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The competitiveness of wine companies of the New and Old Worlds at the International wine market

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Dissertação de Mestrado

apresentado ao Instituto Superior de Contabilidade e Administração do Porto para a obtenção do grau de Mestre em Empreendedorismo e Internacionalização, sob orientação de Armando Mendes Jorge Nogueira da Silva

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Abstract:

The wine segment of alcohol production is one of the most popular in the International market. Every year new vineyards are planted new wineries are opened. Europe as a representative of the Old World as nobody else is famous for its wine traditions. Nevertheless, going by the latest trends in the world of wine the companies of the New World noticeably pressed their European rivals thus granting a common consumer a larger choice of wine production. The adequate assessment of an enterprise's competitiveness may have a crucial role in decision-making what in due course entails an enterprise's further efficient performance and desired financial outcomes. The purpose of this study is to present the possible ways for comparative analysis of the wine companies of the New and Old Worlds.

Besides, based on the survey and correlation matrix method we could individualize the most important factors which were prevailing for consumers making a choice in wine. That, in turn, helped us to forecast consumers' choice in the next a few forms which we illustrated graphically and textually. The results obtained by a such econometric model can also be instrumental in companies' competitiveness evaluation.

Key words: competitiveness, wine companies, comparative analysis, econometric modeling

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INTRODUCTION

The wine segment of alcoholic production is one of the most popular in the International market. Every year new vineyards are planted new wineries are opened. Europe is a representative of the Old World as nobody else is famous for its wine traditions. Nevertheless, going by the latest trends in the world of wine the companies of the New World noticeably pressed their European rivals thus granting a common consumer a larger choice of wine production. The relevance of this topic lies in the fact that the adequate assessment of an enterprise's competitiveness may have a crucial role in decision-making what in due course entails an enterprise's further efficient performance and desired financial outcomes.

The primary goal of this thesis project is to analyze and forecast average consumer preferences in accordance with multiple independent factors concerning wine consumption culture.

At first, we start with the introduction of the concept "enterprise competitiveness", its definitions. We mention the history of this term, its role in the market, opinions of different researchers on its role in the economy e.g. Fatkhutdinov R. [18], Ambastha A. [3], McDonald M. [31], and some others. Next, we introduce and discuss some of the methods of competitiveness evaluation, concluding with the novelty – our systematization of the considered methods according to their feasibility. At the end of the first chapter of this paper we discuss the particular methodology which can be applied to the solution of practical tasks related to competitiveness assessment.

In the second chapter, we perform the general review of the world's vitiviniculture situation primarily drawing on the annual reports of International Organization of Vine and Wine (OIV) [37]. By way of the examples for microeconomic assessment, the author recourses to the case of "Treasury Wine Estates" (New World) company based in Australia but having multiple affiliates across the world. Throughout this Master Thesis, the author draws parallels, describing the main branches of performance of the global segment leader which can serve as a role model in terms of statistics, general performance for the young ambitious "Shumrinka" (Russia, Old World) which wants to make a statement and prospectively siege supermarkets' and wine shops' shelves. As a practical task of this part of work, there were demonstrated two ways to evaluate the competitiveness: through production method (quality of output production) and index-integrated method (financial performance of possible competitors).

It is also worth mentioning that due to the seasonal wrap-up in the wine industry the most of the statistical data was researched to the season 2019 - 2020 since the latest one for 2021 which is supposed to be more logical to analyze is yet to come.

In the third chapter of this Thesis Project the author resorts to the correlation matrix and multiple linear regression as one of the best ways to explain the patterns of consumer behavior and how they influence each other. Among the main tasks, individualization of the most and less important factors, explanation of the algorithms of obtaining the regression statistics. All of them are based on the conveyed poll.

The theoretical and practical significance of this work is that the results of this research can be used in the future financial and managerial decisions of the company as well as it contributes to a better understanding of the main pitfalls to enter the International wine market. Besides, the assessment of competitiveness permits us to solve such crucial issues as, for example:

1) determination of a wine enterprise's position on a specified market;
2) development of strategic and tactical measures for effective management;
3) attraction of facilities for prospective production, and many others.

1 Theory of enterprise competitiveness

1.1 The main definitions of competitiveness of enterprises

There is no limit to the number of definitions of competitiveness. Every year, a large number of scientific papers in this field are published in the press throughout the world. The term originated from the Classical Latin word "petere" meaning to seek, attack, aim at, desire, and the Latin prefix "con-" meaning together. At present, it is often used in different contexts, meaning dissimilar things to various researchers. The phrase was coined in the 70s of the twentieth century. It was then that American economists, under the evidence of severe trade battle between American and Japanese companies, undertook the first attempts to determine the degree of competitiveness between the rival economies [47].

The variety of publications, the application of a different conceptual apparatus, research methods clearly show the complexity of the category "enterprise competitiveness." Each author devoted to the related realm depending on the set goals and objectives of the study, the objects studied, the requirements of market relations, etc., gives, as a rule, his definition of enterprise competitiveness.

The author of this Master Thesis draws attention that there is a general segregation of this concept on the definitions in accordance with:

1) internal and external enterprises' activities;
2) enterprises' commodities competitiveness;
3) combination of commodity and operational activity of the subject;

Thus, proceeding from the first criterium, the author can harmonize a few logically aligned definitions.

J. Robinson believed that competitiveness is not only the ability to deal with competitors but also to get around the conflicts together with them by creating new markets for differentiated products. Meanwhile, Schumpeter J. and Romer P. argued that enterprise competitiveness could be identified as the ability to create new technologies, new markets, and ideas. Williamson, in his writings as the determining basis of competitiveness, singled out low costs for the production of goods received due to the use of a more efficient production model at the same prices as competitors. Hamel G. and Prahalad C. as competitiveness indicated the possibility of predicting the market position in the future based on experience, skills, and intellectual leadership [14].

Japanese economist Konno T. defined the competitiveness of enterprise as a set of characteristics containing: the market share captured by the enterprise, the skills of the enterprise to production, marketing, and development, the ability of senior management to achieve a given goal. Whereas Kalashnikova L. M. regards the term competitiveness as a complex concept, which is determined by the system and quality of management, product quality, breadth and depth of the range demanded by the enterprise or its members, stable financial condition, ability to innovate, efficient use of resources, purposeful work with personnel, level of goods distribution and service system enterprise image. Seleznev A., in his works, believes that competitiveness is a condition and position produced due to various environmental factors in the domestic and foreign markets, characterized by indicators that clearly reflect this condition and its dynamics [41].

According to Starovoytov M.K. and Fomina B. F., competitiveness is a certain level of an enterprise, which is considered a measure of confidence in the enterprise's services in the stock, financial, and labor markets. One of the main factors of this measure is the value of the enterprise, the level of equipment of jobs, the system management, management technology, human resources, strategic marketing, investment, and innovation policy [49].

The definition of Fatkhutdinov R.A. relates to the commodities' competitiveness criterium. He considers that competitiveness as a property of an object that reflects the degree of present and potential satisfaction of a certain need in comparison with similar objects present in this market [18]. Mironov M.G. also believes that the competitiveness of an enterprise lies in the ability to efficiently produce and sell goods at a price no higher than that of any other enterprise in its segment [32].

Porter M. doesn't specify directly and precisely the competitiveness of enterprise, referring to the increase in productivity at the macroeconomic scale as a component of national competitiveness while defining the latter one. On top of that, he establishes the strategies that enterprises shall adapt to gain competitive advantage and highlights the role of innovations in enhancing competitiveness. Nonetheless, as for him, it is the enterprises that actually compete in the global arena and face the direct competition. The environmental factors are more or less uniform for all competing enterprises [22].

McDonald M. and Dunbar I. describe competitiveness as a measure of the real strength of the organization in each segment, an objective assessment of the enterprise's ability to meet the needs of each segment in comparison with competitors [31]. Meanwhile, van Rooyen J., Stroebel L. analyze this term pushing off Porter’s model with further its characterization as the ability to sustain trade in the local and global environment. According to them, competitiveness being a dynamic process that engages companies in the continuous improvement of their performance, and it requires not only the efficient use of resources but also adaptation, innovation, and understanding of the market and the rapidly changing consumer needs [60].

Referring to the definitions based on the commodity and operational activity, one can stumble across the definition of Faskhiev H.A., who believes that the competitiveness of the enterprise is the present and future opportunity of the enterprise to develop, manufacture, market, and service competitive products in certain market segments. According to Ermolov M.O. enterprise competitiveness is a relative characteristic that reflects the difference in the development process of this manufacturer from a competitor manufacturer as to the degree of satisfaction their goods or services of a specific social need and the efficiency of production activities [48].

Italian COGEA gives its interpretation of competitiveness. It is the ability of a system to sustainably produce and sell goods and services on a given market, in such a way that buyers prefer these goods to those offered by competitors. According to the agency the goal of competitiveness in a specific market is the consolidation or increase of market share while maintaining an adequate return. In expanding markets, the goal is achieved with sales growing at a higher rate than that of the total market and of competitors, and vice versa. In this sense, competitiveness reflects the ability of the system to respond to a combination of market conditions originating from intermediate market actors and final consumer markets [13].

Ambastha A. and Momaya K.S. focus on the main competitiveness sources at an enterprise level and classify competitiveness-related literature in the asset-processes-performance framework. Their approach includes two strategic levels: assets and performance and processes. Authors suggest that an enterprise's competitiveness depends on the combination of tangible and intangible assets (e.g., human resources, material inputs, industry infrastructure, technology, reputation, trademarks) and processes within the organization, which together provide a competitive advantage and can be termed as sources of competitiveness [3].

Buckley P.J. writes that enterprise-level competitiveness can be defined as the ability of an enterprise to design, produce, and or market products superior to those offered by competitors, considering the price and non-price qualities. The competitiveness is an enterprise's long-run profit performance and its ability to compensate its employees and provide superior returns to its owners. This suggests that measurement of an enterprise's "competitiveness" should incorporate quantitative measures of costs, prices, and profitability, and qualitative indicators of non-price factors, specifically quality if the definition is to be satisfied [10].

The World Economic Forum, which has been measuring competitiveness among countries since 1979, defines it in its annual report as "the set of institutions, policies, and factors that determine the level of productivity of a country." The concept of competitiveness involves static and dynamic components. Although the productivity of a country clearly determines its ability to sustain its level of income, it is also one of the central determinants of the returns to investment, which is one of the key factors explaining an economy's growth potential [66].

Hence, referring to the definition mentioned above Yeh A. gives his connotation of enterprises that it can be described as the aggregate ability to survive in a competitive environment and to sustain growth by fully utilizing available resources, taking effective measures and making appropriate market strategies to meet the test of international markets. The author also remarks about such important factors as innovation, management regulation, human resources, technology, and information as major determinant attributes of an enterprise's competitiveness [68].

Competitiveness of an enterprise is also a category closely related to a special role of a country as a sovereign, creating not only a particular legal and institutional order but also providing new chances and opportunities as well as encouraging and catalyzing certain behaviors of economic subjects. The improvement in the quality of legal order, deregulation of the economy, the increase in the range of economic freedom and competition as well as pro-progressive economic policy favor the effectiveness of the market mechanism, the reduction of transactional costs and the risk of conducting the activity by economic subjects as well as positively influence opportunities of enterprises' development. Deregulation and the improvement in institutional order are crucial factors that increase the chances of the realization of effective strategies that are a foundation of the formation of competitive ability of enterprises and, in this sense, the entire economy [28].

Chikán A., in her article, understands enterprise competitiveness as a capability of an enterprise to sustainably fulfil its double purpose: meeting customer requirements at profit. This capability gets realized through the offering on the market goods and services that customers value higher than those offered by competitors. It rounds the purpose of the business firm: to meet customer requirements at profit. Besides, she remarks that competitiveness can be a characteristic feature of the firm, but it is not equal to success: it only means that the firm can compete – but it does not necessarily mean winning. This is extremely important since it calls for action by the management of the enterprise in order to realize the chance included in the capability of competitiveness [12].

Covering a vast number of definitions, the author can easily conclude that this concept is multifaceted and ambiguous. It is worth noting from the analysis of definitions that product competitiveness is an essential condition for the competitiveness of the enterprise as a whole. Of course, an enterprise cannot compete in the market without a quality product, but the competitiveness of the entire enterprise is understood as the ability to concentrate its efforts and capabilities in such a sphere of production where the enterprise can become a leader.

Since the competitiveness is a complex concept determined by a multiplicity of factors, it seems that the most appropriate way to estimate the level of competitiveness is by using multidimensional or composite indicators (indexes) of competitiveness. Construction of composite indicators could, however, be associated with the dilemma of selecting appropriate variables (individual indicators) and weights representing their relative importance (priority) as well as of choosing an aggregation method [36].

In conclusion, it’s worth mentioning that in wine industry competitiveness basically based on two levels. First is that the different producing countries are targeting in most cases the same geographical market and the second when two systems compete directly against each other. As the wine business is characterized by an intense international and export activity that plays a central role in gaining prosperity and profitability for the sector. Scholar studies on competitiveness could help enterprises hold a competition at micro or macro levels by adjusting their competitive settings [46].

Thus, having examined the points of view of a row of different authors on the concept of competitiveness, one can formulate the main features of a competitive enterprise that has a certain set of competitive advantages:

1) the enterprise is competitive in a particular market segment;

2) the enterprise provides its customers with competitive products;

3) the enterprise functions efficiently (effectively uses its production factors);

4) the enterprise is going through its constant development being all the time engaged in the search for a competitive advantage.

1.2 The methods of enterprise competitiveness

Many researchers who deal with problems of enterprise competitiveness are trying to fit the phenomenon into a specific approach that determines the further use of a certain quantification method to evaluate competitiveness. Most methods of an enterprise's competitiveness valuation presume that the estimated value is interpreted as a precise "balance of power" between the enterprise and its main competitors. These are so-called parametric methods based on calculation of the parameters of competitors' comparison and identification of the opinions of consumers, sellers, suppliers concerning the chosen comparative characteristics. The advantages of their use include the relative simplicity and low cost of research. However, the practical implementation of this group of methods has certain peculiarities and limitations.

The method of comparative advantage is widely believed by economists to be a key determinant of international production and trade patterns. The main criterion used is low costs. An enterprise has an advantage if its production costs are lower than those of its competitors. In other words, the main benefit of this method is that it allows us to compare the scale of enterprises. Economies of scale, efficient internal systems, and geographic location can also create a comparative advantage.

According to Yamova O., there must be three peers in the comparative analysis comparable characteristics of products that meet identical customer needs; comparable market segments where products are traded; comparable phases of the life cycle of an enterprise [67]. Thus, the competitive advantage of one enterprise over another can be estimated when the compared economic entities satisfy identical needs of buyers, belong to comparable segments of the market, and are in the same phase of the life cycle. If these conditions are not met, the comparison may be considered incorrect.

Comparative advantage does not imply a better product or service, though. It only shows the enterprise can offer a product or service of the same value at a lower price. For example, an enterprise that manufactures a product in China may have lower labor costs than an enterprise that manufactures in the U.S., so it can offer an equal product at a lower price. In the context of international trade economics, opportunity cost determines comparative advantages [58].

Among the main disadvantages of this method that it makes it impossible to assess the process of enterprise adaptation to environmental conditions. The risk of subjectivity and the inaccuracy of value judgments remains quite high as it's often very difficult to objectively evaluate the strength and weaknesses of a competitor alongside with prediction of its possible development. As for the feasibility of its use, it is possible to apply the method to assess the competitiveness on a macro level [59].

The matrix methods for assessing competitiveness are based on building a single matrix considering the processes of competition in dynamics, determining the place of the enterprise under study, and choosing a marketing strategy. The methodology is based on the analysis of competitiveness, taking into account the life cycle of the enterprise's products. The clear advantage of the methods is that if there is reliable information about sales volumes, the method allows for a high representativeness of the assessment [67].

In the framework of matrix methods, enterprises are considered as a set of business units that form a single product portfolio. On the horizontal axis of the matrix most economists plot the value of the indicator characterizing the enterprise's market position, and vertically - the value of the indicator reflecting the degree of attractiveness of this market. Hence, it's worth noting a significant bias of matrix methods in the direction of marketing evaluation of the business entity. The most famous and widely used are the matrix models proposed by American consulting companies: the Boston Consulting Group and McKinsey, and later by Shell and the economist Ansoff I. [26].

By and large, all matrix methods are similar in their relative simplicity and clarity of the assessment results. Besides, the construction of matrix models gives a fairly objective idea of the balance and competitiveness of the enterprise's product portfolio, allowing outlining strategic directions for improving the enterprise's competitive position.

At the same time, many researchers point to the inadmissibility of treating the enterprise as a set of business units, since in this case, when evaluating competitiveness, a number of factors are not taken into account, which significantly reduces the reliability of the results obtained. It excludes a cause-and-effect relationship and requires reliable marketing information that requires, in due course, appropriate research [8].

One of the most common methods of estimation of competitiveness of enterprises is the method based on the theory of J. Clark's effective competition. According to this theory, the most competitive are companies where the best-arranged work of all services and divisions. The efficiency of each of the services is influenced by a number of factors, resources of the enterprise. Evaluation of the effectiveness of each of the units involves an assessment of the effectiveness of the use of these resources. The method is based on the evaluation of 4 groups of indicators or criteria of competitiveness: efficiency indicators of production activity, the financial position of the enterprise, the effectiveness of the marketing and promotion of goods, competitiveness of a product [56].

The first group includes indicators characterizing the efficiency of the production process management: the efficiency of production costs, the rationality of the operation of fixed assets, the perfection of the manufacturing technology of goods, the organization of labor in production.

The second group combines indicators reflecting the efficiency of working capital management: the independence of the enterprise from external sources of financing, the ability of the enterprise to pay off its debts, and the possibility of stable development of the enterprise in the future.

The third group includes indicators that provide an idea of the effectiveness of sales management and product promotion on the market by means of advertising and stimulation. And the fourth group is indicators of product competitiveness: product quality and price [27].

The disadvantage of these groups of the method is the separate consideration of the performance indicators of the enterprise, often there are a lot of such indicators, and some can duplicate each other. This aspect makes it difficult to analyze the situation: there is no consideration of the competitiveness of the enterprise's goods, the ratio of quality and price [69].

The competitiveness of the enterprise is also evaluated according to the quality of production or service. This method is one of a few techniques to give visualization of evaluation. Unlike other approaches, this method provides an investigation of the market segments, an evaluation of a possibility of changing production profitability, and the sale with allowances made for market requirements, as well as an analysis of the marketing network. The use of product methods makes it possible to obtain a fairly objective quantitative assessment of the attractiveness of the enterprise's product portfolio for consumers, as well as to analyze the factors that affect the change in the dynamics of demand for the enterprise's products [59].

The production method is based on the identification of criteria of meeting requirements in relation to a concrete product, on the establishment of a hierarchy of demand, their comparative significance within the spectrum which an ordinary consumer can evaluate. The competitiveness of the product and the enterprise are directly dependent on each other, i.e., the competitiveness of the enterprise grows alongside the growth of the competitiveness of goods. In order to determine the competitiveness of the product, marketing methods may be involved, most of which are aimed at determining the price-quality ratio. When calculating the competitiveness indicator for each type of manufactured product, econometric and parametric competitiveness indices are used [8].

The basic drawback of the specified method consists in the fact that it does not take into account the effectiveness of industrial activity of the enterprise and is acceptable for the enterprises with only one type of product. Therefore, it provides a very limited understanding of the advantages and disadvantages in the enterprise, as the enterprise's competitiveness takes the form of competitiveness of the goods and does not affect other aspects of its activities [26].

Integrated methods are defined as complex due to the fact that the assessment of the competitiveness of enterprises under each of the methods is conducted by identifying not only current but also the potential competitiveness of the enterprise. The approach is based on the assertion that competitiveness is the integral value in relation to current competitiveness and competitive potential. It takes into account the achieved level not only the competitiveness of the enterprise but also its possible dynamics in the future [56].

Comparative integrated assessment methods in determining the level of competitiveness may be applicable in such situations:

- the need to compare the work of several business entities according to the available data on their activities on the basis of a single system of indicators reflecting competitiveness;
- a comprehensive assessment when comparing changes in the level of competitiveness of the analyzed economic entity over time.

The main condition for the applicability of the methods of a comprehensive comparative assessment of the competitiveness of various enterprises is an agreement on the possible commensurability of various inherent indicators. Therefore, the comparison of indicators in assessing competitiveness is carried out not by absolute values, but on the basis of their relative variation [44].

Among the main disadvantages, one can highlight its focus on statistical relationships, often without considering a causal relationship. Besides, there is not carried out an interpretation of economic phenomena in the dynamics, the emphasis on making a static basis. It's difficult to conduct the analysis for companies with a large product range of products. The methods and techniques used in determining current and potential competitiveness in the final account reproduce the methods used in the earlier approaches that entail and disadvantage the respective approaches [6].

Each enterprise has a wide variety of characteristics. To assess them, it is necessary to reduce them into homogeneous groups, to determine quantitative and qualitative indicators and the methodology for their measurement. It is impossible to take into account all the characteristics of the enterprise, so you should choose the most important groups and the most important properties in the group. Therefore, assessing the competitiveness of an enterprise depends on the objectives of the analysis; practical ability to obtain the necessary information; the methodology used to measure indicators.

The following-up chart is based on methods described before in this subchapter forming a certain systematization. Thus, the author of this Master thesis comes up with his own generalization of all of the above:

Table 1 – The enterprise competitiveness methods' systematization [compiled by the author]

Method	Description	Feasibility
1. Comparative advantage	- based on the comparison of production and sales costs: the lower the costs are for the same production the more advantageous position market player has.	It suits better at a macro level assessment
2. Matrix method	- based on the analysis of the product life cycle as well as the construction of a matrix of competitive strategies.	It suits better for a rapid assessment in a particular type of enterprise
3. Competition efficiency	- based on the evaluation of competitiveness with a functional approach which is carried out taking into account the ratio of price, cost and rate of return. The concentration of production and capital is above all.	It is often used to assess the com-petitiveness of an enterprise
4. Product method	- based on the judgment that the higher the competitiveness of an enterprise, the higher the competitiveness of its products. The ratio price-quality is at the top.	It is often used to assess the com-petitiveness of an enterprise
5. Integrated method	- based on the statement that the competitiveness of an enterprise is an integral quantity with respect to current competitiveness and competitive potential.	Used to express the evaluation of 2 businesses.

Having considered the above-mentioned methods, it follows that approaches to assessing the competitiveness of an industrial enterprise developed depending on the subject of research, which was the focus of attention of the corresponding economic period, as well as the field of research of the author. A universal methodology for assessing the competitiveness of an enterprise does not currently exist. This is due to the fact that each of the existing approaches has a number of disadvantages. Basically, they come down to the subjectivity and conventions of the assessment, the difficulty of creating an exhaustive list of factors for analysis, the impossibility of comparing with competing enterprises because of their constant diversification, and the fuzzy definition of the boundaries of a particular market. The choice of one or another method of assessing competitiveness should depend on the goals and objectives that the enterprise sets before itself, as well as the budget that it can devote to conducting a competitive assessment.

1.3 Methodology of enterprise competitiveness

In spite of the fact that various methods provide the basis for the analysis of competitiveness, the author of this thesis resorts to four of them in the methodological part: methods of comparative advantage, matrix methods, product methods, and integrated methods.

Balogh J., in his article, indicates the method worked out by Balassa, a measurement of comparative trade advantage by calculating the relative strength or disadvantage of a particular country in a certain class of goods, as evidenced by trade flows. Although the following comparative advantage methods are more applicable to countries' export/import competitiveness, they also can be assumed regarding the enterprises' evaluation of competitiveness. It's worth noting that pertaining to the considered enterprise's competitiveness import (in case it is going to be calculated) shall be regarded as the products designed for the internal market.

Based on the concept of Ricardian trade theory, Balassa's measurement of comparative trade advantage is calculated using different index numbers. The original index of comparative advantage is defined as follows:

$$B_{ij} = RCA_{ij} = \left(\frac{X_{ij}}{X_{it}}\right) / \left(\frac{X_{nj}}{X_{nt}}\right) \quad (1)$$

where

X refers to the export;

i indicates a given enterprise;

j is a given product;

t is a group of products;

n is a group of enterprises.

It follows that a comparative advantage index of exports can be calculated by comparing the enterprise's export share of its total exports with the export share in total exports of a reference group of enterprises. If the value of B-index is greater than 1, the enterprise has a comparative advantage compared to the reference enterprises or, if B is less than 1, a comparative disadvantage [5].

The Balassa index is criticized for neglecting the effects of agricultural policy, and it exhibits asymmetric values. Various state interventions and trade limitations distort trade structure. The asymmetric amount of the B-index reveals that it extends from one to infinity; this is not a problem, except in the case of comparative disadvantage, in which it varies between zero and one, which overestimates a sector's relative weight.

Due to the critiques mentioned above, one can come across the Revealed Symmetric Comparative Advantage (RSCA) index, developed by Dalum, thereby tackling the problems of the B index cited above. The RSCA index is a transformed B index as follows:

$$RSCA = (B-1)/(B+1) \quad (2)$$

The RSCA takes ranges between −1 and 1. Values between 0 and 1 indicate a comparative export advantage, and values between −1 and 0, a comparative export disadvantage. Since the RSCA distribution is symmetric and centered around zero, potential bias is avoided [25].

Yu et al. adopted an alternative measure to assess the dynamics of comparative advantage. The Normalized Comparative Advantage (NRCA) index is defined as follows:

$$NRCA_{ij} = \frac{Eij}{E} - \frac{E_i}{E}\frac{E_j}{E} \quad (3)$$

where

E denotes the total world trade;

Eij describes enterprise *i*'s actual export of the commodity *j* in the world market;

Ei is the enterprise *i*'s export of all commodities;

Ej denotes export of the commodity *j* by all considered enterprises.

If NRCA > 0, an enterprise's agri-food comparative advantage on the world market is revealed. The distribution of NRCA values is symmetrical, ranging from −1/4 to +1/4, with 0 being the comparative-advantage-neutral point [7].

The matrix methods in assessing the level of competitiveness of enterprises make it possible to take into account the level of significance of each indicator of its competitiveness, which increases the accuracy of the assessment. All matrix methods are similar in their relative simplicity and clarity of the assessment results. According to Reshetnyak O. I., there are five stages to assess enterprise competitiveness:

1st stage. The justification of the system of estimated indicators is carried out, and a matrix of initial data is formed in the shape of a table, where the names of the competing enterprises being evaluated are displayed in rows, and the indicators that are taken into account in this assessment are displayed in columns;
2nd stage. The analysis of the source data of the competitiveness assessment is carried out, determining the maximum values of the matrix elements for each indicator;
3rd stage. All matrix elements are squared;
4th stage. The significance level of competitiveness indicators that make up the assessment matrix is determined on the basis of expert assessment;

The formula determines the rating for each system:

$$R_j = \sum_{i=1}^{n} k_i \cdot x_{ij}^2 \quad (4)$$

where
k_i is the weight coefficient determined by the expert way of *i*'s competitiveness' indicator;
xij is the standardized coefficient of the *i*-th indicator of the *j*-th competitor.
5th stage. The formation of ratings in accordance with the criterion max *Ri* [44].

Boston Consulting Group (BCG) Matrix is a four celled matrix (a 2 * 2 matrix) developed by BCG, USA. The BCG matrix allows enterprises to classify each of their strategic business units according to their market share relative to their main competitors and annual growth rates in the industry.

The matrix makes it possible to determine which of the divisions of the enterprise occupies a leading position in comparison with competitors, what is the dynamics of its markets, allows preliminary distribution of financial resources between divisions. The matrix is based on the premise: the larger the unit's market share, the lower unit costs, and higher profits as a result of relative savings from production volumes [35].

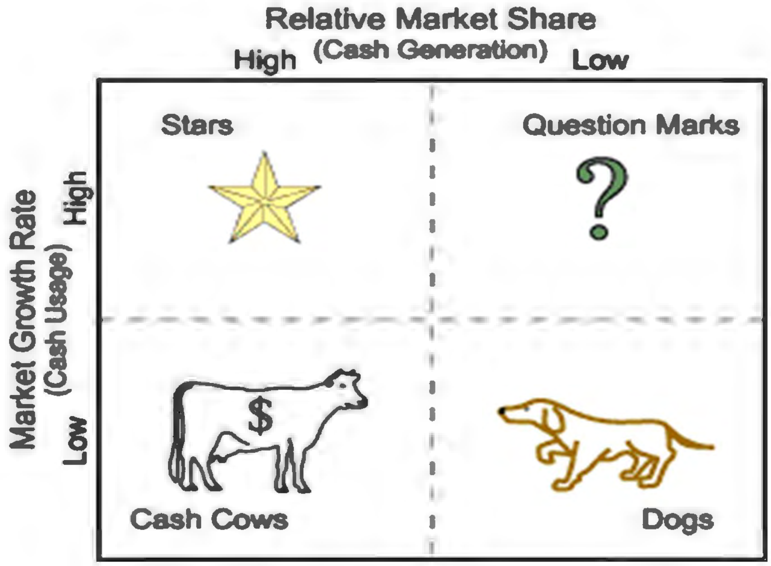

Figure 1 – Boston Consulting Group (BCG) Matrix

To help businesses further analyze its assets, the BCG matrix divides the business products into four categories as:

1. „Question Marks" indicates the products in high growth markets, and with low market share;
2. „Stars" shows that both, the growth markets and market share are in the highest position;
3. „Cash Cows" predicts that the products are in low growth markets, and market share is in high;
4. „Dogs" displays that both growth and market share are in a low position [33].

Apart it's worth mentioning product methods. The authors of this group of methods, including renowned economist Porter M., proceed from the fact that the competitiveness of its products determines the enterprise's ability to compete with other market participants successfully. The main criterium, as Zhdanova E.S. says, is the quality. The competitiveness indicator of an industrial enterprise is calculated through the weighted average of competitiveness indicators for each type of product, which in turn is found using economic and parametric indices:

$$K = \Sigma Kprod.,i \times \mathrm{D}prod.i \quad (5)$$

where

Kprod.,i - a volume of production;

D*prod.,i* - the specific weight of products in total sales.

Analysis of existing product methods allows us to state that their main advantage is a comprehensive assessment of one of the most important components of the competitiveness of a business entity - the competitiveness of its products [69].

The use of product methods makes it possible to obtain a fairly objective quantitative assessment of the attractiveness of the enterprise's product portfolio for consumers, as well as to analyze the factors that affect the change in the dynamics of demand for the enterprise's products.

According to Mokronosov A.G., complex methods of enterprise competitiveness are implemented with the use of the integrated assessment method, which contains three elements: operational efficiency, innovative activity and market adaptability. The model is based on the integral-index method, which is the calculation of the indices of variables and their multiplication with subsequent extraction of the root. The general formula of the model is as follows [34]:

$$\mathrm{C} = \sqrt{\mathrm{Ce} * \mathrm{Ci} * \mathrm{Ca}} \quad (6)$$

where

C – competitiveness criteria;

Ce – operation efficiency coefficient;

Ci – innovativeness coefficient;

Ca – adaptability coefficient.

The most complete idea of the content of the formula can be obtained by looking at table 2.

Table 2 – Indicators' formulas for the model's components

Indicator	Formula	Description
Operation efficiency coefficient	$Eo = \frac{R}{C}$	Eo – operating efficiency; R – revenue; C – costs.
Degree of innovation activity	$I = \frac{Ci}{C} : \frac{Ci0}{Co}$	I – degree of innovation activity; Ci, Ci0 – innovation costs at current and previous period; C, C0 – costs of enterprises at current and previous period.
Index of changes in revenue	$\Delta R = \frac{R}{R0}$	R – revenue in current period; R0 – revenue in previous period.

Lazarenko A. declares that the relative values can be obtained by dividing the values of specific indicators for the organization by maximum values or by relevant indicators for the most powerful organization of a competitor can also serve as individual indicators of an organization's competitiveness. They are based on the use of the weighted arithmetic average of individual competitiveness indicators:

$$K = \sum_{i=1}^{N} W_i K_i \quad (7)$$

where

Ki is an individual indicator of the competitiveness of the organization (product) with the total number *N*;

Wi is an indicator of the significance (weight) of the *i*-th unit indicator of competitiveness [27].

Many researchers consider the enterprise's current competitiveness as the competitiveness of its products and perform an assessment using models offered by the authors of product methods. A competitive potential of the organization mentioned by the authors is often determined by assessing the effectiveness of the use of various resources of the enterprise by analogy with product methods. The integral indicator of the enterprise's competitiveness in most complex methods, as well as in other methods, identified within the framework of the factor approach, is calculated by the formula of the average arithmetic weighted:

$$K = K_{actual}{}^{\times}B_1 + K_{potent.}{}^{\times}B_2 \sum K_{unit.,i}{}^{\times}B_{unit.i} \quad (8)$$

where

Kactual. - actual competitiveness of the enterprise;

Kpotent. - potential competitiveness of the enterprise;

Kunit.,i - indicators of competitiveness of the enterprise functional units;

Bunit.,i - the importance of functional units for enterprise activities;

B_1 and B_2 are the parameters associated with x_1, x_2, i.e. they are independent variables [55].

According to Krivorotov V., the main advantage of comprehensive methods is the desire of their authors to take into account, based on a combination of indicators of the current competitiveness and competitive potential, not only the level of competitiveness achieved by the business entity, but also the prospects for its growth in the future, which is quite valuable from a practical point of view [26].

In conclusion, it's possible to note that due to the fact that each of the existing methodologies has several strengths and drawbacks, we cannot find a universal one. In most cases, they come down to the subjectivity and conventions of the assessment, the difficulty of creating an exhaustive list of factors for analysis, the impossibility of comparing with competing enterprises because of their constant diversification, and the fuzzy definition of the boundaries of a particular market. The choice of one or another method of assessing competitiveness should depend on the goals and objectives that the enterprise sets before itself, as well as the budget that it can devote to conducting a competitive assessment.

Therefore, an important task to solve this problem, in author's view, is to decide on an appropriate methodological framework of criteria and evaluation of the competitiveness of the enterprise, choice of adequate instruments which meet the requirements of the modern market environment and contemporary trends in the industry, as well as the formation of specific criteria for the evaluation and selection parameters of assessment – competitive advantages of enterprises. For the above-mentioned reasons, the author eventually gives preference to the matrix model. The search of parameters will be carried out through the selection of data obtained from the questionnaire's results of the Ad Hoc Groups of Experts as well as the construction of the competitiveness model with the use of correlation matrix and regression analysis.

CHAPTER II – GENERAL TRENDS AT THE INTERNATIONAL WINE MARKET

2 General trends at the International wine market

2.1 Overall performance of the industry

One of the most important ways that wines and wine regions around the world are categorized is in terms of the Old World and New World. It is a division in both winemaking style and philosophy but generally speaking “Old World” describes wines from Europe or produced in a traditional European style. The term “New World” is used primarily to describe wines outside Europe where there is not a long-standing tradition, wines are made using technical innovation, experimentation and manipulation. The wines of the New World are made with different grapes and have their unique interpretations of many European classic styles. “Old World” techniques in the vineyard and cellar rely more on tradition and less on science [20]. Among the most important winemaking countries of the Old World and New World we can make the following-up classification in table 3.

Table 3 – Important wine countries of the Old World and New World

Part of the world	Countries
Old World countries	France, Italy, Spain, Germany, Portugal, Austria, Greece, Hungary, Romania. Here we relate the ex-Soviet Union countries as Russia, Ukraine, Georgia, Armenia, Moldova, etc.
New World countries	United States, Australia, New Zealand, China, South Africa, Chile, Argentina, Canada, Mexico, Uruguay, etc.

In spite of the fact that nowadays the winemaking is a common practice it’s still been developing throughout the world. The 2020 world area under vines is estimated to be 7.3 mha. Thus, for example, considering some countries of the Old World the latest available data indicates an increase in vineyard surface area (compared to 2019) in the following countries: France (797 kha/+0,4%), Italy (719 kha/+0,8%), Russia (96 kha/+0,6%). Germany demonstrated a certain stabilization for the fifth year in a row (103 kha) [37].

It is significant that a trend of reduction is quite apparent in Europe. A row of countries keeps showing a decrease in their planted area for a few last years and it is doubtful whether we can link this fact to COVID-19 pandemic. These countries are Spain (961 kha; -0,6%, decrease since 2018), Hungary (65 kha; -3,9%, decrease since 2018), Moldova (140 kha; -2%, decrease since 2017), Turkey (431 kha; -1,1%, decrease since 2013). Hereby we can say about a certain transformation and restructuring which apparently has a temporary nature [37].

This reduction tendency can be also rooted in sticking to the European Union harvest programme (2010/2011) that is oriented towards the regulation of viticultural production potential. The main aim hereafter was to increase the competitiveness of wine producers [42]. In 2016 there was also adopted the regulation that introduced some important prescriptions how the planted areas shall be managed which enabled its Member States to increase their vineyard surfaces by 1% annually of the vineyard already planted [43].

Speaking about the countries – representatives of the New World – the most prominent growth in surface area compared to 2019 was gained by New Zealand (40 kha; +2%). At the same time there was recorded a stabilization with respect to 2019 in a row of the following countries: China showed just an insignificant grow holding onto 785 kha (+0,6%); South Africa stood at 122 kha (-0,7%); Australia maintained 146 kha for the third straight year [37]. Concerning the latter one may foresee the imminent decline in planted vineyards caused by devastating bushfires which were taking place yet in 2020 spreading across the entire continent. According to Wine Australia, about 1% of vines were in the heart of the worst-hit region - the Adelaide Hills [64].

When referring to a downward trend it's worth mentioning apart United States. For the third consecutive year a lot of efforts are applied to overcome wine grape oversupply in California what causes the drop in prices. Winegrowers were trying to maximize the yields by the use of the latest technologies but no one expected that wine shipments would flatten out. Thus, for the past couple of years, American farmers try to reconvert their fields. Pistachios, walnuts and almonds are among the most demanded cultivars [19].

In the countries of the Southern Hemisphere, there is also traced a declining trend. Mainly that relates to such countries as Chile (-3 kha; 207 kha), and Brazil (1 kha; 80 kha). The main reason according to OIV is the climatic changes [37]. In figure 2 we can graphically trace the dynamics in the evolution of wine-growing areas based on the example of a few leading countries.

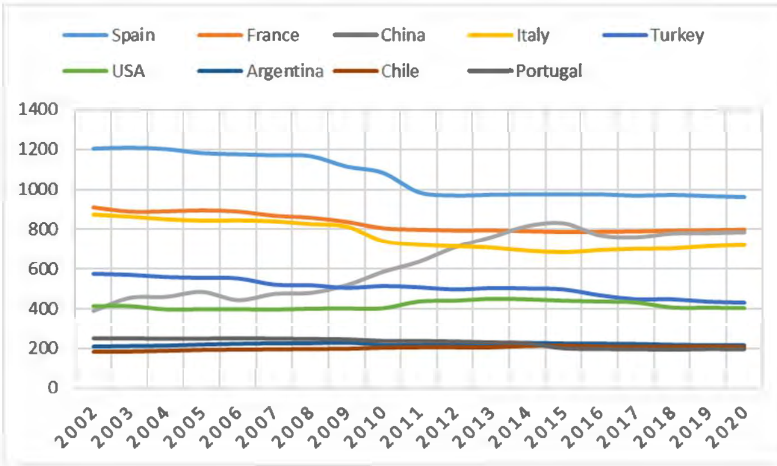

Figure 2 - Evolution of areas under vine, ha

World wine production marked a slight increase compared to 2019 (260 mhl; +1%). Every major wine producer was higher in volume in 2020 compared to 2019, with Italy by 3%, France by 11% and Spain by almost 21%. This increase could be accrued to a warm spring and summer, experienced in these countries that favored an early and large 2020 harvest. The particular attention also deserves New Zealand which touched the highest recorded level ever (3,3 mhl; +11%) and South Africa (10,4 mhl; +7%) which seemed to be recovering from the years of heavy draught 2016-2018 [38].

Turning to the other the EU countries a substantial decrease in production for 2020 with respect to 2019 was registered in Moldova (0,9 mhl, -37%) and Ukraine (0,7 mhl; -33%). This downfall can be put down to unfavorable climatic conditions due to a draught. The following countries demonstrated negative trend as well: Hungary (2,4 mhl, -12%), Austria (2,4 mhl, -3%), Romania (3,6 mhl, -7%), Greece (2,3 mhl, -6%), Russia (4,4 mhl; -4%), Portugal 6,4 mhl (-2% / 2019) [38].

A very similar situation is observed regarding the New World countries. In Asia, China demonstrated a record drop for the third consecutive year. The vinified production was estimated at 6,6 mhl which is 16 % less than it was in the preceding year. The negative tendency on the Chinese market can be primarily related to a set of factors as harsh climatic conditions, low productivity, and technological imperfections. Besides, apart from the above-mentioned factors, favorable governmental trade policy regarding the imported production impedes the development of the local wine industry [62].

The production of wine in the USA fell strikingly by 11% in 2020. Among the factors impacted that fall were raged wildfires in California from August to October [45].

According to A. Weed most producers prefer not to release their wines in case their vineyards were near the fires as smoke easily impacts flavors and aromas making wine unpleasant and unmarketable consequently [63].

In the South America, the trend for wine production is also negative. The main wine-producing countries Argentine (10,8 mhl) and Chile (10,3 mhl) showed a reduction equal to -17% and -13% respectively. As for Brazil (1,9 mhl), it also showed a drop which is -5%. It is the lowest production volume since 2016. The decrease in production in the South American countries, first of all, related to squally El Niño which caused excess rainfall in the vine growing areas as well as La Niña with its draught both having devasted a large number of crops [53], [29]. In table 4 we can see the dynamics in wine production across the globe for the past five years.

Table 4 – Evolution of world wine production over the last 5 years (2016 -2020), mhl

Country	Years					Change (+/-), %
	2016	2017	2018	2019	2020	
Spain	975	968	972	966	961	-1,44
France	786	788	792	794	797	1,40
China	770	760	779	781	785	1,95
Italy	693	699	701	713	719	3,75
Turkey	468	448	448	436	431	-7,91
USA	439	434	408	407	405	-7,74
Argentina	224	222	218	215	215	-4,02
Chile	209	207	208	210	207	-0,96
Portugal	195	194	192	195	194	-0,51

World wine consumption in 2020 was estimated at 234 mhl. This volume turned out to be lower by 3% than it was in 2019. OIV also notes that it is the lowest level consumption since 2002 [37]. Yet now we may say that Covid-19 severely affected global wine consumption. IWSR estimated -9,7% in volume and -9,5% in value of decline for the wine market [24]. According to Vinexpo the parity in consumption to 2019 is awaited only by 2024. As for the current year 2021 is expected some partial recovery [65].

Considering in more detail statistics there was quite asymmetric aggregate consumption behaviors in different countries of the world. To the Old World's counties which saw an increase in consumption we can relate Italy (24,5 mhl; +10%), Germany (19,8 mhl; +0,2%), Austria (2,3 mhl; +2,2%). France stood at 24,7 for the second year straight. Apart it's worth mentioning Russia that gained 3% (10,3 mhl) and UK (13,3 mhl; +2.2%).

Nevertheless, the majority of European countries saw a decline in consumption among which we can single out Spain (9,6 mhl; -1,9%), Portugal (4,6 mhl, -0,6%), Romania (3,8 mhl, -1,9%), Belgium (2,6 mhl; -3,1%), Sweden (2.2 mhl; -2.3%). In Hungary the equivalent figure worked out at 1,9 mhl and -10,2% compared to 2019 [37].

According to Statista the highest wine consumption across the world was observed in the United States which amounted to 33 mhl for the second year running [50]. It is quite surprising especially taking into account the fact that the volume of the consumed wine dropped for the second straight time since 1994 referring to industry tracker IWSR [24]. The Wall Street Journal reported that it is primarily accounted for a shift in alcoholic preferences among millennials [11]. Of note is the fact that the data of IWSR on the alcohol goes in contrast to the data presented by OIV. The organization in its annual report states that the internal demand keeps increasing for the past several years. As for Covid-19 it seemed not to have noticeable influence on the American market what proved its resilience.

Looking at the Asian region, China has a sixth position in terms of consumption with 12.4 mhl. Thus, this oriental country demonstrated an essential percent drop with respect to 2019 (-17,4%). This drop which is taking place for the third consecutive year. But compared to the year earlier when this drop was 3% it makes obvious that pandemic "put in its two cents". The general reduction trend though can be somehow put down to the higher level of knowledgeability of a Chinese consumer, i.e., he/she prefers to spend more for quality instead of quantity [4]. Japan holds the second position meanwhile. Their level keeps being stable for the past 7 years at 3.5 mhl [51].

The lowest wine consumption level of the last twenty years was recorded in South Africa (3.1 mhl; -19.4%). A key driver of this major drop in consumption is certainly linked to the COVID-19 crisis: local sales of alcohol were banned for 14 weeks during the lockdown period, what had a devastating impact on the market with a loss of more than R7.5 billion in sales, according to Palm K. [39]. In Oceania, Australia saw a slight decrease -3,7% but it's still in line with 5,7 mhl with the last 5-year average value [37].

In the figure below are illustrated graphically the most consuming countries in the world according to 2020.

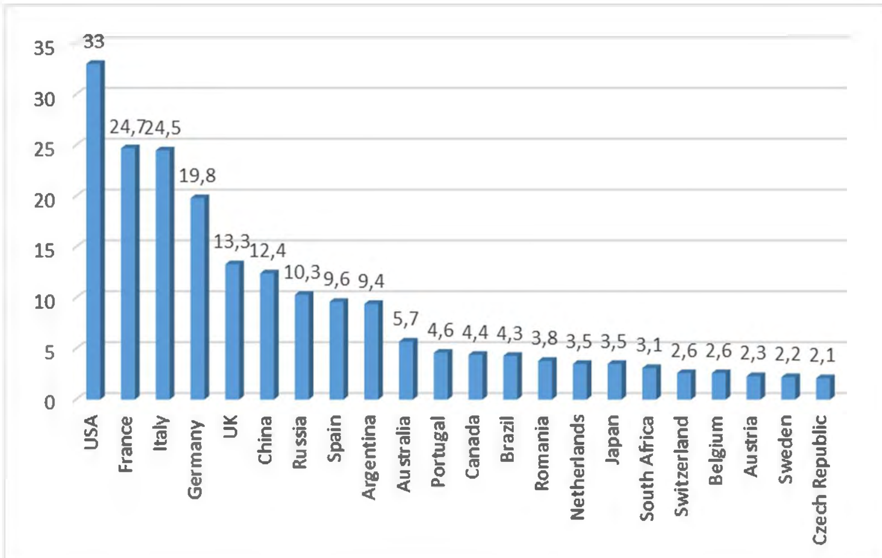

Figure 3 – The largest world wine consumers, 2020

In 2020 the world wine export market saw a slight contraction both in terms of value (29.6 bn EUR; -6.7%) and volumes (105,8 mhl; -1,7%). Deepening into the reasons of downward trend apart the pandemic it's noteworthy that geo-political tensions played a crucial role. The imposition of multiple trade tariffs (the US towards Germany, France, Spain; Chinese tariffs on Australian wine) as well as Brexit uncertainty all sums up [61].

According to the latest data performed by the OIV France keeps the leading export position in terms of value, with 8,7 bn EUR exported in 2020. Besides, there were noted value falls in export in the following countries: France (-10,6%), Italy (-2,0%), Chile (-7,0%), the USA (-9,0%), Spain (-3,0%). Portugal (+3%) and New Zealand (+3%) were the only two countries among the major exporters that showed rises [37].

In terms of volume, in 2020 there were three countries set off from the others: Italy (20,8 mhl; -2,4%), Spain (20,2 mhl; -5,9%), France (13,6 mhl; -4.9%). Compared to 2019 the general decrease stood at 1,7%. Developments in export volumes were gained by the following countries: Argentina (+27,0%), New Zealand (+6,0 %), USA (+1,8%), Portugal (+5,3%). A decrease in export volumes in 2020 was recorded in South Africa (-11,9%), Germany (-10,3%), Chile (-2,2%) [37].

Table 5 gives a classification of the most-exporting countries in terms of value and volume in 2020 with a percentage of change compared to 2019.

Table 5 – Main exporters of wine, 2020 [compiled by the author]

Country	Export			
	Volume (mhl)	Change (+/-), %	Value, (mEUR)	Change (+/-), %
Italy	20,8	-2,4	6 387	-2,4
Spain	20,2	-5,9	2 718	-3,4
France	13,6	-4,9	9 794	-10,8
Chile	8,5	-2,2	1 716	-7,1
Australia	7,5	0,5	1 829	-2,3

Bottled wines constituted 53% of the total value of wines exported in 2020. The bottled export share (< 2 litres) was high in terms of volume in France (71%), Germany (73%), Portugal (81%) and Italy (59%). The world sparkling wine trade wasn't lucrative in 2020 having decreased in both volume and in value (-5,0% and -15,0% respectively compared with 2019). One of the reasons of the decline is the closure of Horeca distribution channels. A significant share of Italy and France's exports in terms of volume consisted of sparkling wines (20% and 13% respectively). In terms of value, sparkling wines conquered 19% of the world export market [37].

The countries with the highest levels of wine imports in 2020 were the UK (14,6 mhl), the U.S. (12,3 mhl), Germany (14,1 mhl) together amounting to 39% of total import. In value terms, the largest wine importing markets worldwide were the same the U.S. (5,2 bnEUR), the UK (3,8 bnEUR) and Germany (2,6 bnEUR), together accounting for 38% of global imports [37]. Table 6 gives a classification of the most-importing countries in terms of value and volume in 2020 with a percentage of change compared to 2019.

Table 6 – Main importers of wine, 2020 [compiled by the author]

Country	Import			
	Volume (mhl)	Change (+/-), %	Value, (mEUR)	Change (+/-), %
UK	14,6	4,2	3 804	-3,9
Germany	14,1	-5,0	2 572	-2,4
USA	12,3	0,1	5 160	-10,8
France	6,3	-13,5	761	-12,4
Netherlands	4,3	10,7	1304	8,8

With regard to the pricing Tel Aviv ranked first with $28,77 for a bottle of table wine even despite the fact that it is not considered the world's most expensive city according to The Economist (ranked 9th). The newspaper compared the cost of living of countries by a price for a bottle as well as by all-around expensiveness and came to a conclusion that the above-mentioned factors don't always correlate. To prove that are also illustrative the examples of Paris and Geneva which have the ninth ($11,90) and the tenth ($8,37) position in a bottle-pricing ranking whereas ranked as ones of the most expensive world's cities holding the second and the sixth position respectively [40].

Besides, pertaining to the average pricing for a bottle of table wine, it is also observed a certain tendency of cost reduction: we can see it in the example of such leading wine-producing countries as Italy, Spain, France in table 7 [17].

Table 7 – Evolution in the price for a bottle of wine (Euro)

€/Vol/HL	Aug 2019	July-19		Aug-18		3 year 2016-18	
	Euro	Euro	%	Euro	%	Euro	%
France	4,76	4,82	-1,4	5,21	-8,8	5,36	-11,3
Italy	3,82	3,72	2,5	5,69	-32,9	4,19	-8,9
Spain	3,11	3,04	2,4	4,85	-35,8	3,50	-11,0

2018 Wine harvest was characterized by a bumper harvest (14% above the 5-year average and 32% above the 2017 harvest) what led to a decrease in prices in most wine segments. The 2019 wine year started with an appropriate stock level and price levels close to the 3-year average, in some cases slightly below. Even though 85% of all wines produced within the European Union are consumed or processed inside the Union, tensions due to uncertainty remain concerning some major destination markets. Besides, the countries of the New World have been going through pretty tough times especially due to climatic changes as well as the local problems. Virtually, none of those countries didn't show outstanding results in the producing segment mainly balancing at the level of the preceding years. Such factors as climatic changes as well as the recent outbreak of coronavirus have already inevitably led to a significant decrease both in statistical output and consumer demand.

2.2 Microeconomic assessment of the companies of the Old and New Worlds

By way of example of the New World representative with a well-functioning export mechanism, the author of this thesis considers Treasury Wine Estates (TWE) which is one of the world's largest wine companies, listed on the Australian Securities Exchange (ASX). TWE was formerly the wine division of international brewing company Foster's Group. Through world-class winemaking and brand marketing, their business is focused on meeting evolving consumer interests across the globe, and on delivering sustainable growth. Everything they do is dedicated to delivering a high-quality product in the International market.

First of all, the company impresses by the extent of its enterprise deservedly being the giant of the industry:

1) Australia: it has 72 vineyards, 8651 planted hectares, 8 wineries. Its corporate offices are situated in Melbourne and Victoria;

2) New Zealand: it has 9 vineyards, 498 planted hectares and 1 winery. Country head office is in Marlborough;

3) The USA: 44 vineyards, 3728 planted hectares, 7 wineries. Regional head offices are in Napa Valley and Oakland, California.

4) Europe: 2 vineyards, 148 planted hectares, 1 winery. Regional head office: Twickenham, UK; country head office: Gabbiano, Italy.

5) and Asia. South East Asia: regional head office: Singapore. North Asia: regional head office: Shanghai, China [2].

The Board governed by the Company constitution has eight directors, comprising seven non-executive directors and the Chief Executive Officer (CEO) – Michael Clarke. The chairman is Paul Rayner. The company includes more than 3,000+ employees across the world, over 70 brands of wine and has access to more than 12 thousand hectares of planted vineyards [2].

For six months ended 31 December 2020, Treasury Wine Estates Ltd's revenues decreased 8% to A$1.42B. Net income before extraordinary items decreased 43% to A$120.9M. Revenues reflect Operating-Americas segment decrease of 13% to A$535.1M, Operating-Asia segment decrease of 18% to A$333.2M, Australia segment decrease of 12% to A$630.7M, USA segment decrease of 13% to A$537.6M [23]. Figure 4 illustrates the dynamics in total revenue and net income of TWE for the past four years.

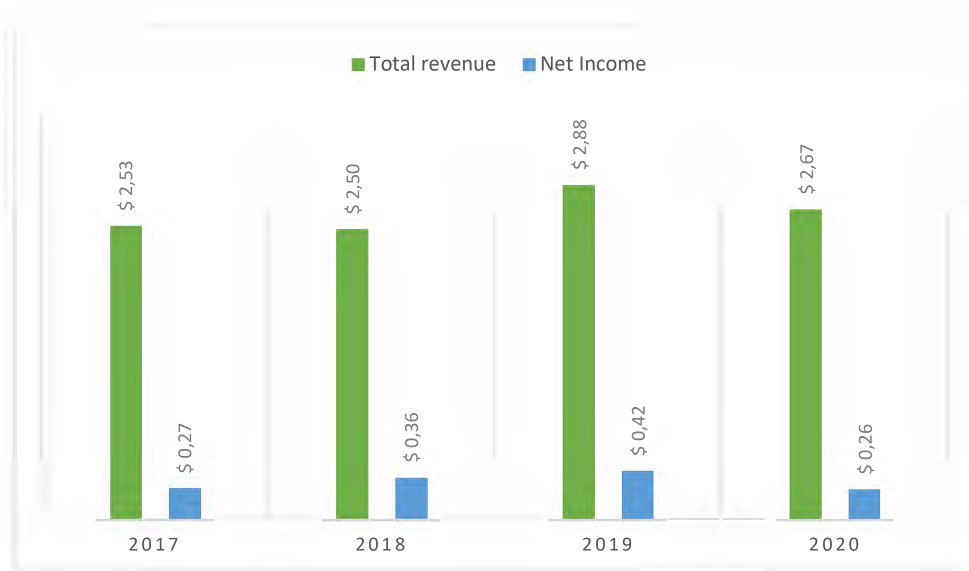

Figure 4 – The annual income statement “TWE”, 2017-2020, bn

From the statement, we can see that total revenue over the past two years approximately remains the same, whereas the net income has sustainable growth. Referring to the Wall Street Journal statistics chart [53], we can also take notice that the decrease in sales worked out at -7,10% in 2020. Net Income fell by 37,83% compared to 2019.

According to the financial forecast given by MarketScreener [30], the profitability of the company is expected the further increase what we can see from figure 5.

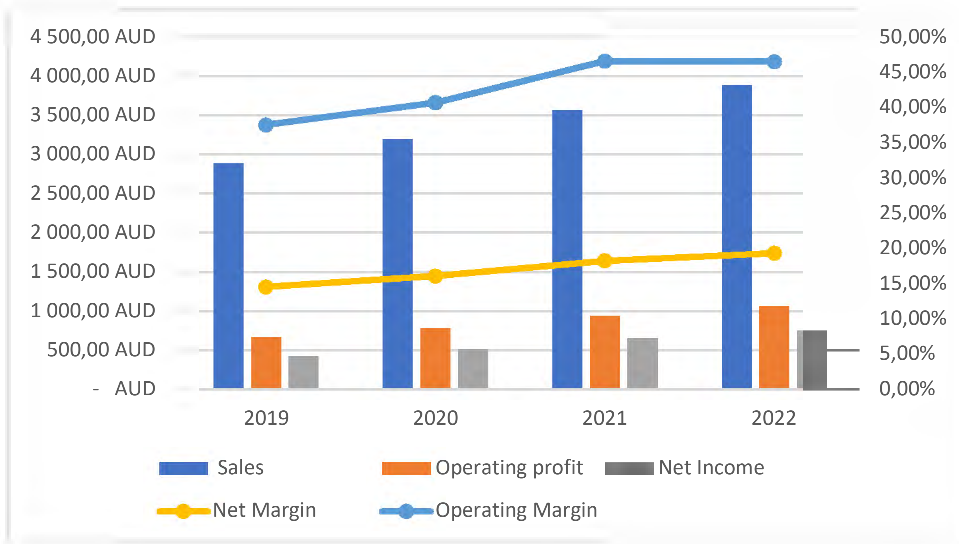

Figure 5 – Income statement evaluation "TWE", 2019-2020, m

Deepening more in financial performance of TWE we can consider liquidity of the company through financial coefficients [23]. In the most recent quarter, it stood at 2,39 what directly indicates at the fact that the company's assets are liquid and its excellent ability to cover short-term debts. Another indicator is the quick ratio which is equal to 1,34 and hence backs up the above-mentioned fact. Debt to equity ratio constitutes 0,43 which is lower than the year before (0,49) but it has increased from 18.6% to 25.4% over the past 5 years. Inventory turnover decreased from 1,63 in 2019 to 1,53 in 2020 which can be a combined effect of poor inventory management and lower sales. With premiumization, the products have been removed from the low margin commercial markets thereby the sales have taken a hit. Further, expansion with new distribution models and warehouses around Asia calls for inventory and store stocks in order to ensure availability. Both of these steps would positively impact the company in the future.

Working capital declined $42.2 million to $1,948.5 million, reflecting the impact of lower sales on receivables, offset by the lower payables balance as a result of lower volumes and the higher inventory balance which increased by $29.3 million to $2,076.6 million. Figure 6 demonstrates the evolution of debt and equity for the past years alongside with their ratio.

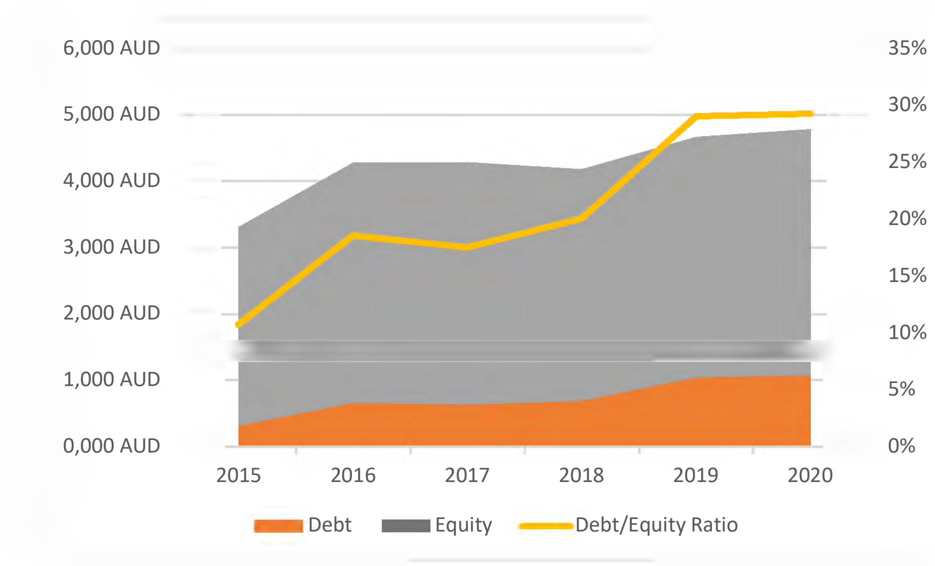

Figure 6 – Debt and equity evaluation "TWE", 2015-2020, m

Evaluating the solvency of the company we can pay attention to such ratios as interest coverage ratio, debt-to-assets ratio, shareholder equity ratio. As for the interest coverage TWE's interest payments on its debt are well covered by EBIT (5.4x coverage). Total debt-to-assets stands at 28,86 so it is significantly funded by debt. Shareholders' equity by December 2020 was $2,678 mln. against $2,545 mln in December 2019. Besides, TWE's debt to equity ratio (25,4%) is considered satisfactory.

Another way the companies can be compared is in terms of the segments of diversified production, i.e., whether an alcohol business which doesn't limit itself only with wines can be competitive with the only wine-specialized company. By the way of example Treasury Wine Estate (the New World) was opposed to one of the biggest alcohol producer Italian Campari Group (as a representative of the Old World). Campari Group includes in its segment spirits, liquors, sparkling wines, alcohol free beverages. In terms of financial turnover, these two companies are very commensurable. By this evaluation, one may have an understanding through the examples of world-leading companies which segment of production is more promising from the perspective of starting up a new enterprise. The comparison of two companies we can see in table 8.

Table 8 – The comparison of liquidity of TWE and Campari Group [compiled by the author]

#	Financial ratio	TWE			Change (+/-), %	Campari Group			Change (+/-), %
		2018	2019	2020		2018	2019	2020	
1	Current ratio	2,15	2,32	2,14	-0,47	2,35	1,32	2,06	-12,34
2	Quick ratio	0,9	1,24	1,1	22,22	1,49	0,95	1,19	-20,13
3	Debt to equity ratio	0,25	0,31	0,53	112,00	0,6	0,55	0,77	28,33
4	Days Sales Outstanding (DSO)	71,34	66,61	70,77	-0,80	65,7	60,37	58,82	-10,47
5	Inventory Turnover	1,46	1,57	1,55	6,16	1,27	1,21	1,22	-3,94
6	Working Capital Turnover	2,44	2,55	2,26	-7,38	1,88	2,53	2,6	38,30
7	The receivables turnover ratio	4,33	4,54	5,21	20,32	5,21	4,94	5,44	4,41

First of all, both companies have excellent values in liquidity what attests to their large capability to cover their short-term liabilities. That we may see from the current ratio. For Campari Group the low value in 2019 is attributable to the fact that the Parent Company issued a lot of bonds that year (€560 mln). Considering the quick ratio both companies are doing well enough what also backs up that they are capable of paying off their debts. In 2018 Campari Group had this value at 1,49 which provided the organization even more sustainable activity. Turning to the debt-to-equity ratio the value for TWE quite low what indicates the incomplete usage of the companies' potential. As for Campari Group, the situation looks fine on the whole. As regards DSO, TWE takes 70 days on average to collect the payments. By contrast, Campari Group succeeded in shortening an average number from 65,7 to 58,82 in the course of the past three years. What applies to Inventory turnover it's worth noting that both companies have this indicator low. It can testify to poor management or possibly excess inventory. An average working capital turnover for both companies stands at approximately 2,5. In 2018 Campari Group saw it just 1,88 due to lower value in average current liabilities which was offset soon by the merger of a few companies in the next two years (Fratelli Averna S.p.a, Sorfinn Ltd., etc.) [1]. According to the receivables turnover ratio, we may conclude that accounts receivables are paid 4-5 times a year.

The following step with which we assess the financial health of the companies in the evaluation of their solvency, i.e. how well they are meeting their total financial obligations and long-term debts. The comparison we can see in table 9.

Table 9 – The comparison of solvency of TWE and Campari Group [compiled by the author]

#	Financial ratio	TWE			Change (+/-), %	Campari Group			Change (+/-), %
		2018	2019	2020		2018	2019	2020	
1	Interest Coverage Ratio	7,17	6,47	3,05	-57,46	11,22	9,35	9,03	-19,52
2	Debt-to-Assets Ratio	0,16	0,19	0,29	81,25	0,28	0,27	0,34	21,43
3	The shareholders equity ratio	0,64	0,54	0,54	-15,63	2,16	2,39	1,99	-7,87
4	Debt-to-Equity Ratio	0,25	0,31	0,53	112,00	0,6	0,55	0,77	28,33

To begin with interest coverage ratio in the course of the past three years. TWE saw a decline from 7,17 (2018) to 3,05 (2020). It can indicate the negative trend in the company's ability to meet the interest on its debt even though it is still able to do it without any problems. By contrast, Campari Group feels much more confident pertaining to this aspect. Statistical data for the debt-to-assets ratio is completely normal what suggests that the companies are significantly funded by assets rather than debts. It is noteworthy that the shareholders equity is much higher in Campari Group what means that the Italian company uses much less debt to pay for the assets compared to TWE. Both companies are covered low in debt.

The next step the author resorts to in his Thesis is the evaluation of the profitability of the companies. Table 10 below brings together the considered data.

Table 10 – The comparison of profitability of TWE and Campari Group [compiled by the author]

#	Financial Ratio	TWE			Change (+/-), %	Campari Group			Change (+/-), %
		2018	2019	2020		2018	2019	2020	
1	Gross Profit Margin	43,7	43,8	41,1	-5,95	60,06	60,86	57,9	-3,60
2	Return on Assets (ROA)	6,61	6,15	3,91	-40,85	6,46	6,47	4,19	-35,14
3	Return on Equity (ROE)	10,15	11,23	7,1	-30,05	14,16	13,41	9	-36,44
4	EBITDA margin	22,67	27,77	22,67	0,00	21,55	25,66	25,87	20,05
5	Net profit margin	14,4	14,6	9,74	-32,36	17,31	16,74	10,6	-38,76
6	Operating margin	21,2	23	16,54	-21,98	22,23	20,97	13,09	-41,25

Analyzing the gross profit margin of two companies in 2020 it decreased in value for both companies mainly due to the low Net Sales Revenue. If we trace the change in percentage terms for other profitability ratios for the last year the numbers clearly illustrate the impact of the pandemic. That is obvious that COVID-19 caused the real disruption in key sales channels for higher-margin segments and consumer trading down in some markets even though such a fall hardly won't allow the companies to remain afloat. What applies to ROA and ROE the fall is caused also by decrease in income which is -36,16% for TWE and -39,07% for Campari Group respectively. The level of EBITDA margin has remained as a whole stable for both companies for the past three years standing at 22,67% (TWE) and 20,05% (Campari Group). The splash of this indicator in the case of TWE in 2019 was due to the increased EBITDA which constituted € 800 mln (+41,30%) compared to € 566 mln (+5,05%) in 2018 and € 607 mln (-24,09%) respectively. As for Campari Group, the slight decrease in EBITDA margin took place as a result of the exchange rate effects. Addressing Net profit margin, it fell significantly in 2020 in the case of both companies. Drawing parallels for 2018 and 2019 Campari Group succeeded in generating more net income from the revenues received. As for the reasons of downfall in 2020 in Operating margin for companies they remain the same: lower operating earnings as well as the revenues.

Contrasted to TWE Russian "Shumrinka is considered as a representative of the Old World. Shumrinka is a young project situated in the south of Russia. Officially, it was founded in 2016 including 18 employees among them there are agronomists, wine-makers, technologists. Like a baby the company only is trying to make its first steps by introducing a quality product that it is going to be recognizable and prized. Totally, the company has in its possession 400 ha of land in the village Gai-Kodzor. The planted territories cover 62 hectares, including 17 predominantly international variety grapes. This project is newly born: the first vines were planted only in 2016 but the great potential is already seen with the naked eye on the latest presentation.

Here are at work the most modern agricultural techniques. The wine is produced under rigorous supervision of world-renowned winemakers who seek for making the wine that in prospective will be competitive to the leaders of Russian wine segment. Here are at work manual harvest, sorting, control of fermentation temperature, French oak barrels of various degrees of roasting - the winery uses all the international experience alongside with cutting-edge technologies. Virtually, all that experience is being developed right now. It is a living and complex product of the interaction of the earth, the vine and human hands. And a long investment when it comes to business.

The winery has already presented three basic rows: the white and red "Semisam" 2018; more seasoned and rounded "Petrichor" and premium "Surb Gevorg." In the production of these wines are used the grapes of European varieties predominantly. The first public degustation took place only at the end of December 2019 in Moscow and the quality and perspectives of the enterprise were commended. So far, "Shumrinka" is presented only in Moscow and only in the winery of the renowned sommelier Arthur Sarkisyan. The circulation of wines “Semisam” and “Petrichor” - 40,000 bottles each, “Surb Gevorg” - only 2,000 bottles [16].

Perhaps, this project characterizes the will and the first steps of the Russian wine industry to carry out a certain breakthrough internally with the further perspective externally. Yet now Russian wine enterprises take medals in the international contests as — International Wine Challenge, Decanter World Wine Awards, International Wine & Spirit Competition, Mundus Vinus. However, for Shumrinka, the case of such companies as TWE remains the hard act to follow so far but in terms of wine quality, it still has considerable space for maneuver and can be more than competitive to the worldwide giants. By 2017 there were about 40 wine-producers from Russian grapes and 60 companies which import wine-making material. According to Rosstat, the retail commodity circulation in 2018 was equal to 4,2% of inflation resulting in decline in purchasing power. It made consumers look more for discounts and special offers. The supermarkets as Auchan or Metro faced the stagnation since there was an explosion in growth of many other discounters and specialized stores. So, the main conclusion we can make that there is a tendency “all turn on each other”.

If we analyze the percentage of sales of wine in retail, we can make the following conclusions: 61% of sales pertains to the segment of wines up to 500 rub. and only 5% in the segment more than 1000 rub. The best range for Shumrinka is supposed to be from 400 to 600 roubles – the segment represented in a quite dense way. We can see that looking at figure 7.

Figure 7 – The price segment of the Russian wines

The leaders of distribution with their own well-functioning logistic system are “Kuban-vino”, “Fanagoria”; the small and medium-sized vineyards from Abrau-Durso: Vedernikov Winery, Perovskikh Manor, Myskhako; the row of wines of V. Zakharjin.

“Shumrinka” is a limited liability company. Its main purpose is the pursuit of profit as well as the saturation of the market with products and services. There are two co-founders A. Kislitsyn and L. Cirillo. Everyone has its share equal to 50%.

The company contains 18 employees: general director, general director deputy for economics and finance, chief agronomist, economist, laboratory assistant-microbiologist, chief engineer, engineer in energetic, senior technologist, specialist for EGAIS, engineer-mechanic, tractor driver-machinist, technologist, handyman, workman, locksmith-repairman.

The work at the company is guided by the charter which contains provisions and regulations about: the goal of establishing the society, the subject matter, rights and duties of the participants, the peculiarities about the order of foundation, the amount of capital, any changes concerning the share capital including its possible shift to one of the participants, contributions to the properties, its administration, distribution of profit and keeping the documents.

The LLC has the right to carry out any activity which is not forbidden by the Russian law. The main activities are: cultivation of grapes; production, storing and supply of the produced alcohol-containing food products (the winemaking materials with no ethanol); to carry out any other economic activities and service delivery and implementation of other work that correspond the Russian law.

Shumrinka, first of all, is targeting the following price ranges:

1) 400 – 500 rub. is considered as niche perspective in terms of relationship marginality and volume of sales. This niche suits best for the basic row for sales in retail format. It can particularly important in the regional markets;

2) 500 – 600 rub. is important for the basic row of the company’s wines. This one suits better in the markets where the population has higher incomes (Moscow, St. Petersburg) in supermarket format, a specialized network, wine boutiques;

3) 700 – 800 rub. This niche the company also regards in the imminent future. It is considered that it would be better to commence with Moscow and St. Petersburg due to

higher purchasing power as the wines of this segment are better to be sold fresh (especially relevant for white wines).

In the nearest future, “Shumrinka” is not only decisive towards the Russian market but it also has a strong vision towards the export of its wine abroad.

In conclusion, we have considered the competitiveness of wine companies in terms of their financial health, performed an analysis of financial ratios, evaluated the possible risks. Besides, we counterpoised the wine global leader (TWE) to a not only specialized-in-wine company which in terms of its scale one can see a rival in the segment of alcohol production. That also gave us an idea of what kind of business could be more promising in the long run. To contrast everything above-mentioned the author considered as well the case of a young wine enterprise (Shumrinka), carried out its microeconomic assessment as well as the market where the company is aiming at.

2.3 Comparative analysis of the wines of the Old and New Worlds

The quality of end-product which companies produce can demonstrate the potential perspectives of those companies on the market whether they will stand up to their competitors or not. As an example of the comparative analysis of those companies through the product the author resorts to the method of the weighted arithmetic average of individual competitiveness indicators:

$$K = \sum_{i=1}^{N} W_i K_i \quad (9)$$

where

Ki is considered as a point of the given evaluation with the total number N;
Wi is an indicator of the weight of the i-th unit of evaluation criteria.

Besides, it is noteworthy to say that the evaluation is qualitative in nature, i.e. the author performs his independent assessments of a row of red and white dry wines of the Old and New Worlds in terms of the following criteria: Appearance, Aroma and Bouquet, Taste and Texture, Aftertaste, Overall Impressions, and final counting Overall Score. For that reason, the author is guided by the American Wine Society Evaluation. The enumerated before factors help to assign points for each given area of evaluation. It is important to note that the score must be consistent with the descriptors. Objectivity is the main pillar of such an evaluation according to A. Hartung [20].

Despite the above-mentioned pillar, it's worth taking into account that the points which got awarded to the wines it's a strictly subjective opinion of the author. It may vary a lot with the opinions of the professional sommeliers. The main purpose of such an evaluation is to display how the competitiveness of wines can be measured through quality characteristics. As is well-known it is up to them whether a product will be in demand or not. Besides, it stands to reason that any other wines might be equally subjected to evaluation. The full classification according to which points must by awarded with comments one can see in figure 8.

APPEARANCE

3 - Excellent	- Brilliant with outstanding characteristic color.
2 - Good	- Clear with characteristic color.
1 - Poor	- Slight haze and/or slight off color.
0 - Objectionable	- Cloudy and/or off color.

AROMA AND BOUQUET

6 - Extraordinary	- Unmistakable characteristic aroma of grape-variety or wine-type. Outstanding and complex bouquet. Exceptional balance of aroma and bouquet.
5 - Excellent	- Characteristic aroma. Complex bouquet. Well balanced.
4 - Good	- Characteristic aroma. Distinguishable bouquet.
3 - Acceptable	- Slight aroma and bouquet. Pleasant.
2 - Deficient	- No perceptible aroma or bouquet or with slight off odors.
1 - Poor	- Off odors.
0 - Objectionable	- Objectionable or offensive odors.

TASTE AND TEXTURE

6 - Extraordinary	- Unmistakable characteristic flavor of grape-variety or wine-type. Extraordinary balance. Smooth, full-bodied and overwhelming.
5 - Excellent	- All of the above but a little less. Excellent but not overwhelming.
4 - Good	- Characteristic grape-variety or wine-type flavor. Good balance. Smooth. May have minor imperfections.
3 - Acceptable	- Undistinguished wine but pleasant. May have minor off flavors. May be slightly out of balance, and/or somewhat thin or rough.
2 - Deficient	- Undistinguished wine with more pronounced faults than above.
1 - Poor	- Disagreeable flavors, poorly balanced, and/or unpleasant texture.
0 - Objectionable	- Objectionable or offensive flavors and/or texture.

AFTERTASTE

3 - Excellent	- Lingering outstanding aftertaste.
2 - Good	- Pleasant aftertaste.
1 - Poor	- Little or no distinguishable aftertaste.
0 - Objectionable	- Unpleasant aftertaste.

OVERALL IMPRESSION

2 - Excellent
1 - Good
0 - Poor

TOTAL SCORES

18 - 20	Extraordinary
15 - 17	Excellent
12 - 14	Good
9 - 11	Commercially Acceptable
6 - 8	Deficient
0 - 5	Poor and Objectionable

Figure 8 – Points Assessed during AWS Wine Evaluation

As examples of red dry wines the following wines were chosen:

- Petrichor (Shumrinka, Russia; 2017 vintage; €8,2 bottle price), Papa Figos (Casa Ferreirinha, Portugal; 2017 vintage; €8,52 bottle price) – the Old World;
- Reserve Collection Shiraz - Cabernet Sauvignon (Willow Hill, South Africa; 2017 vintage; €7,76 bottle price), 19 Crimes (TWE, Australia; 2017 vintage; €8,2 bottle price) – the New World.

In table 11 are collected all points awarded as for comparison of the red dry wines representatives of the Old and New Worlds.

Table 11 – comparative analysis of the red dry wines of the Old and New Worlds

Characteristic of wine (red dry)	Weight	Petrichor (Shumrinka, Russia) €8,2	Papa Figos (Casa Ferreirinha, Portugal) €8,52	Reserve Collection Shiraz - Cabernet Sauvignon (Willow Hill, South Africa) €7,76	19 Crimes (TWE, Australia) €8,2
Appearance	0,15	3/0,45	3/0,45	3/0,45	2/0,3
Aroma and bouquet	0,2	4/0,8	4/0,8	3/0,6	3/0,6
Taste and texture	0,2	4/0,8	4/0,8	4/0,6	4/0,8
Aftertaste	0,15	2/0,3	3/0,3	3/0,6	2/0,3
Overall impression	0,3	1/0,3	2/0,6	1/0,3	1/0,3
Total weight	1,0				
Overall score		14/2,65	16/2,95	14/2,55	12/2,3

As a result of the evaluation of the red dry wines, Papa Figos got the highest score. According to the author's opinion, the Portuguese wine turned out to be well-balanced, first of all, in terms of all the considered criteria. Russian Petrichor and South African Shiraz-Cabernet Sauvignon were evaluated at the same level. The only distinction we can see in the integral score was achieved by multiplication of the weight indicator by the given assessment point. The Russian brand had it slightly higher despite the equal number of points and that is expressed primarily in the different scores for Aroma and Bouquet and Aftertaste. 19 Crimes of TWE impressed less the author. That wine had also a good balance, nice color, and distinguishable full-bodied taste but slightly conceded to its opponents in the aftertaste.

As examples of white dry wine the following wines were chosen:

- Petrichor (Shumrinka, Russia; 2017 vintage; €8,2 bottle price), Papa Figos (Casa Ferreirinha, Portugal; 2017 vintage; €6,8 bottle price) – the Old World;
- Reserve Collection Chardonnay (Willow Hill, South Africa; 2017 vintage; €7,76 bottle price), Lindeman's Chardonnay (TWE, Australia; 2017 vintage; €7 bottle price) – the New World.

In table 12 are collected all points awarded as for comparison of the white dry wines representatives of the Old and New Worlds.

Table 12 – comparative analysis of the white dry wines of the Old and New Worlds [compiled by the author]

Characteristic of wine (white dry)	Weight	Petrichor (Shumrinka, Russia) €8,2	Papa Figos (Casa Ferreirinha, Portugal) €6,8	Reserve Collection Chardonnay (Willow Hill, South Africa) €7,76	Lindeman's Chardonnay (TWE, Australia) €7
Appearance	0,15	3/0,45	2/0,3	2/0,3	2/0,3
Aroma and bouquet	0,2	5/1	3/0,6	3/0,6	3/0,6
Taste and texture	0,2	5/1	3/0,6	5/1	2/0,4
Aftertaste	0,15	2/0,3	1/0,15	1/0,15	1/0,15

Overall impression	0,3	2/0,6	0/0	1/0,3	0/0
Total weight	1,0				
Overall score		17/3,35	9/1,65	12/2,35	8/1,45

In summarizing the evaluation of the white dry wines, the Russian Petrichor stayed out of reach. The author was highly impressed by its aroma and taste and therefore put an «Excellent» score. Apart from the Russian wine, the African Reserve Collection Chardonnay didn't leave the author emotionless either in terms of taste which was a delicious, soft, mouthful of fruits, apples, and pear. The product of Willow Hill indeed was quite smooth in all the criteria not having large imperfections. Hence, it could be considered perfectly as a decent example of its segment. Whereas the other two brands the Portuguese Papa Figos and the Australian Lindeman's Chardonnay deeply disappointed the author having left an overall poor impression. Both wines were equally poor in the aftertaste. That was reflected in the overall score as well. One can pay attention to how much the integral score differs among the compared wines.

Apart from that, it's worth mentioning that the above-mentioned method is perfectly at work when it concerns quality evaluation. Although, quality doesn't always make difference pertaining to the competitiveness of wines. Such factors as reputation and brand image, financial stability, service, production potentialities, promotion and marketing, and many others are able to rise above a product even if its qualities leave something to be desired. That, in turn, becomes the main problem for a common inexperienced customer who faces a rich choice of a product on the shelves and in most cases is endured to act through trial and error.

Nevertheless, the product method doesn't remain the only solution to compare the competitiveness of companies. By contrast, one may resort to another one which is called the integral-index method. But before presenting it one had better take a closer look at the compared companies. As our examples were chosen the Australian wine enterprise TWE as a representative of the New World and the Italian Campari Group as the Old World (the beverage company which includes sparkling and still wines). Such a choice is primarily attributable to the comparable volumes of their turnover even though the latter one is not in its core only wine-related (even more specialized in spirits and other strong drinks). In table 13 is shown the financial performance of TWE.

Table 13 – Financial performance of TWE as a representative of the New World (Euro) [compiled by the author]

Year	Cost of sales	Revenue	Income tax	Operating costs	Net profit
2019	1026,37	1781,69	105,99	364,17	259,25
2018	908,02	1578,97	72,80	324,52	227,95
2017	1055,94	1706,28	78,98	360,21	181,72
2016	1015,98	1569,07	50,76	332,96	116,11
Change, %	1,02	13,55	108,82	64,28	123,28

Tracing the dynamics of the singled out financial indicators one may conclude that the Australian company is doing quite well. One may notice that in cost of sales there was a small decline in 2018 which was driven by Supply Chain Optimisation savings. It led in turn to the decrease in revenues but it was offset by portfolio premiumization and realization of the new Luxury brands in the US the same year as well as the growth in prices of the Australian commercial wine a year after [2]. In table 14 is shown the financial performance of TWE.

Table 14 – Financial performance of Campari Group as a representative of the Old World (Euro) [compiled by the author]

Year	Cost of sales	Revenue	Income tax	Operating costs	Net profit
2019	721,30	1842,50	46,20	696,30	308,40
2018	683,60	1711,70	54,50	637,80	296,30
2017	741,10	1753,40	55,80	625,20	356,40
2016	741,90	1816,00	56,10	615,40	166,30
Change, %	-0,11	-3,45	-0,53	13,14	114,31

Considering the performance of Campari Group, it is noticeable that except net profit the company shows negative dynamics. It is noted especially after 2017. Getting into specifics one of the main reasons of such a decline in 2018 was lower adjustments to operating income and charges. That means that effects of the first-time application of a new IFRS 15 - ‘Revenue from contracts with customers’ led to the decrease in numbers, first of all, but not in profits as it was simply recalculated according to the new provision. Another reason which could worsen dynamics was net effects of exchange rate differences [1].

Going to the application of the integrated-index method the author addresses to the following formula:

$$\mathrm{C} = \sqrt{\mathrm{Ce} * \mathrm{Ci} * \mathrm{Ca}} \quad (10)$$

where

C – competitiveness criteria;

Ce – operation efficiency coefficient;

Ci – innovativeness coefficient;

Ca – adaptability coefficient [35].

All of the coefficients we have to calculate according to the table in part 1.3 putting in the appropriate numbers from the financial statements of the chosen companies. All of the values get calculated for 2019.

In order to find operation efficiency coefficient, we have to address to the formula below R – revenue, C – costs of goods sold.

$$Ce = \frac{R}{C} = \frac{1781{,}69}{1023{,}37} = 1{,}741 \text{ (TWE) (11)}$$

$$Ce = \frac{R}{C} = \frac{1842{,}5}{753} = 2{,}44 \text{ (Campari Group) (12)}$$

then we have to identify Ca – adaptability coefficient which will be equal to the difference in revenue for the current and last periods:

$$Ca = \frac{R}{R0} = \frac{1781{,}69}{1578{,}97} = 1{,}128 \text{ (TWE) (13)}$$

$$Ca = \frac{R}{R0} = \frac{1842{,}5}{1711{,}7} = 1{,}076 \text{ (Campari Group) (14)}$$

All that remains is to find innovativeness coefficient. As innovativeness activity expenses the author singled out the following items:

- TWE: IT development costs which amount at €58,21 million (2019) and €52,59 million (2018); difference in goodwill for current and preceding year €92,7 mln (2019) and €1,9 mln (2018); and difference in intangible assets for current and preceding year €111,2 mln (2019) and €20,8 mln (2018);

- Campari Group: investment in intangible assets with a finite life related to IT projects (€14,2 mln, 2019; €16,5 mln, 2019); R&D costs and operating grants (€2,2 mln, 2019; €2,0 mln, 2018); difference in goodwill for current and preceding year €65 mln (2019) and €29 mln (2018); and difference in intangible assets for current and preceding year €97 mln (2019) and €48 mln (2018).

As for costs of goods sold, they are €1023,408 (2019) and €915,37 (2018) for TWE; €753 (2019) and €702 (2018) for Campari Group.

Putting the above-mentioned expenses in the formula where Ci, Ci0 – innovation costs at current and previous period and, C, C0 – costs of goods sold at current and previous period we get:

$$Ci = \frac{Ci}{C} : \frac{Ci}{Co} = \frac{262{,}11}{1023{,}408} : \frac{75{,}29}{915{,}37} = 3{,}121(\text{TWE}) \ (15)$$

$$Ci = \frac{Ci}{C} : \frac{Ci0}{Co} = \frac{178{,}4}{753} : \frac{95{,}5}{702} = 1{,}735 \ (\text{Campari Group}) \ (16)$$

Having got all necessary data, we can put them in the formula and thus calculate the competitiveness index:

$$\mathrm{C} = \sqrt{\mathrm{Ce} * \mathrm{Ci} * \mathrm{Ca}} = \sqrt{1{,}741 \cdot 1{,}128 \cdot 3{,}121} = \sqrt{6{,}129169} = 2{,}475 \ (\text{TWE}) \ (17)$$

$$\mathrm{C} = \sqrt{\mathrm{Ce} * \mathrm{Ci} * \mathrm{Ca}} = \sqrt{2{,}44 \cdot 1{,}076 \cdot 1{,}735} = \sqrt{4{,}55513} = 2{,}134 \ (CGroup) \ (18)$$

As a result, we can conclude that based on the analysis of the sources of formation of enterprise competitiveness, TWE turned out to be more competitive in terms of its operational activity than Campari Group. The formula gets even sharper results provided the comprehensive individualization of innovation expenses which do not always get reflected clearly in financial statements.

To cap it all, in this subchapter we have carried out two kinds of comparative analysis through the production method as well as the index-integrated method. One doesn’t have to limit oneself only to these methods as there are many others but on the other hand, the above-mentioned methods are quite widespread in scientific literature and able to deliver a certain image upon the subject of competitiveness. Besides, in this chapter we illustrated a current state of wine industry in the world, main trends and patterns as well as we performed the microeconomic assessment of two wine companies which could be applicable in practice.

CHAPTER III – ECONOMETRIC MODELING AND FORECASTING OF CONSUMERS' PREFERENCES

3 Econometric modeling and forecasting of consumers' preferences

3.1 Panel Data Set of factors that influence consumer wine preferences, individualizing their most and less important correlation

In the concluding part of Master's Thesis Project the author conducts a survey based on common consumer's preferences. According to the task, 85 respondents were surveyed. There were totally ten questions; each of them pertained to a consumer's wine preferences. It is possible to study them all in appendix 1.

By way of example and as a dependent variable, there was chosen the sixth question asking about the consumer preferences concerning a variety of white wine. All respondents were suggested to choose their gender as well as their age group. As a result, in the poll took part: 33 men, 52 women; age groups – 33 votes (from 18 to 30-year-old), 29 (from 31 to 50-year-old), 23 (51 + year-old). Concerning the other independent variables, first of all, it's worth mentioning the following factors: place where a consumer buys wine, the main factor which influences consumer choice, consumer choice of local/foreign producer, consumer choice in wine according to foreign producer, and, finally, how much a respondent is ready to pay for a bottle of wine.

Based on the obtained results, the method of correlation matrix was chosen. The choice is attributable to the vast availability of qualitative data which, in turn, was translated into quantitative by way of dummy variables. According to appendix 1 for questions 3, 4, 5, 6, 7, 9, 10, there was acceptable to make a multiple choice so that the author summed the number of respondents' answers in the questions mentioned above to reach the amplification of the average result.

Thus, having got the final calculated results, demonstrated in appendix 3, we can make up the spreadsheet (table 15) about the influence of the value of a factor (x) on the obtained result (y).

Table 15 –The summary of correlation of the factors pertaining to the sixth factor [compiled by the author]

Factors	Correlation, (r)	Influence on y, %	Interpretation
x_1	-0,16	-16	Unimportant factor
x_2	0,04	4	Low-importance factor
x_3	0,16	16	Low-importance factor
x_4	0,34	34	Medium importance factor
x_5	0,56	56	Important factor
x_7	0,68	68	Important factor
x_8	0,07	7	Low-importance factor
x_9	0,43	43	Medium importance factor
x_{10}	0,22	22	Relatively medium importance factor

Hereafter, we can conclude the above-indicated spreadsheet. Due to the negative value of the correlation factor x_1 that was the age of responders, it results to be an unimportant factor towards the preferences that don't make sense. All people who have taken part are already supposed to be consumers, "targeted audience."

The next group of factors x_2 (the gender), x_3 (general preferences in wine), x_8 (local/foreign producer priority) are of the low-importance. It can be put down to too generalized character of the suggested questions and barely relate to the dependable variable.

The medium importance factors are x_4 with 34% (where wine is purchased), a consumer's preferences concerning the foreign country producer which is x_9 with 43%. In this group, we can also relate the price for the bottle that a respondent is ready to pay – x_{10} (22%).

As for the most important factors, it turned out to be x_5 with 58% (what a consumer considers the most important aspect buying a wine) and surprisingly x_7 with 68% which are the preferences in the choice of red wine. In the author's viewpoint, it can be attributable to the similar nature of the questions.

3.2 Algorithms for obtaining the regression statistic data based on the wine questionnaire

One of the main methods the author resorted to in his Master Thesis is the multiple linear regression model. According to Devault G. [15], regression models are summoned to predict a certain correlation between two and more factors. In linear regression, each observation consists of two values where one is for the dependent variable and the other one is for the independent variable. In the simple model, a straight line approximates the relationship between these different variables. When it happens that two or more independent variables are used in regression analysis, the model becomes multiple.

The example of the formula for Multiple Linear Regression is:

$$y_i=\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+\ldots+\beta_p x_{ip}+\epsilon \quad (19)$$

where

$i=n$ observations;

y_i = dependent variable;

x_i = explanatory variable;

β_0 = y-intercept (constant term);

β_p = slope coefficients for each explanatory variable;

ϵ =the model's error term (residuals).

For the reason that the data set for the multiple regression we've got too big, it was put at the end of this paper as the appendix 2. As was mentioned earlier, the author conducted a poll concerning a consumer's wine preferences, where 85 respondents were surveyed. Having processed our set of data, we have got the regression coefficient table or the table ANOVA of results (see it at the end as appendix 4).

Bj, in our model, denotes the coefficient of the jth regressor (intercept, all independent variables x). Column "Coefficient" gives the least-squares estimates of βj. Column "Standard error" gives the standard errors (i. e. the estimated standard deviation) of the least squares estimates regression line bj of regression model βj. Column "t Stat" gives the computed t-statistic for H_0: βj = 0, against Ha: βj ≠ 0. This is the coefficient divided by the standard error. It is compared to a t with (n-k) degrees of freedom where here n = 85 and k = 11.

Having got the column "P-value" in our regression coefficient table, we can make two kinds of test: one-sided (we shall divide p-value for each case by 2) or two-sided equaling to Pr {|t| >t-Stat}. We check the sign of T-Stat in both cases. Columns "Lower 95%" and "Upper 95%" values define a 95% confidence interval for slope coefficient βj. Thus, in the appendix 4 confidence intervals for the β_1 is (-0,015, 0,031), β_2 (-0,74, 1), β_3 (-1,283, 0,931).

Having constructed our model in MS Excel, we've also got our table of outputs.

Table 16 - Regression statistics of MLRM

#	Indicator	Volume
1	Multiple R	0,74
2	R – Square	0,55
3	Adjusted R-square	0,49
4	Standard Error	2,25
5	Observations	85

where multiple R is the square root of R^2 (coefficient of determination) which is equal to 0,55. Hence, multiple R is equal to 0,74. Turning to the evaluation of the overall goodness-of-fit measures, the adjusted R^2 has the overall number of regressors which is 11 in our case and number of observations (respondents) which is 85. The adjusted R-squared is a modified version of R-squared that has been adjusted for the number of predictors in the model. It can be expressed with this formula:

$$Adjusted\ R^2 = R^2 - (1 - R^2) \times \frac{(k-1)}{(n-1)} = 0{,}55\ -\ 0{,}45 * \frac{11-1}{85-1} = 0{,}497$$

(the same value) (20)

The standard error here refers to the estimated standard deviation of the error term u or ϵ. We can calculate it with the following formula:

$$\text{Standard error} = \text{sqrt} \times \left(\frac{SSE}{(n-k)}\right) \quad (21)$$

Thus, we can conclude that according to the data obtained, our regression corresponds to the basic rules of the model's construction.

The next step is the ANOVA table which is meant variance analysis:

Table 17 – ANOVA variance analysis

#	Indicator	*df*	*SS*	*MS*	*F*	*Significance F*
1	Regression	10	474,49	47,44	9,34	8,14641E-10
2	Residual	74	375,92	5,08		
3	Total	84	850,42			

The ANOVA table splits the sum of squares into its components. Total sums of squares = Residual sum of squares + Regression sum of squares. Thus,

$$\Sigma_i(y_i - ybar)^2 = \Sigma_i(y_i - yhat_i)^2 + \Sigma_i(yhat_i - ybar)^2 \quad (22)$$

where

$yhat_i$ is the value of y_i predicted from the regression line and;

ybar is the sample mean of y.

The column labeled F gives the overall F-test of H_0: $\beta_2 = 0$ and $\beta_3 = 0$, versus Ha: at least one of β_2 and β_3 does not equal zero. Aside: Excel computes F this as:

$$F = \frac{\left[\frac{Regression\ SS}{k-1}\right]}{\left[\frac{ResidualSS}{n-k}\right]} = \frac{\left[\frac{474,49}{11-1}\right]}{\left[\frac{375,92}{85-}\right]} = \frac{47,449}{5,08} = 9,34 \quad (23)$$

The column labeled significance F has the associated P-value. Since 8,14641E-10 (significance F) > 0,05, we do not reject H_0 at significance level 0,05.

Eventually, our regression model will be presented this way:

y= -0,766 + 0,007x_1 + 0,130x_2 + (-0,176)x_3 + 0,092x_4 + 0,090x_5 + 0,164x_6 + 0,530x_7 + (-0,226)x_8 + 0,157x_9 + 0,143x_{10} + u (24)

where all values β are the regression coefficients and all values x independent variables according to the survey (appendix 1).

The coefficient of x_1 has estimated standard error of 0,011, t-statistic of 0,68 and p-value 0,498. It is therefore statistically insignificant at significance level $\alpha = .05$ as 0,498 > 0.05. There are 85 observations and 11 regressors (intercept and x) so we use t(n-k) = 74.

Thus, all the above-mentioned algorithms and regularities were used in building of simple and multiple regression models. All statistics outcomes are covered, patterns are explained step by step. As we will be able to see further on, these algorithms have become instrumental in performing the forecasting of consumers' answers in the wine questionnaire.

3.3. Forecasting of consumers' choice in the next several forms

The author decided to forecast the answers in the following three surveys with the help of a system of simple linear equations. For this purpose, each time was chosen two columns, namely the relation of y dependable variable with each x independent variable which, in turn, was expressed in scatterplot backed up by the linear trend line. The first factor is the age of a presumably following respondent:

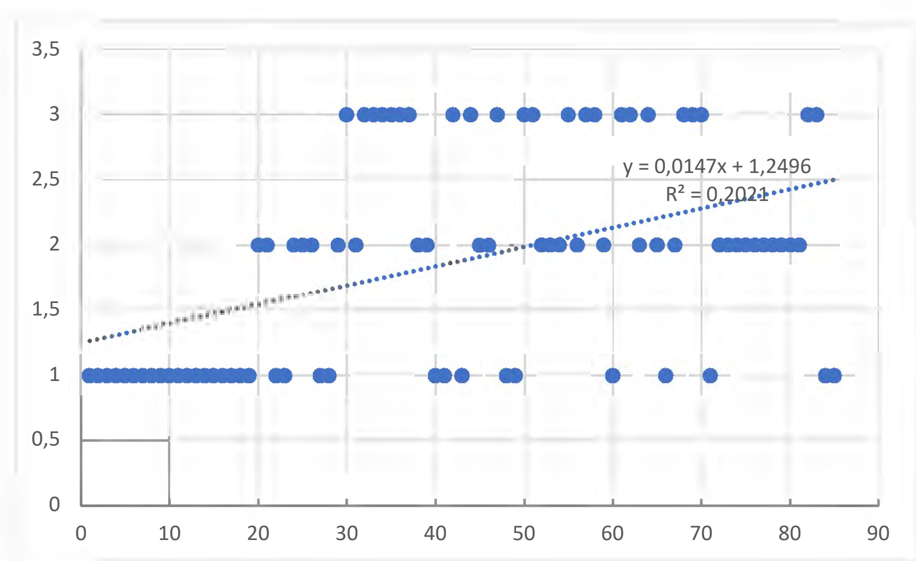

Figure 9 – answers on question 1

Having got the equation y= 0,0147x + 1,2496, we insert the number of the next 86th respondent - 0,0147 × 86 + 1,2496 = 2,5138 which is closer to the option 2.

Then, we put in that equation 87th and 88th prospective respondents and obtain the results of 2,52 (2) and 2,54 (2). That means that the next three respondents are likely to be in the age range from 31 – 50 years-old.

By analogy, we take the same actions with the following nine independent variables.

The second factor is the sex of the next respondent. In the picture below we have the equation y = -0,0029x + 1,7345 and putting the numbers 86, 87, 88, we obtain the following results: for 86th 1,48 (1), 87th 1,48 (1), 88th 1,47 (1) which means that the following three respondents are likely to be males.

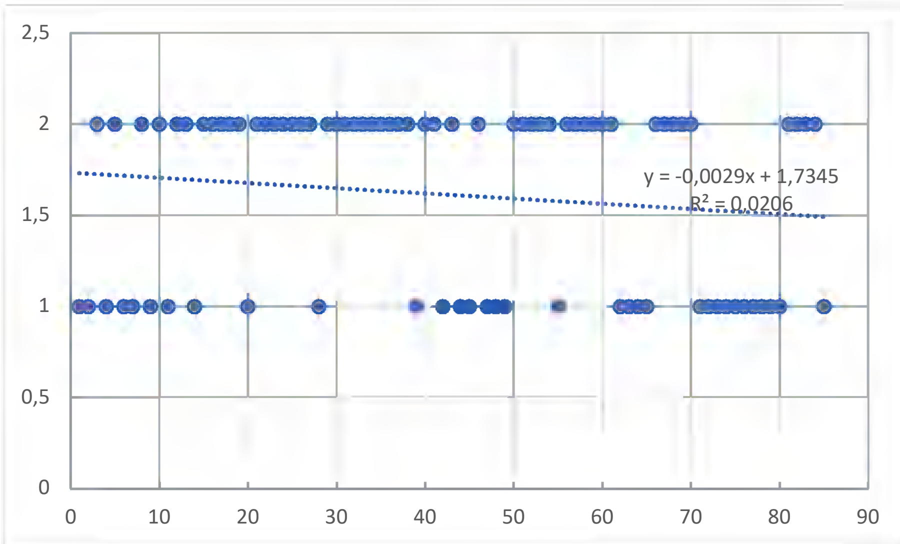

Figure 10 – answers on question 2 [compiled by the author]

Question number 3 invites a responder to choose the favorite type of wine:

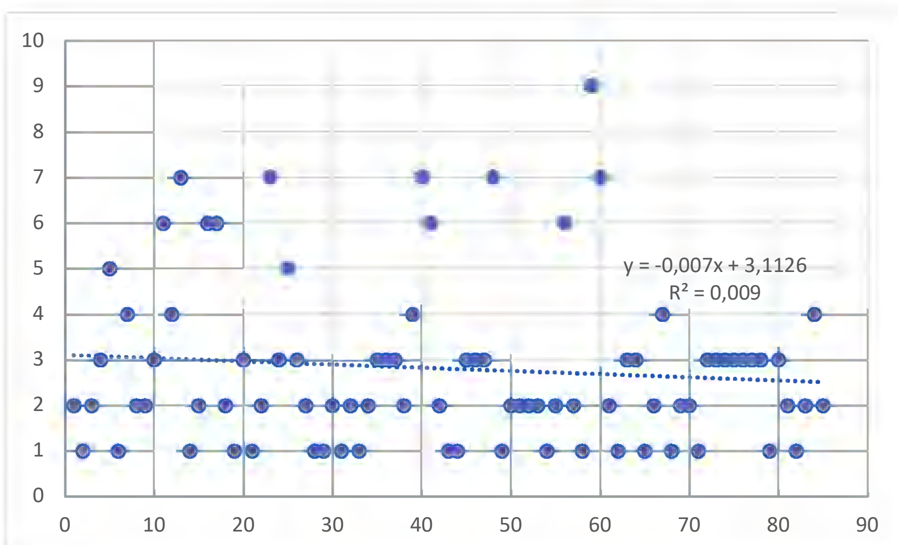

Figure 11 – answers on question 3

Having got the equation y = -0,007x + 3,1126, we put the respondents instead of x by analogy and here are our results: for 86th 2,51 (2), for 87th 2,50 (2), for 88th 2,49 (2). That means that the following people are likely to choose the second answer, which is indicated as “red semisweet.”

The next step is the forecasting of the place where a consumer tends to buy wine:

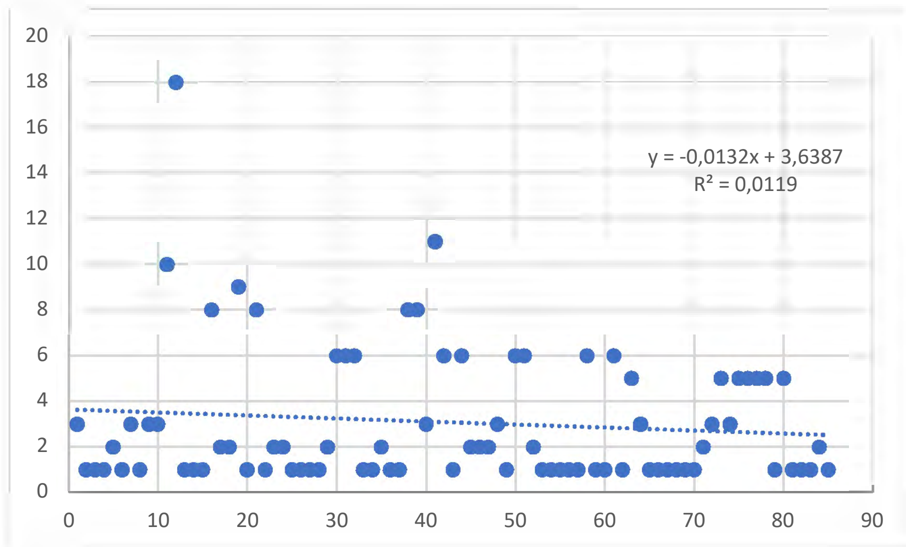

Figure 12 – answers on question 4

Having obtained the equation y = - 0,0132x + 2,6387, we calculate by analogy by putting in the supposed respondents: 86th 1,50 (1), 87th 1,49 (1), 88th (1). The next three respondents are likely to choose the first option, i.e. they tend to buy wine in supermarkets.

The fifth question is about the most important aspect a consumer regards before purchasing wine.

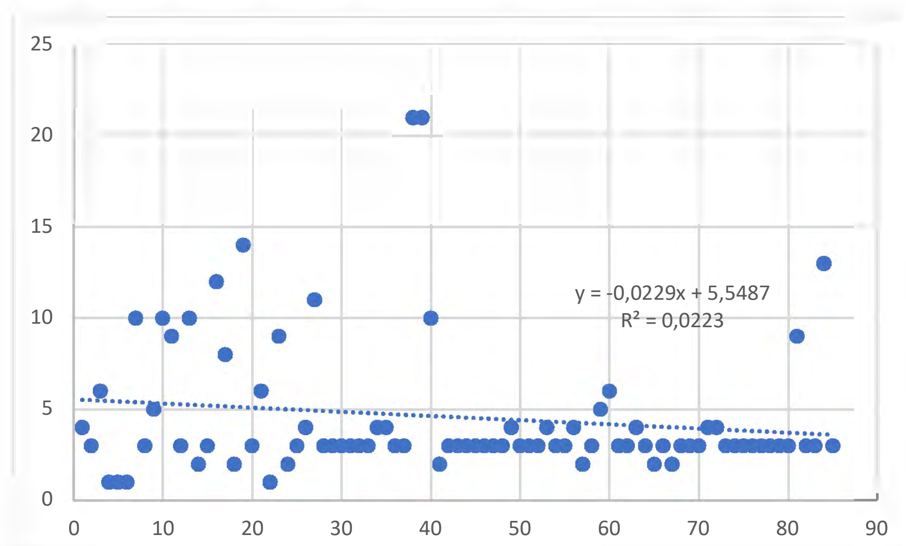

Figure 13 – answers on question 5

By analogy we put in the equation y=-0,0229x + 5,548 the numbers 86th, 87th, 88th and get the following results 3,57 (4); 3,55 (4); 3,53 (3). Surprisingly, the 86th and 87th tick the fourth variant, which is a locality of production; the 88th logically will choose the third variant – the quality of the wine.

The sixth question evaluates consumers' preferences in white wine:

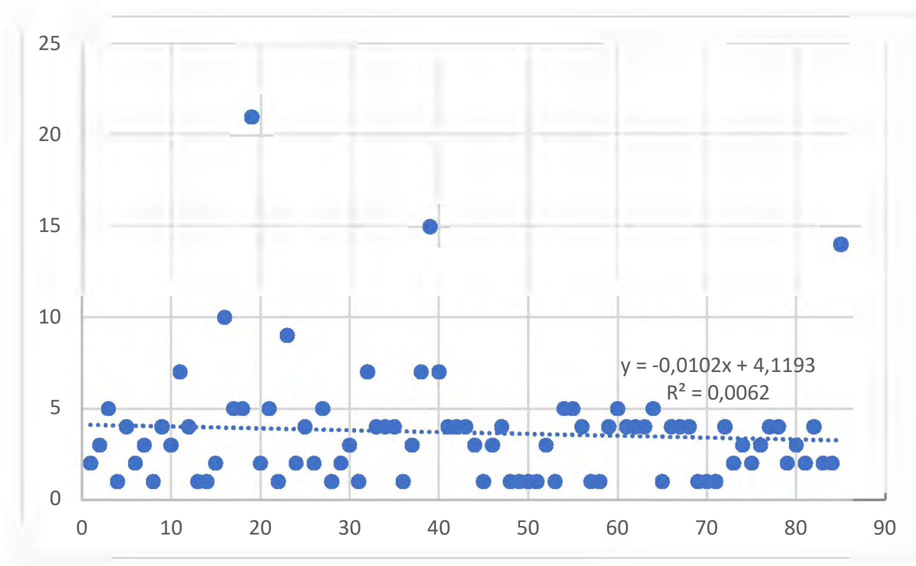

Figure 14 – answers on question 6

The same course of action with the equation y=-0,0102x + 4,1193 for the three following respondents. Our results are 3,24 (3), 3,23 (3) and 3,22 (3). They mean that all respondents tick Riesling.

Yet now the preferences in red wine go afterward:

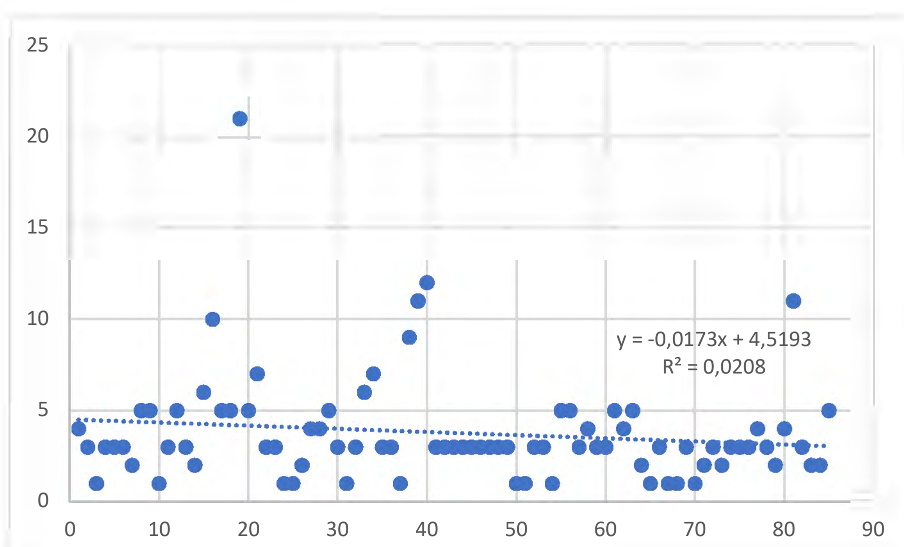

Figure 15 – answers on question 7

By putting in the equation y = -0,0173x +4,5193 the next three supposed respondents we obtain the numbers 3,03 (3) – 86th; 3,01 (3) – 87th; 2,92 (3) – 88th. The respondents highly likely will choose the third option Cabernet Sauvignon.

Another very interesting prediction we can make about the competition of Russian/ foreign producer:

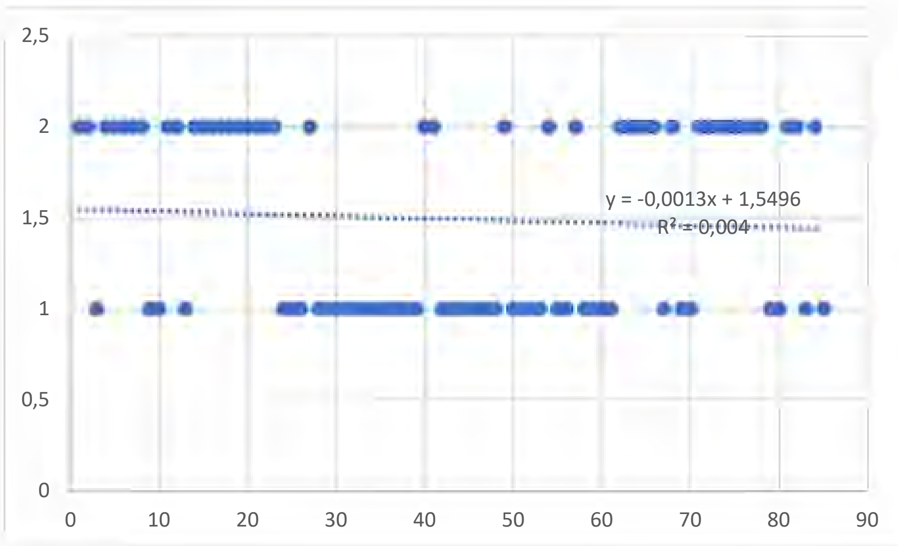

Figure 16 – answers on question 8

By putting the numbers in the regression equation, we have the forecasting for all three following respondents equal to 1,43 which indicates their ”local choice.”

One of the most exciting questions concerning the foreign producer:

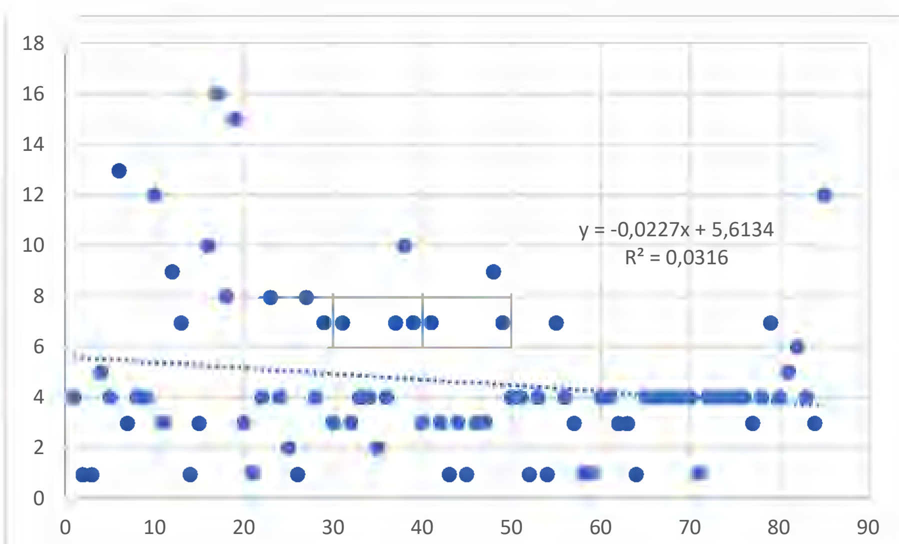

Figure 17 – answers on question 9

Following the order, we put respondents in the equation y =- 0,0227x + 5,6134 and obtain the following results: for 86th 3,66 (4), for 87th 3,63(4), for 88th (4). The next three persons will vote for Georgia.

The last question is about the price a consumer is ready to pay for a bottle of wine:

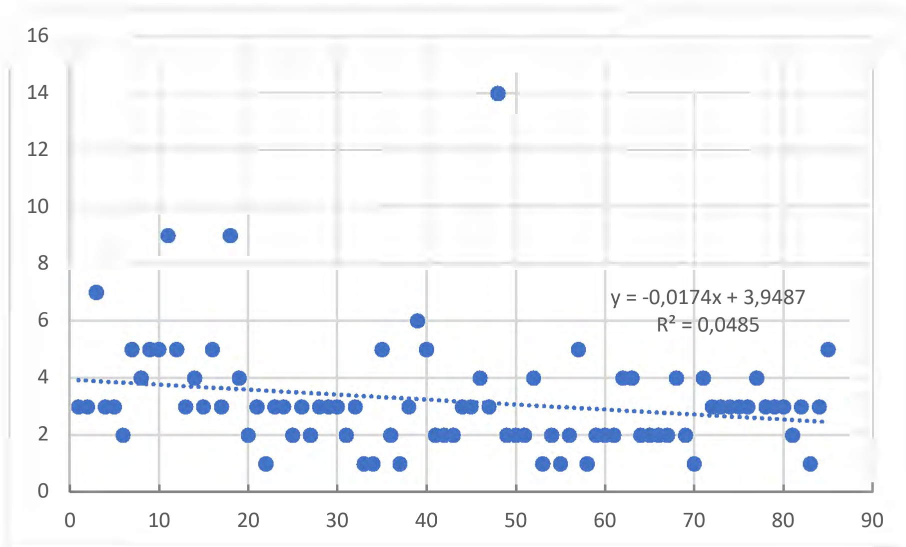

Figure 18 – answers on question 10

Having put in the regression equation the next three respondents we've got these numbers: 2,45 (2); 2,43 (2); 2,41 (2). The next three respondents will vote for a second option price range, which is \$5-\$10.

When we have our forecasting done, we can create the table with our results:

Table 18 – The prediction of respondents' answers

Y	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
86	2	1	2	1	4	3	3	1	4	2
87	2	1	2	1	4	3	3	1	4	2
88	2	1	2	1	3	3	3	1	4	2
R^2	0,2021	0,020	0,009	0,0119	0,0223	0,0062	0,0208	0,004	0,0316	0,0485

It's worth mentioning if the number of respondents increases by 1%, the percent of regression increases as well when: x_1; the other cases there is a tendency to decrease.

In conclusion, we can check our multiple regression models with obtained forecasted results:

y_{86}= -0,766 + 0,007×2+ 0,130×1+ (-0,176)×2 + 0,092×1+ 0,090×4+ 0,164×3 + 0,530×3+ (-0,226)×1 + 0,157×4 + 0,143×2 + 2,25 = 5,02

y_{87}=-0,766 + 0,007×2+ 0,130×1+ (-0,176)×2 + 0,092×1+ 0,090×4+ 0,164×3 + 0,530×3+ (-0,226)×1 + 0,157×4 + 0,143×2 + 2,25 = 5,02

y_{88}= -0,766 + 0,007×2+ 0,130×1+ (-0,176)×2 + 0,092×1+ 0,090×3+ 0,164×3 + 0,530×3+ (-0,226)×1 + 0,157×4 + 0,143×2 + 2,25 = 4,75

As we can see from our multiple regression models, the value of y for 88th respondent also decreases. In view of the fact that for the 86th and 87th a row of respondents' answers remains the same; hence, we get the value of y the same.

In conclusion, based on the survey we could individualize the most important factors which were prevailing for consumers making a choice in wine. Then, through algorithms and regularities of multiple linear regression we extracted the statistical data also based on the respondents' answers. That, in its turn, helped us to forecast consumers' choice in the next a few forms which we illustrated graphically and textually.

In conclusion, we have considered the theory of econometric modeling with all the most common definitions and methods that were extremely useful in our calculations.

The author, first of all, addressed to the correlation matrix, which allowed him to individualize the most important factors correlated with consumers' preferences. All that became possible to the thoughtful organization of the survey with the most relevant list of questions. Altogether the obtained results obviously suggest that bosses of "Shumrinka" are better off consider larger production of quality red wine as it turned out to be more in demand.

In addition to that, we described the main algorithms of getting results of the regression statistics to table the ways of their calculation, their meaning including presentation of formulas. The method of dummy variables helped us to form the data set and then with the use of SLRM and MLRM, perform the prediction of the probable consumer preferences over the next five years.

Besides, the author analyzed the general trends in the International and Russian wine market, provided comprehensive statistics relating to export, import, value and volume of the wine trade, volumes of production and consumption, average bottle pricing and planted vineyard area. The example of the Australian "TWE" demonstrated the values, strategy, organizational structure of the global wine leader which case could be considered as exemplary in terms of doing business and wine popularization across the globe.

It is also important to note that the author raised the subject of popularization of wine production and consumption in Russia. As an example, the case of the young perspective "Shumrinka" winery was considered; how the new enterprises seek to make a difference with regard to the Russian wine segment through the thoughtful approach in winemaking.

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Appendix I – Survey: consumer wine preferences

Survey: consumer wine preferences

1) What is your age?
a. 18-30
b. 31-50
c. 51+

2) What is your gender?
a. Male
b. Female

3) What type of wine do you like? - Multiple choice
a. Red dry
b. Red semisweet
c. White dry
d. Dessert
e. Sparkling
f. Other

4) Where do you buy wine usually? - Multiple choice
a. Supermarket
b. Wine Shop
c. Wine maker
d. E-shop
e. Restaurant
f. I am producer

5) What is the most important aspect for you when you are buying a wine?
a. Prize
b. Producer
c. Quality

d. Locality

e. Vintage

f. Bottle design

6) Please check your preferences (the grape variety of white wine)

a. Chardonnay

b. Sauvignon Blanc

c. Riesling

d. Moscato

e. Pinot grigio

f. Pinot blanc

7) Please check your preferences (the grape variety of red wine)

a. Syrah

b. Merlot

c. Cabernet sauvignon

d. Malbec

e. Pinot noir

f. Sangiovese

8) What producer you look for the first

a. Local

b. Foreign

9) In case of foreign what country do you prefer?

a. Italy

b. Spain

c. France

d. Georgia

e. South Africa

f. South America

g. Other

10) What are your budget limits for an average bottle of wine?

a. Up to $5
b. $5-$10
c. $10-$15
d. $15-$20
e. $20+

Appendix II – Table with respondents' answer

Table 19 - Respondents' answers

x_0 (y)	x_1	x_2	x_3	x_4	x_5	x_7	x_8	x_9	x_{10}	y(x_6)
1	1	1	2	3	4	4	2	4	3	2
2	1	1	1	1	3	3	2	1	3	3
3	1	2	2	1	6	1	1	1	7	5
4	1	1	3	1	1	3	2	5	3	1
5	1	2	5	2	1	3	2	4	3	4
6	1	1	1	1	1	3	2	13	2	2
7	1	1	4	3	10	2	2	3	5	3
8	1	2	2	1	3	5	2	4	4	1
9	1	1	2	3	5	5	1	4	5	4
10	1	2	3	3	10	1	1	12	5	3
11	1	1	6	10	9	3	2	3	9	7
12	1	2	4	18	3	5	2	9	5	4
13	1	2	7	1	10	3	1	7	3	1
14	1	1	1	1	2	2	2	1	4	1
15	1	2	2	1	3	6	2	3	3	2
16	1	2	6	8	12	10	2	10	5	10
17	1	2	6	2	8	5	2	16	3	5
18	1	2	2	2	2	5	2	8	9	5
19	1	2	1	9	14	21	2	15	4	21
20	2	1	3	1	3	5	2	3	2	2
21	2	2	1	8	6	7	2	1	3	5
22	1	2	2	1	1	3	2	4	1	1
23	1	2	7	2	9	3	2	8	3	9
24	2	2	3	2	2	1	1	4	3	2
25	2	2	5	1	3	1	1	2	2	4
26	2	2	3	1	4	2	1	1	3	2
27	1	2	2	1	11	4	2	8	2	5
28	1	1	1	1	3	4	1	4	3	1

29	2	2	1	2	3	5	1	7	3	2
30	3	2	2	6	3	3	1	3	3	3
31	2	2	1	6	3	1	1	7	2	1
32	3	2	2	6	3	3	1	3	3	7
33	3	2	1	1	3	6	1	4	1	4
34	3	2	2	1	4	7	1	4	1	4
35	3	2	3	2	4	3	1	2	5	4
36	3	2	3	1	3	3	1	4	2	1
37	3	2	3	1	3	1	1	7	1	3
38	2	2	2	8	21	9	1	10	3	7
39	2	1	4	8	21	11	1	7	6	15
40	1	2	7	3	10	12	2	3	5	7
41	1	2	6	11	2	3	2	7	2	4
42	3	1	2	6	3	3	1	3	2	4
43	1	2	1	1	3	3	1	1	2	4
44	3	1	1	6	3	3	1	3	3	3
45	2	1	3	2	3	3	1	1	3	1
46	2	2	3	2	3	3	1	3	4	3
47	3	1	3	2	3	3	1	3	3	4
48	1	1	7	3	3	3	1	9	14	1
49	1	1	1	1	4	3	2	7	2	1
50	3	2	2	6	3	1	1	4	2	1
51	3	2	2	6	3	1	1	4	2	1
52	2	2	2	2	3	3	1	1	4	3
53	2	2	2	1	4	3	1	4	1	1
54	2	2	1	1	3	1	2	1	2	5
55	3	1	2	1	3	5	1	7	1	5
56	2	2	6	1	4	5	1	4	2	4
57	3	2	2	1	2	3	2	3	5	1
58	3	2	1	6	3	4	1	1	1	1
59	2	2	9	1	5	3	1	1	2	4
60	1	2	7	1	6	3	1	4	2	5
61	3	2	2	6	3	5	1	4	2	4

62	3	1	1	1	3	4	2	3	4	4
63	2	1	3	5	4	5	2	3	4	4
64	3	1	3	3	3	2	2	1	2	5
65	2	1	1	1	2	1	2	4	2	1
66	1	2	2	1	3	3	2	4	2	4
67	2	2	4	1	2	1	1	4	2	4
68	3	2	1	1	3	1	2	4	4	4
69	3	2	2	1	3	3	1	4	2	1
70	3	2	2	1	3	1	1	4	1	1
71	1	1	1	2	4	2	2	1	4	1
72	2	1	3	3	4	3	2	4	3	4
73	2	1	3	5	3	2	2	4	3	2
74	2	1	3	3	3	3	2	4	3	3
75	2	1	3	5	3	3	2	4	3	2
76	2	1	3	5	3	3	2	4	3	3
77	2	1	3	5	3	4	2	3	4	4
78	2	1	3	5	3	3	2	4	3	4
79	2	1	1	1	3	2	1	7	3	2
80	2	1	3	5	3	4	1	4	3	3
81	2	2	2	1	9	11	2	5	2	2
82	3	2	1	1	3	3	2	6	3	4
83	3	2	2	1	3	2	1	4	1	2
84	1	2	4	2	13	2	2	3	3	2
85	1	1	2	1	3	5	1	12	5	14

Appendix III – Correlation matrix results

	Column 1 (x_0)	Column 2 (x_1)	Column 3 (x_2)	Column 4 (x_3)	Column 5 (x_4)	Column 6 (x_5)	Column 7 (x_7)	Column 8 (x_8)	Column 9 (x_9)	Column 10 (x_{10})	Column 11 (x_6)
Column 1 (x_0)	1										
Column 2 (x_1)	0,449576676	1									
Column 3 (x_2)	-0,143646804	0,093711799	1								
Column 4 (x_3)	-0,095092148	-0,299298446	0,130895453	1							
Column 5 (x_4)	-0,109006501	-0,021154553	-0,021680593	0,123019297	1						
Column 6 (x_5)	-0,149257267	-0,258382432	0,126001157	0,275517478	0,279348934	1					
Column 7 (x_7)	-0,144366282	-0,175798684	0,087345565	0,043114038	0,311736437	0,564237051	1				
Column 8 (x_8)	-0,063297538	-0,411923031	-0,226649821	-0,001226849	0,103153706	0,026786708	0,16339977	1			
Column 9 (x_9)	-0,177788039	-0,310995969	0,076625368	0,126977712	0,205664591	0,367103049	0,39066102	0,077337214	1		
Column 10 (x_{10})	-0,220326436	-0,370176802	-0,204169697	0,266189631	0,215871692	0,208697473	0,129770947	0,116497991	0,170459993	1	
Column 11 (x_6)	-0,078827545	-0,162911271	0,042110181	0,162601981	0,340106069	0,565786049	0,681486669	0,069491955	0,433812598	0,227107085	1

Figure 19 - Correlation matrix results

Appendix IV – Table of regression

	Coefficients	*Standard error*	*t-statistics*	*P-Value*	*Lower 95%*	*Upper 95%*
y-intercept	-0,766120534	1,968486836	-0,389192612	0,698251388	-4,688416175	3,156175107
Variable x_1	0,007986128	0,011729	0,680887378	0,498067848	-0,015384415	0,031356671
Variable x_2	0,130097867	0,436912478	0,297766426	0,766715828	-0,740469249	1,000664983
Variable x_3	-0,176032544	0,555833673	-0,316700036	0,752362928	-1,283555315	0,931490226
Variable x_4	0,092913483	0,153481063	0,605374248	0,546782518	-0,21290421	0,398731176
Variable x_5	0,090101231	0,091299637	0,986873926	0,326920296	-0,091817267	0,272019729
Variable x_6	0,164733264	0,085650184	1,923326438	0,058286302	-0,005928454	0,335394982
Variable x_7	0,530828287	0,10868922	4,883909256	5,84166E-06	0,314260289	0,747396285
Variable x_8	-0,226991686	0,573251838	-0,395972016	0,693265072	-1,369220907	0,915237535
Variable x_9	0,157612265	0,089679007	1,757515713	0,082965639	-0,021077058	0,336301588
Variable x_{10}	0,143107826	0,145881175	0,980988989	0,329794586	-0,14756676	0,433782413

Figure 20 – Table of regression