beer compared to females. However, there is no significant difference in case of radlers. Then, primarily educated people consume less beer than people with higher education. This is another surprising result since, in general, more educated people tend to consume more luxurious alcoholic beverages than just beer. Next, it seems that students consume more fruit beer compared to other statuses. This goes hand in hand with the fact that age group 18 – 29 consume more fruit beer than older people.

Next, there is a dependency between gender and beer consumption of a certain type. Particularly, females are likely to prefer black beer compared to males. Lastly, decrease in income implies decrease in beer consumption and likewise, increase in income indicates increase in beer consumption. Those two findings were generally expected.

The comparison to other research actually rejects all stated hypotheses, that is to say, people from the sample drink significantly more. This is the case of both beer and radlers. One of the possible explanations may be the fact that people consuming beer found more exciting to participate in the survey.

6 Conclusion

To conclude, this thesis deals with the assessment of beer consumption preferences. Particular attention is given to selected age group 18 – 29. Special emphasis is also placed on fruit beer. The evaluation is be carried out by own questionnaire survey. The hypotheses are mainly tested using a χ^2 independence test. Moreover, the methods for a proportional reduction of error (PRE) are also used for detailed and accurate analysis. SAS analytics software is used in order to analyse obtained data.

All in all, 420 respondents filled the questionnaire in. Specifically, 337 of them belonged to the selected age group. 52 percent were females while 48 percent were males. Over a half of these respondents lived in a city with a population exceeding one thousand inhabitants. 88 percent of interviewees were of Czech nationality. Lastly, 259 participants of this survey have not finished their studies yet.

Next, 91 percent of respondents drank beer, whereas four-fifths of the people that filled the questionnaire out had tried fruit beer. The most favourite beer brands were Pilsner Urquell and Velkopopovický Kozel. Furthermore, the most preferred type of beer was light beer and we can also state that the draft beer was the most popular form of serving. The most important criteria were taste, own experience and type. We may also observe that the price played relatively greater role for age group 18 – 29. Finally, fruit beer drinkers mainly prefer grapefruit flavour. Furthermore, beer non-drinkers argued that they did not like beer and that they mostly consumed cocktails.

Then, the working hypotheses were stated as follows:

- *There is a dependency between age and fruit beer consumption.*
- *There is dependency age of beer consumer and his or her attitude to follow his or her favourite brand on social network.*
- *There is a dependency between age of beer consumer and his or her preferred serving of beer.*
- *There is a dependency between gender and beer consumption.*
- *There is a dependency between gender and fruit beer consumption.*
- *There is a dependency between nationality and beer consumption.*
- *There is a dependency between economic status and beer consumption.*
- *There is a dependency between gender and beer consumption of a certain type.*
- *There is a dependency between change in income and change in beer consumption.*

A majority of these expectations was proved, however, some were not. Moreover, there were some other interesting findings. Of these, the dependency between gender and fruit beer consumption was not found. Any dependency between nationality and beer consumption was not found, either.

Moreover, there was discovered a dependency between age and preferred type of serving. Of course, it was expected that younger do not care about any packaging or whatever and prefer beer in a bottle, can or PET, that is to say, cheaper variants. However, the opposite was true. Next, there was not found any dependency between economic status and beer consumption. Nevertheless, dependency between economic status and fruit beer consumption was found. In other words, students consume fruit beer more in comparison to other statuses.

Based on the results stated above, one of the possible recommendations is to distinguish among age groups and emphasize on specific age group, for instance, age group 18 – 29. This age does not hesitate to give a 'like' to his or her favourite beer brand. Therefore, if these people proved they had given such 'like', they could have received a discount when buying beer. This would require an interconnection among beer producers, pubs and customers, but nowadays, it is possible. Moreover, the breweries would realise who their clients are. Such relationship building would benefit everyone.

Next, the most favourite brands such as Pilsner Urquell and Velkopopovický Kozel do not produce any fruit beer. However, this age group likes it. Since the price plays a greater role for this age group, an introduction of radler made by Kozel would probably bring positive feedback. Thus, advice is to include such fruit beer in Kozel's portfolio.

Finally, due to prioritizing draft beer by this age groups, beer companies could also offer fruit syrups and juices and supply them to the pubs. Beer consumers could have mixed fruit beer then on their own in variable proportions. In general, such fancy approach could have been perceived more positively by females. Moreover, we cannot forget about them because this research proved that the fruit beer was consumed by them to the same extent as by males.

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8 Appendices

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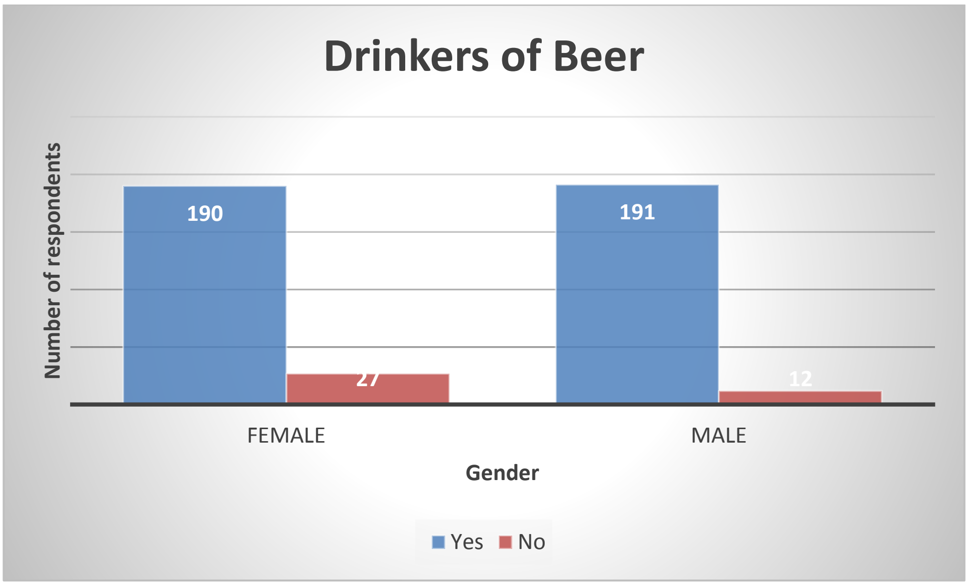
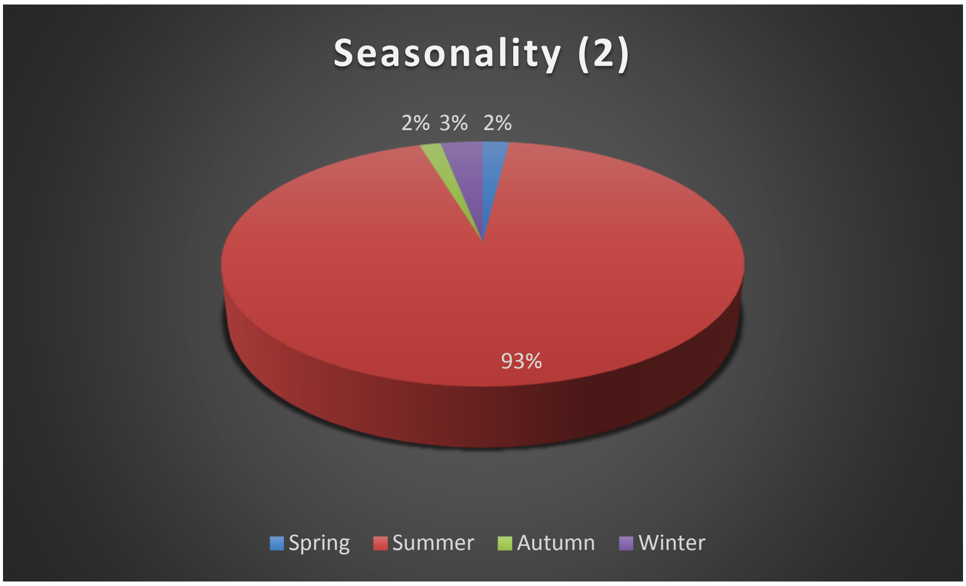
Appendix 1 - Drinkers of Beer by Gender



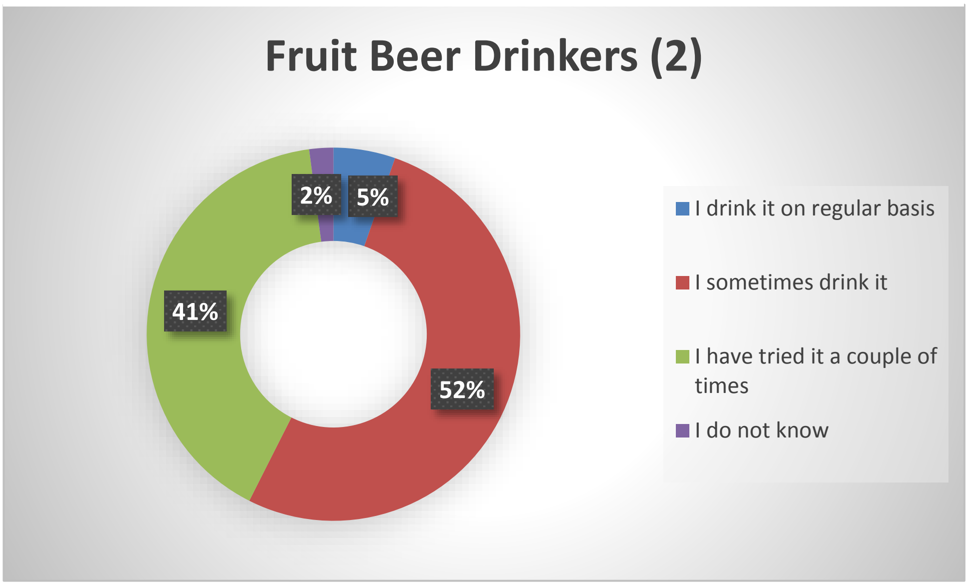
Source: own processing

Appendix 2 - Seasonality (2)



Source: own processing

Appendix 3 - Fruit Beer Drinkers (2)

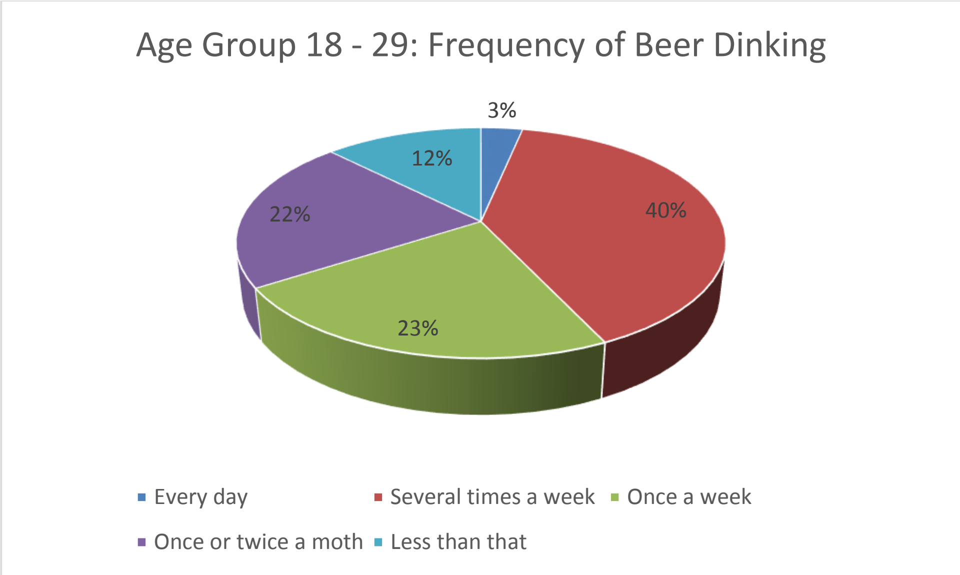


Source: own processing

Appendix 4 - Other Alcoholic Beverage

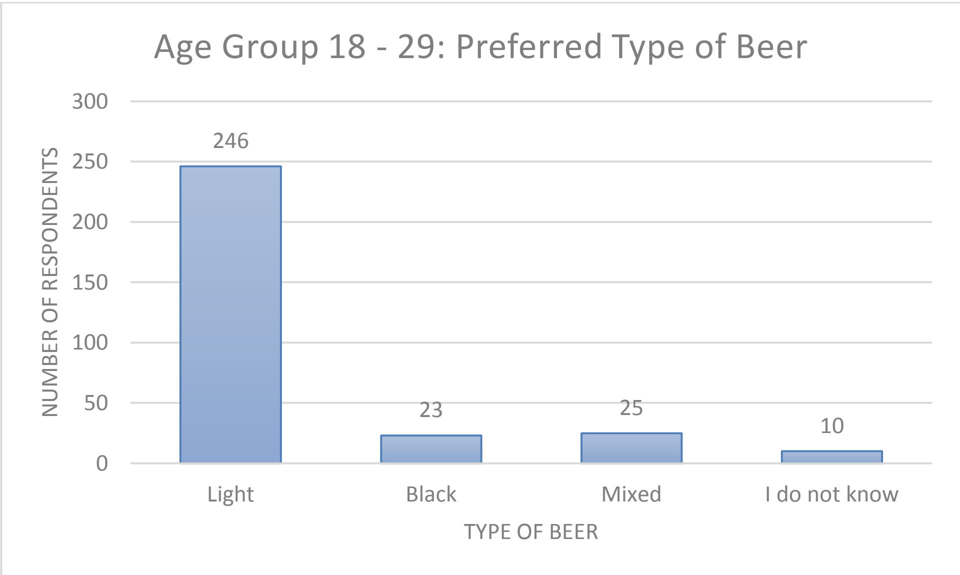
Source: own processing

Appendix 5 - Age Group 18 - 29: Frequency of Beer Drinking



Source: own processing

Appendix 6 - Age Group 18 - 29: Preferred Type of Beer



Source: own processing

Appendix 7 - Contingency Table: Status x Beer Consumption

		Do you at least sometimes drink beer?		
		No	Yes	Total
What is your status?				
Employed	Frequency	11	126	137
	Expected	12.721	124.28	
Maternity leave	Frequency	1	7	8
	Expected	0.7429	7.2571	
Pensioner	Frequency	1	3	4
	Expected	0.3714	3.6286	
Self-employed	Frequency	0	29	29
	Expected	2.6929	26.307	
Student	Frequency	24	201	225
	Expected	20.893	204.11	
Unemployed	Frequency	2	15	17
	Expected	1.5786	15.421	
Total	Frequency	39	381	420

Source: SAS output, own processing

Appendix 8 - Contingency Table: Status x Beer Consumption (2)

		Do you at least sometimes drink beer?		
		No	Yes	Total
What is your status?				
Employed (no matter how)	Frequency	11	149	160
	Expected	14.857	145.14	
Student	Frequency	24	201	225
	Expected	20.893	204.11	
Non-employed	Frequency	4	31	35
	Expected	3.25	31.75	
Total	Frequency	39	381	420

Source: SAS output, own processing

Appendix 9 - Statistics: Status x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	2	1.8041	0.4057
Contingency Coefficient		0.0654	
Cramer's V		0.0655	

Source: SAS output, own processing

Appendix 10 - PRE Values: Status x Beer Consumption

Statistic	Value	ASE
Gamma	-0.2031	0.1469
Kendall's Tau-b	-0.0620	0.0454
Somers' D C|R	-0.0340	0.0252
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Appendix 11 - Contingency Table: Status x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your status?				
Employed	Frequency	22	127	149
	Expected	17.99	131.01	
Student	Frequency	16	185	201
	Expected	24.268	176.73	
Non-employed	Frequency	8	23	31
	Expected	3.7428	27.257	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Appendix 12 - Statistics: Status x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	2	9.7276	0.0077
Phi Coefficient		0.1598	
Contingency Coefficient		0.1578	
Cramer's V		0.1598	

Source: SAS output, own processing

Appendix 13 - PRE Values: Status x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	0.0439	0.1513
Kendall's Tau-b	0.0166	0.0570
Somers' D C|R	0.0102	0.0351
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Appendix 14 - Contingency Table: Size of Settlement x Beer Consumption

		Do you at least sometimes drink beer?		Total
		No	Yes	
What is your size of settlement's population?				
20,001 - 100,000 inhabitants	Frequency	4	52	56
	Expected	5.2	50.8	
5,001 - 20,000 inhabitants	Frequency	5	62	67
	Expected	6.2214	60.779	
Less than 5,000 inhabitants	Frequency	9	75	84
	Expected	7.8	76.2	
More than 100,001 inhabitants	Frequency	21	192	213
	Expected	19.779	193.22	
Total	Frequency	39	381	420

Source: SAS output, own processing

Appendix 15 - Statistics: Size of Settlement x Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	3	0.8563	0.8360
Phi Coefficient		0.0452	
Contingency Coefficient		0.0451	
Cramer's V		0.0452	

Source: SAS output, own processing

Appendix 16 - PRE Values: Size of Settlement x Beer Consumption

Statistic	Value	ASE
Gamma	-0.0909	0.1353
Kendall's Tau-b	-0.0298	0.0434
Somers' D C|R	-0.0151	0.0220
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Appendix 17 - Contingency Table: Size of settlement x Fruit Beer Consumption

		Have you ever tried fruit beer?		
		No	Yes	Total
What is your size of settlement's population?				
20,001 - 100,000 inhabitants	Frequency	6	46	52
	Expected	6.2782	45.722	
5,001 - 20,000 inhabitants	Frequency	7	55	62
	Expected	7.4856	54.514	
Less than 5,000 inhabitants	Frequency	13	62	75
	Expected	9.0551	65.945	
More than 100,001 inhabitants	Frequency	20	172	192
	Expected	23.181	168.82	
Total	Frequency	46	335	381
Frequency Missing = 39				

Source: SAS output, own processing

Appendix 18 - Statistics: Size of Settlement x Fruit Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	3	2.5009	0.4751
Phi Coefficient		0.0810	
Contingency Coefficient		0.0808	
Cramer's V		0.0810	

Source: SAS output, own processing

Appendix 19 - PRE Values: Size of Settlement x Fruit Beer Consumption

Statistic	Value	ASE
Gamma	0.0679	0.1172
Kendall's Tau-b	0.0262	0.0460
Somers' D C|R	0.0148	0.0261
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Appendix 20 - Contingency Table: Gender x Beer consumption of a Certain Type

		Which type of beer do you prefer?				
		Black	I do not know	Light	Mixed	Total
What is your gender?						
Female	Frequency	19	9	142	20	190
	Expected	13.963	6.4829	153.1	16.457	
Male	Frequency	9	4	165	13	191
	Expected	14.037	6.5171	153.9	16.543	
Total	Frequency	28	13	307	33	381
Frequency Missing = 39						

Source: SAS output, own processing

Appendix 21 - Statistics: Gender x Beer Consumption of a Certain Type

Statistic	DF	Value	Prob
Chi-Square	3	8.6999	0.0336
Phi Coefficient		0.1511	
Contingency Coefficient		0.1494	
Cramer's V		0.1511	

Source: SAS output, own processing

Appendix 22 - PRE Values: Gender x Beer Consumption of a Certain Type

Statistic	Value	ASE
Gamma	0.1145	0.1199
Kendall's Tau-b	0.0477	0.0500
Somers' D C|R	0.0391	0.0412
Lambda Asymmetric C|R	0.0000	0.0000

Source: SAS output, own processing

Appendix 23 - Contingency Table: Change in Income x Change in Beer Consumption

		In the last two years your beer consumption:			
		Stayed at the same level	Went down	Went up	Total
In the last two years your net income:					
Stayed at the same level	Frequency	101	23	40	164
	Expected	87.381	34.436	42.184	
Went down	Frequency	10	12	5	27
	Expected	14.386	5.6693	6.9449	
Went up	Frequency	92	45	53	190
	Expected	101.23	39.895	48.871	
Total	Frequency	203	80	98	381
Frequency Missing = 39					

Source: SAS output, own processing

Appendix 24 - Statistics: Change in Income x Change in Beer Consumption

Statistic	DF	Value	Prob
Chi-Square	4	16.8288	0.0021
Phi Coefficient		0.2102	
Contingency Coefficient		0.2057	
Cramer's V		0.1486	

Source: SAS output, own processing

Appendix 25 - PRE Values: Change in Income x Change in Beer Consumption

Statistic	Value	ASE
Gamma	0.1624	0.0808
Kendall's Tau-b	0.0962	0.0482
Somers' D C|R	0.1000	0.0501
Lambda Asymmetric C|R	0.0112	0.0262

Source: SAS output, own processing

Appendix 26 - Questionnaire

1. What is your gender?
    - Female
    - Male
2. What is your age?
3. What is your highest reached education?
    - Primary
    - Secondary
    - University
4. What is your status? (mark all that fit)
    - Student
    - Employed
    - Self-employed
    - Unemployed
    - Pensioner
    - Maternity leave
    - Other:
5. What is your size of settlement's population?
    - Less than 5,000 inhabitants
    - 5,001 - 20,000 inhabitants
    - 20,001 - 100,000 inhabitants
    - More than 100,001 inhabitants
6. What is your nationality?
    - Czech
    - Other:

7. Do you at least sometimes drink beer?
    - Yes (continue with question number 8)
    - No (continue with question number 25)

8. How often do you drink beer?
   - Every day
   - Several times a week
   - Once a week
   - Once or twice a month
   - Less than that
9. Which type of beer do you prefer?
   - Light
   - Black
   - Mixed
   - I do not know
10. Which of the following form of serving do you prefer?
    - Draft
    - Bottle
    - Can
    - PET
    - I do not care
11. Which beer brand do you prefer?
    - Pilsner Urquell
    - Budweiser Budvar
    - Staropramen
    - Other:
12. Do you drink different amount of beer in different seasons?
    - Yes (continue 13)
    - No (continue 14)
13. In which season do you drink the most?
    - Spring
    - Summer
    - Autumn
    - Winter

14. Do you use Facebook?
    - Yes (continue 15)
    - No (continue 16)

15. Do you ‘like’ your favourite brand of beer on Facebook?
    - Yes
    - No
16. What percentage of price increase would evoke the reduction of your beer consumption?
    - 10% (continue 17)
    - 20% (continue 17)
    - 50% (continue 17)
    - I would not reduce my beer consumption by any means (continue 18)
17. What would be your substitute for that missing beer consumption?
18. Which criteria do you consider important when consuming beer? (mark all that fit)
    - Taste
    - Price
    - Brand
    - Country of origin
    - Type
    - Alcohol percentage
    - Own experience
    - Advertisement
    - Other:
19. In the last two years your net income:
    - Went up
    - Went down
    - Stayed at the same level
20. In the last two years your beer consumption:
    - Went up
    - Went down
    - Stayed at the same level

21. Estimate your weekly beer consumption in litres:

22. Have you ever tried fruit beer?

- Yes (continue with 23)
- No

23. How often do you drink such fruit beer?

- I drink it on a regular basis
- I sometimes drink it
- I have tried it a couple of times
- I do not know

24. What is your favourite flavour?

- Lemon
- Orange
- Grapefruit
- Cherry
- Strawberry
- Other:

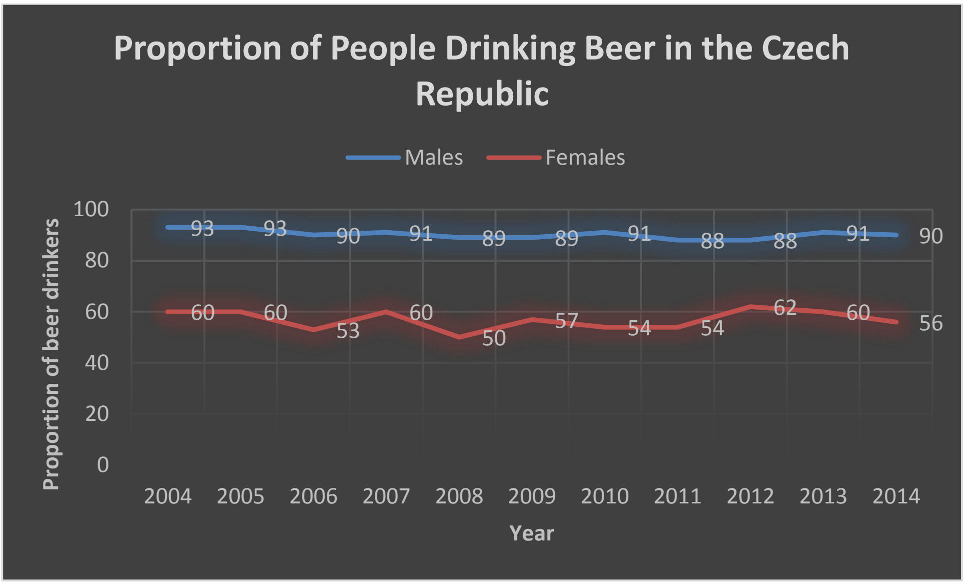
25. Why do you not drink beer? (mark all that fit)

- I do not like it
- I do not drink alcohol at all
- Medical reason
- Other:

26. Which other alcoholic beverage do you drink? (mark all that fit)

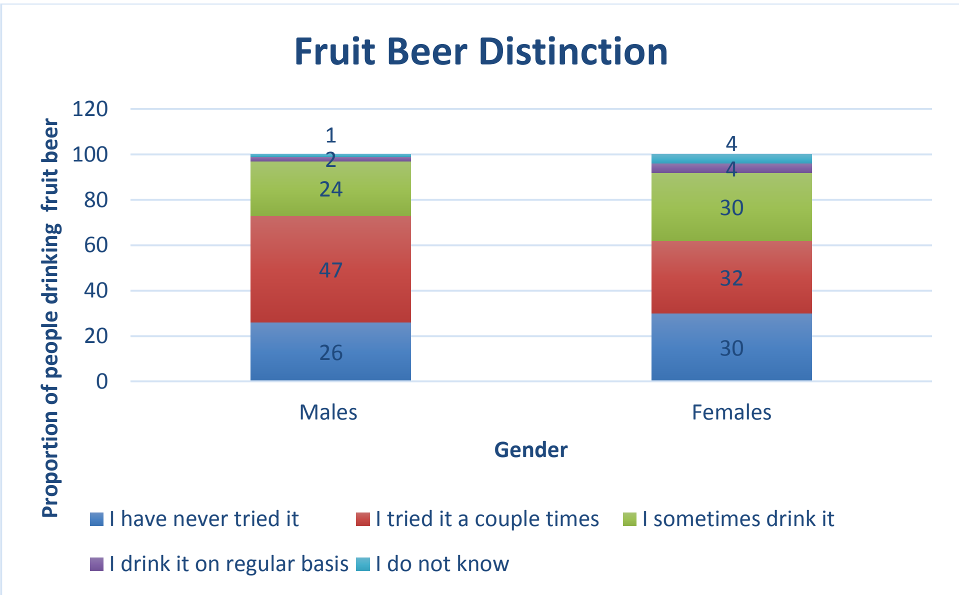
- None
- Wine
- Cocktails (mixed beverages)
- Heavy alcohol
- Other:

Appendix 27 - Proportion of Beer Drinkers in the Czech Republic



Source: Vinopal, 2014b, own processing

Appendix 28 - Frequency of Fruit Beer Drinking in the Czech Republic



Source: Vinopal, 2014a, own processing