

AGRICULTURAL UNIVERSITY PLOVDIV
FACULTY - ECONOMICS

MARIA SASHA DUKOSKA

**OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT OF VITICULTURE IN
NORTHERN MACEDONIA**

ABSTRACT

of a dissertation for awarding an educational and scientific degree "Doctor" in a scientific
specialty

"Organization and management of production"

Plovdiv, 2020

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Reviewers:

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The dissertation was discussed and focused on the defense of an extended meeting of the Department of Management and Marketing at the Faculty of Economics, Agricultural University of Plovdiv.

The defense of the dissertation will take place on 2020 from hours in hall
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I. General characteristics of the dissertation

Relevance of the topic

Sustainability and sustainable development have become particularly popular around the world in recent decades. They reflect the imperative need for a new global approach to the functioning of human society. Human activity is extremely diverse, while at the same time it is interconnected and dependent on the state and changes in other systems. Ultimately, the planet Earth, as a natural basis for the development of mankind should be considered as a single system, ie. human activity is an element, a subsystem of another larger system.

The wine sector is one of the most important economic sectors in agriculture, covering both significant areas of arable land and providing livelihoods and work for thousands of producers. On the other hand, this is a very intensive sector, which in view of its functioning and competitiveness uses significant in number and intensity agro-technical measures that have a significant impact on the environment, soils, plants and the rest of the ecosystem.

B For centuries, viticulture has been an important, integral part of Macedonian agriculture with a significant contribution, both to the added value and national income of the country, as well as to the export structure and employment of the land and the provision and enrichment of biological diversity. With the increase of the population and the intensification of the economic activity the impact of the sector on the environment increases. The sector itself is also suffering from the ongoing changes in the environment and in the search for adaptation and coping with the ongoing changes, actions are being taken, the consequences of which are often ambiguous. The question of the consequences and the action required as a result of this complex and contradictory interaction is particularly relevant today,

As a result of the above on the one hand and the focus on environmentally friendly agriculture, environmental protection and development and improving the quality of human life on the other, the concept of sustainable agriculture comes to the fore and is becoming increasingly important.

Even more and more often, sustainable agriculture is perceived as the most important component of sustainable development. By its nature, economic activity in agriculture and in particular in the wine sector is of particular importance for the existence not only of the regions where the sector occupies a significant place in the production structure, but also for society as a whole. The development of the sector over the last decade is developing in the spirit of harmonization with the requirements of the Common Agricultural Policy of the EU and there are clear changes, especially related to the restructuring of wine production, increasing the area under vines, increasing the area of large producers and the implementation of European legislation for the production and control of vinification.

Conceptual thesis of the dissertation

The use of the approach of sustainable development of viticulture guarantees the achievement of sustainable competitive positions of the sector in the future.

Purpose and tasks of research

The goal of the dissertation research is to assess the main factors determining the sustainable development of viticulture in the Republic of Northern Macedonia and to determine the opportunities for sustainable development of the sector in the future.

Achieving the goal is sought by solving the following tasks:

- Clarification of the nature and content of the approach to sustainable development of viticulture as a management approach;
- Development of methodological approaches and methodology for studying the factors determining the sustainable development of viticulture;
- Analysis and assessment of the main factors determining the sustainable development of viticulture;
- Determining the opportunities for sustainable development of viticulture in the future.

Subject and object of the dissertation research

The subject of the study is the sustainable development of viticulture, the Republic of Northern Macedonia

The object of the study are the vineyards in the Republic of Northern Macedonia. An agricultural holding is considered to be an agricultural holding in which at least 50% of the cash income from its activity is generated as a result of the production of grapes and / or grape products.

Research approaches

The study of sustainability includes both theoretical concepts and doctrines with an overview of theories of sustainability in agriculture and in particular in the wine sector, as well as an analysis of relevant methodologies and tools to assess sustainability. The idea is to find and develop a developed and verified methodology for sustainability assessment in agriculture, which will be tested and applied to perform a similar assessment in the wine sector.

In order to assess the sustainability of the sector, along with the general theoretical examination of the issue of sustainability, the aim is to conduct a sectoral analysis of the overall development of the sector, both in terms of its production and in trade, economic and structural aspects.

With the completion of this study, a methodology was selected to be used to collect the necessary information from the reference areas and on the basis of a significant set of indicators, considered in a holistic-integrated aspect (economic, environmental, social and institutional). factors), to assess resilience.

The following methods are used in the research process to prove the conceptual thesis of the dissertation: systematic and graphical analysis; index method; the method of expert assessment; the focus group method and the multiple comparison method.

Main literary and information sources

The dissertation is developed using: scientific publications and works of Macedonian and foreign authors; newsletters of international organizations; reports and bulletins of the Ministry of Agriculture of the Republic of Northern Macedonia, as well as a number of regulations.

Empirical information about the research is also provided by sample surveys conducted at the level of viticulture on a questionnaire prepared by the author.

Volume and structure of the dissertation

The dissertation is presented in an introduction, three chapters and a conclusion, located on 139 pages, used literature and appendices. The study is illustrated with 47 figures and 1 appendix. 106 literature sources are cited.

Content of the dissertation

Introduction

Chapter I. Sustainability in agriculture: principles and paradoxes

1. Sustainable Development
2. Sustainable agriculture
3. The concept of sustainable development based on sustainability in agriculture
4. Organization of the research

Chapter II. Assessment of the sustainable development of viticulture

1. Assessment of the sustainability of farms under the "Green" pillar in terms of their legal status
2. Assessment of the sustainability of farms under the pillar "Environmental friendliness" by regional aspect
3. Assessing the resilience of farms under the Social Responsibility pillar in terms of their legal status
4. Assessment of the sustainability of farms within the pillar "Social responsibility" by regional aspect
5. Assessing the resilience of farms under the Economic Efficiency Pillar in terms of their legal status
6. Assessment of the sustainability of farms under the pillar "Economic efficiency" by regional aspect
7. Assessment of the resilience of farms under the "Institutional Efficiency" pillar in terms of their legal status
8. Assessment of the sustainability of farms under the pillar "Institutional efficiency" by regional aspect

Chapter III. Overall assessment of sustainability and identification of opportunities for sustainable development of viticulture in the future

1. Significance and relevance of the analysis of the sustainability of viticulture
2. Sector Sustainability Analysis for the Economic Efficiency Pillar
3. Sectoral sustainability analysis for the Pillar of Environment
4. Sector Sustainability Analysis for the Social Responsibility Pillar
5. Sector Sustainability Analysis for the Institutional Efficiency Pillar
6. Structural analysis of sectoral sustainability
7. Overall assessment of the sustainability of farms according to their size
8. Overall assessment of the sustainability of farms according to their legal status
9. Overall assessment of the sustainability of farms in a regional aspect
10. Conclusions
11. Opportunities for sustainable development of the sector in the future

References

Application

II. Main content of the dissertation

INTRODUCTION

B For centuries, viticulture has been an important, integral part of our agriculture with a significant contribution, both in the added value and national income of the country, as well as in the export structure and employment of the land and the provision and enrichment of biological diversity. With the increase of the population and the intensification of the economic activity the impact of the sector on the environment increases. The sector itself is also suffering from the ongoing changes in the environment and in the search for adaptation and coping with the ongoing changes, actions are being taken, the consequences of which are often ambiguous. The question of the consequences and the necessary action as a result of this complex and contradictory interaction is

especially relevant today, when climate change is changing the natural conditions for economic activity in agriculture.

As a result of the above on the one hand and the focus on environmentally friendly agriculture, environmental protection and development and improving the quality of human life on the other, the concept of sustainable agriculture comes to the fore and is becoming increasingly important.

Even more and more often, sustainable agriculture is perceived as the most important component of sustainable development. By its nature, economic activity in agriculture and in particular in the viticulture sector is of particular importance for the existence not only of the regions where the sector occupies a significant place in the production structure, but also for society as a whole. The development of the sector over the last decade is developing in the spirit of harmonization with the principles of the Common Agricultural Policy of the EU and there are clear changes, especially related to the restructuring of grape production, increasing the area under vines, increasing the area of large producers and the implementation of European manufacturing law and vinification control.

The dissertation research is a topical and relevant research, with the application of modern theories concerning the understanding of this concept and for the assessment of sustainability in agriculture. The study aims to trace both the state of the industry and development trends in recent years, and to assess its sustainability, considered as the sustainability of production units. The dissertation is divided into several sections, which deal with the individual issues of the development of the industry and the presentation of farms in relation to a modern formulation of sustainability, considered in its holistic integrity.

Sustainability and sustainable development have become particularly popular around the world in recent decades. They reflect the imperative need for a new global approach to the functioning of human society. Human activity is extremely diverse, while at the same time it is interconnected and dependent on the state and changes in other systems. Ultimately, the planet Earth, as a natural basis for the development of mankind should be considered as a single system, ie. human activity is an element, a subsystem of another larger system.

The wine sector is one of the most important economic sectors in agriculture, covering both significant areas of arable land and providing livelihoods and work for thousands of producers. On the other hand, this is a very intensive sector, which in view of its functioning and competitiveness uses significant in number and intensity agro-technical measures that have a significant impact on the environment, soils, plants and the rest of the ecosystem.

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As a result of the above on the one hand and the focus on environmentally friendly agriculture, environmental protection and development and improving the quality of human life on the other, the concept of sustainable agriculture comes to the fore and is becoming increasingly important. Even more and more often, sustainable agriculture is perceived as the most important component of sustainable development. By its nature, economic activity in agriculture and in particular in the viticulture sector is of particular importance for the existence not only of the regions

where the sector occupies a significant place in the production structure, but also for society as a whole. The development of the sector over the last decade has been in line with the spirit of the EU's Common Agricultural Policy and has undergone significant changes, mainly related to the restructuring of wine production, increasing the area under vines, increasing the area of large producers and the implementation of European legislation on vinification production and control. In the dissertation, the measurement and assessment of sustainability in the wine sector is not done, as the moment is a picture of what is happening in a single period of time,

Hence the importance of the methodology and tools for evaluation, ie. of the proposed system of indicators, allowing to reach a quantitative characteristic of the phenomenon. This part of the dissertation is especially useful because it is a successful example of the application of modern research methods, including complex conclusions about the stability of a system. The methodology and approach developed and implemented for the purpose of the study allow to consider the sustainability of production farms and entities in a dynamic aspect, as the indicators are recreated by the so-called "proxy" sub-indicators, which have a quantitative or qualitative value that allows to give quantitative expression of sustainability. This is one of the great advantages of research,

The analysis of sustainability is made not only by applying an integrated methodology taking into account the impact of production and management activities of farms on the environment, social relations, economic indicators and institutional conditions, but it also reveals regional differences, features existing between farms, differentiated. by legal status and size.

The dissertation presents in a clear and accessible form what are the challenges facing the sector, what are the opportunities for development and how promising and stable the future of this industry will be. It provides an opportunity to draw conclusions as well as to make specific recommendations and suggestions for good practices that will lead to higher sustainability. This is also a guarantee that the current development of the industry will not endanger and damage its future and will allow future generations to deal with it, and modern ones will not be affected by the existence of this activity.

ORGANIZATION OF THE RESEARCH

The methodology for studying sustainability in the sector is based on a holistic-integrated approach (a set of economic, environmental, social and institutional factors is considered). The selection of indicators is done through Multi-criteria analysis with different thematic criteria - analytical solidity, measurability, transparency, political relevance, portability and relevance to sustainability issues. A potential list of indicators has been prepared and evaluated by experts from various scientific fields - economists, sociologists, ecologists and agronomists. Based on their assessments, the final set of indicators was formed, which are included in the field survey questionnaire. The questionnaire itself was tested in 5 vineyards in order to improve the perception of the questions by the respondents, as well as the inclusion of new ones,

The methodology is divided into different steps, covering literature review, multi-criteria evaluation, selection of indicators, integration of indicators, field research, data analysis and sustainability assessment. A comprehensive literature review will be performed during the field study. As a result, a list of indicators will be drawn up, taking into account the four pillars of sustainability. A special place among them is occupied by:

- Indicators used by national and international institutions
- Specific characteristics
- Indicators created by the doctoral student and his / her supervisor

In the Multi-Criteria Expert Assessment (FEM), the validation of potential indicators will be done by experts. They will be selected on the basis of their competence, as well as using the capacity of the members of the Project Advisory Board (PSB) and other participants directly

involved in this topic. The indicators and experts will be grouped thematically in panels forming the sustainability of the sector. The evaluation of the potential indicators by the experts is carried out on eight headings included in the criteria of expert selection (CES).

After agreeing to participate, the experts receive the following documents: a list of the characteristics of the indicators (name, sustainability of assessment, description, source, calculation method, required information, assessment and interpretation scale) and guidelines for the assessment procedure. Based on these documents, the experts, according to their thematic affiliation, evaluate each indicator according to the eight criteria. Reporting is done on a scale where indicators that have received expert assessments above a certain level are selected. The criterion for selection of an indicator includes the assessment received by the expert for each indicator and the average score on the eight criteria. The different expert assessments on each indicator are synthesized into an "arithmetic mean", formed as an expert consensus result (EASij),

The selected indicators are included in a questionnaire, which is used in organizing a field survey among 62 vineyards from Provardarski wine region, Pelonia-Polog wine region and Osogovo wine region. The selected indicators represent the principles and themes included in these four pillars of sustainability - economic, environmental, institutional and social. The performed calculation makes it possible to assess sustainability, both in relation to the individual pillars of sustainability, as well as to obtain a comprehensive sustainability index (SI_{it}) for individual and category types of subjects (size, legal status and regional aspect).).

Table 1. Description of the criteria for expert evaluation of the proposed list of indicators

KES		Description
1 & 2	Distinctive power by (1) time / (2) place	The ability to reflect (1) time / (2) in place differences due to external factors and those resulting from management
3	Analytical value	The indicator must be scientifically substantiated, ie. to be calculated using established scientific terms
4	Measurability	The indicator must be easy to measure. Therefore, its use is judged by the costs it requires.
5	Transparency	The meaning of the indicator must be clear to understand and unambiguous
6	Relevance	The indicator should help to take into account the effect of legislative measures and identify places in need of legislative action.
7	Transferability	The indicator must be able to be used in different types of business structures
8	Relevance of sustainability	The indicator should be as relevant as possible in terms of stability relevant to the database

Source: Own.

The procedure for selecting criteria is the backbone of the methodology used. Of course, this procedure is based on science. But at the same time, the choice of indicators implies flexibility for two important reasons:

- The selected indicators may not fully take into account the problematic issues;
- Experts can be subjective in assessing indicators, giving weight to certain indicators.

Therefore, the value of decisions depends on the quality of the expert assessment. During the project, in case a problem arises in this regard, the research team (doctoral student and his / her research supervisor), assisted by the Project Advisory Board, specifies the results of the evaluation of the indicator and decides to include this indicator or not, following the scientific approach.

After the completion of the work on the formulation and selection of the indicators, which will be used to assess the sustainability in the sector and on the development and testing of a questionnaire, the data collection is started. The vineyards planned for visiting and interviewing are distributed between the individual wine-growing regions in approximately equal proportions, which should depend on the possibilities for visiting the sites and the readiness of the farmers to assist in conducting the survey. The survey is conducted within 2018 and 2019 and the aim is to visit and interview 62 farms, differing in legal status and size of land, organization and purpose of production and more. The processing of information began in the second half of 2019 and ended in early 2020. As a result, an analysis of resilience is made, with the calculation of resilience in the individual pillars of resilience and making a comprehensive assessment of resilience. The sustainability assessment is made by types, regions and size of holdings / enterprises.

One of the most serious challenges in performing this task was how the individual indicators would be transformed into questions in order to obtain specific information from the respondents and how to convert this into a value for sustainability assessment. The organization of the work took place, and along with CES and FEM a working panel was formed, composed both of the members of the research team and with the involvement of external experts in order to support the formation of scales for converting information from farms of the questionnaire for the collection of this information.

Members of the Project Advisory Board, as well as researchers from other academic units, experts from specialized organizations and industry members took part in this flexible working panel at different times. With the implementation of the FEM and after the performance of the work on the analysis of the results and in separate working panels, a decision was made to assess the sustainability on the basis of 25 indicators. They cover all aspects of sustainability, being evenly distributed across the individual pillars, as follows: Pillar "Environmentally Friendly" - 7 indicators; "Economic efficiency" pillar - 7 indicators; "Social responsibility" pillar - 7 indicators; "Institutional efficiency" pillar - 4 indicators. Each of these pillars received an assessment, as in the Overall Sustainability Assessment, the weight of all pillars is the same without giving priority or greater importance to any of the pillars. The institutional pillar participated with a smaller number of indicators because it was considered to be largely involved and overlapped with other areas of sustainability, occupies a smaller perimeter and can be exhausted with a smaller number of indicators, which in turn be represented by a larger set of sub-indicators called proxies.

These proxy indicators should give the specific value expression of the observed condition and phenomenon in the holdings and enterprises and by means of a ranking scale, these values should be converted into a sustainability assessment. The sustainability rating scale includes a score from 0 to 10, which has a qualitative interpretation listed in Table 2.

Table 2. Scale for qualitative compliance of the indicator value

Rank of the indicator	Quality matches
10	The stability and flexibility of the system is in excellent condition
9	The stability and flexibility of the system is increasing to excellent condition

8	The stability and flexibility of the system is maintained in a growing stable state
7	The stability and flexibility of the system is maintained in a stable condition
6	The stability and flexibility of the system is favorably balanced
5	The stability and flexibility of the system is moderately balanced
4	The stability and flexibility of the system is slightly impaired
3	The resilience and flexibility of the system is being compromised
2	The stability and flexibility of the system is severely impaired
1	The stability and flexibility of the system is unstable
0	The system is completely unstable with completely impaired functions

Source: Own.

In this way the structure of the research organization acquires a two-sided layout, composed of 25 indicators covering the holistic nature of sustainability with the corresponding number of proxy indicators against which there is a scale from 0 to 10. The questions in the questionnaire are structured to gather information on indicators according to the proxy indicators that recreate them. The majority of questions were based on objective information from farmers, rather than self-assessment on an indicator or sub-indicator.

Table 3. List of indicators and "proxy" indicators used in the study

№	List of indicators	List of "proxy" indicators
Environmental Pillar		
1	Age structure of the vineyards	Age structure
2	Formation and scheme of planting vines	Correspondence between formation and planting scheme
3	Soil acidity	Soil acidity
4	Pesticide residues in the soil	Pesticide residues in the soil
5	Good agricultural practices	Soil treatments
		Balanced fertilization
		Use of plant protection products
		Good plant protection practices

6	Energy consumption	energy consumption
		change in energy consumption
7	Biodiversity	Varietal diversity
		Change in varietal diversity
Economic efficiency pillar		
8	Labor invested and income received	GRE / 1 decare
		Achieved yield of a variety compared to the potential%
		Average daily income per seasonally employed
		Average monthly income of a permanent employee
9	Capital effects	Attracted / own ratio
		Profit / capital ratio,%
		The rate of return on the cost of borrowed capital
10	Provision with the necessary staff	Staffing
11	Experience	Years of professional experience
12	Net income / profit	Profit or income per area - BGN
		Efficiency - total revenue / total costs
		Profitability - profit / income
13	Production channels	Realization channels
14	Productivity per unit area and quantity of grapes for wine	Achieved yield of a variety compared to the potential%
		Total costs per kg. grapes
Social Responsibility Pillar		
15	Possession of certificates for organic production of grapes and wine	Organic production
		Quality systems
		Wine quality certificates
16	Employment	Management and administrative staff
		Agronomic and technological staff
		General permanent workers
		Seasonal workers
17	Gender equality	Manager
		Constantly busy
		Seasonal workers
18	Consumption of wine	Own consumption of grapes
		Change in own consumption of grapes
19	Consulting services	Frequency of use
20	Remuneration of employees	Average daily income per seasonally employed

		Average monthly income of a permanent employee
21	Association of vine growers	Use of equipment
		Production support
		Finding markets
Institutional Efficiency Pillar		
22	Farmer adaptability index	Compliance with institutional constraints
		Difficulties in land supply
		Difficulties in labor supply
		Difficulties in delivering management
		Difficulties in financing
		Difficulties in supplying raw materials
		Difficulties in supplying know-how
		Difficulties in finding placement
23	Number of walks to different administrations and the distance to get there	Administrative services - regulatory costs / revenues
		Management services - regulatory costs / revenues
24	Fragmentation of ownership shares in the company / farms	Number of owners or shareholders
		Number of bondholders
25	Settlement of property rights over fixed capital and land	Share of own land
		Share of own machines and equipment
		Share of own funds in financial capital

Source: Own.

SUSTAINABILITY ANALYSIS IN VITICULTURE

Analysis of the "Economic Efficiency" pillar

In forming the generalized assessment of the economic pillar, 7 indicators were used, covering all economic dimensions of the economic activity. The results of the descriptive analysis are presented in Table 4. The average assessment of the economic pillar amounts to 5.91, which according to the methodology used is interpreted as a favorable balanced sustainability.

Table 4. Quantification of the Economic Efficiency Pillar

<i>Descriptive statistics</i>	<i>Value</i>
Average	5.91
Standard error	0.18
Median	5.86
Fashion	7.77
Standard deviation	1.34

Sampling variation	1.81
Kartosis	-0.26
Download	-0.35
Scope	5.92
At least	2.48
Maximum	8.40
Amount	366.42
Number	62
Confidence interval (95.0%)	0.34

Source: Field research - 2018-2019

The difficulties that vine growers have experienced in carrying out their activities in recent years have had a negative impact on the economic performance of many production structures in the sector. The low value of the median in the group determines that economic sustainability is threatened by a large number of producers. This situation is typical especially for small farmers who do not have the opportunity to process wine grapes and work for the free market. The minimum value of the indicator of 2.48 is an indication of the existence of structures whose economic potential is at a very low level and as a result their restructuring or closure can be envisaged in the near future. The total sum of all assessments of economic indicators amounts to 366.42, which, compared to the results of the other three pillars, assigns the economic pillar third place in importance for the sector, ie. the economic situation in the sector is unfavorable and in general it can be concluded that it hinders its sustainable development.

The distribution of economic assessments shows that the largest number of farms receive a score between 5 and 6 (Fig. 1), which confirms the conclusion that a significant number of producers are experiencing economic difficulties. As can be seen from the graphical image, the predominant share of the holdings in the study receive a rating of gravity and close to 6 on the ten-point scale for measuring sustainability. The very distribution of individual resistance ratings shows an elongated to the left of the top and the average location of the values, which is evidenced by the coefficient of withdrawal, which is - 0.35 and molehill, which is not much greater than 0, evidence of significant protrusion at the top of the curve.

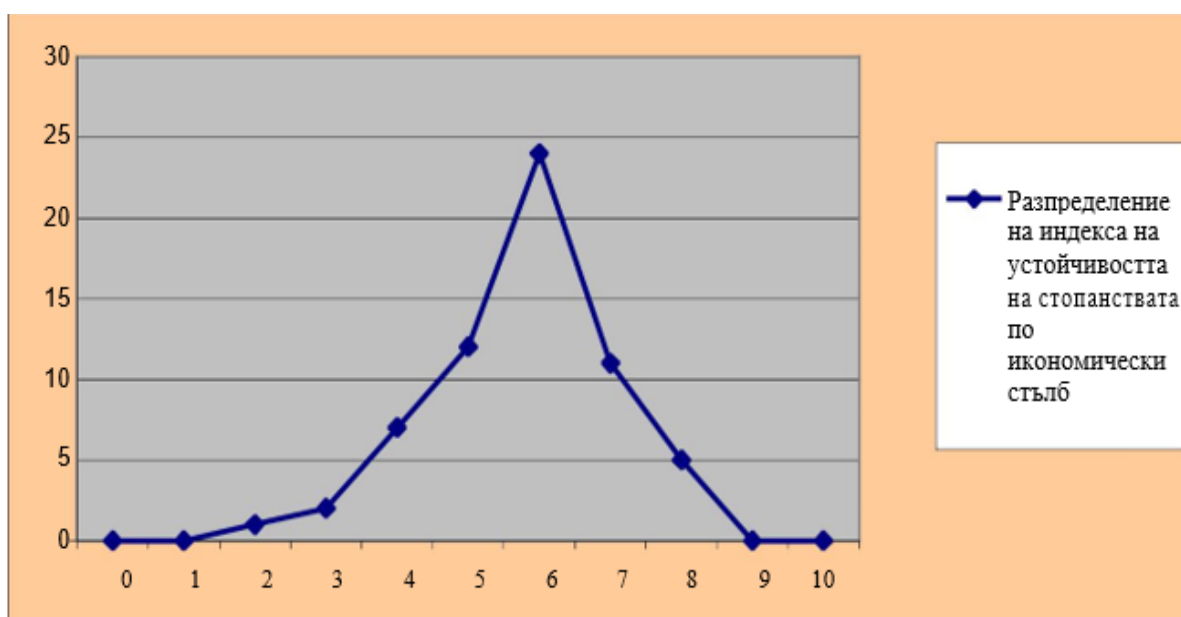


Figure 1. Distribution of the sustainability assessment under the Pillar "Economic efficiency". Source: Field study 2018-2019.

B Conclusion of the analysis of the economic pillar of sustainability of the wine sector can be summarized that a significant number of economic factors creating risks for the development of the sector are identified. Among them the following stand out with the highest degree of significance:

- low labor productivity;
- weak capitalization of production;
- poor productivity;
- difficulties with the realization of the finished products.

Analysis of the ecological pillar of sustainability

In forming the generalized assessment of the ecological pillar, 7 indicators were used, covering all dimensions of environmental protection in carrying out economic activity in the sector. The results of the descriptive analysis are presented in Table 5. The average assessment of the environmental pillar is 7.39, which is an indication that the sector is working in accordance with the norms of good environmental practices. This assessment of sustainability for the environmental characteristics observed on the farms must be interpreted as very good, as the sustainability and flexibility of the system is stable and the farms show very good indicators reflecting the protection of the environment and the protection of the environment.

The value of the assessment is significantly higher than that of the economic pillar, which is a sign that the production structures in the sector maintain the environmental potential for development of their farms. The high value of the median in the group determines that environmental sustainability is ensured for most producers. The minimum value of the indicator of 4.58 is a sign of the lack of significant problems in the field of ecology, which is a good prerequisite for the preservation of viticulture. The total amount of all assessments of environmental indicators amounts to 458.23, which compared to the results of the other three pillars assigns the environmental pillar an important role in stabilizing the sector, ie. its sustainable development is guaranteed from the point of view of protection of natural resources.

Table 5. Quantitative assessment of the pillar "Environmental friendliness". Source: Field research 2018-2019.

<i>Descriptive statistics</i>	<i>Value</i>
Average	7.39
Standard error	0.14
Median	7.44
Fashion	6.8
Standard deviation	1.16
Sampling variation	1.3
Kartosis	-0.31
Download	-0.30
Scope	5.12
At least	4.58
Maximum	9.71
Amount	458.23
Number	62

The distribution of ecological assessments shows that the largest number of farms receive assessments above 7 (Fig. 2), which confirms the conclusion that a significant part of producers maintain the stability of ecosystems. A large number of producers also receive ratings close to the maximum, which ensures that the environmental element of their sustainable development is guaranteed. The negative value of the withdrawal coefficient indicates that the average value tends closer to the upper levels and the majority of farms have ratings in the upper half of the rating scale.

At the same time, the krtosis coefficient of the sample reveals that the peak of the distribution is much more rounded and has a more even distribution of farms around the average. This is evidenced by the minimum and maximum values, which range from 4.58 to 9.71, thus the figure of the distribution resembles a trapezoid. The fashion in the distribution of sustainability on the "environmental" pillar is 6.8, but the dominance of this value, as the frequency does not significantly exceed the other average ratings on the scale, which is the difference with the distribution of sustainability assessments on the economic pillar.



Figure 2. Distribution of the sustainability assessment under the "Green" pillar. Source: Field research - 2018-2019.

B Conclusion of the analysis of the environmental pillar of sustainability of the wine sector can be summarized that a small number of factors creating risks to the development of the sector are identified. The following are defined as such:

- poor age structure of the plantations;
- low degree of biodiversity.

The greatest contribution to the reported high values of sustainability in the ecological pillar is the use of adequate vineyard formations, the application of good production practices and the maintenance of soils in good condition.

Analysis of the social pillar of sustainability

In forming the generalized assessment of the social pillar, 7 indicators were used, covering all social dimensions of economic activity. The results of the descriptive analysis are presented in Table 6. The average assessment of the social pillar is extremely low and amounts to 4.15, which is a sign of serious social problems in the sector. Such a value of the social pillar of sustainability in

wine-growing farms must be understood as impaired sustainability and flexibility, which can lead to the undermining of the normal functioning of the industry.

The low value of the median in the group determines that social sustainability is threatened by most producers. This condition cannot be unambiguously defined as being specific to a particular type of holding, as it is observed in all business forms. The minimum value of the indicator of 2.39 is a sign of the existence of structures in which the social factor is at a very low level and threatens the sustainable development of the business. The total of all assessments of social indicators amounts to 257.51, which is the lowest value among the results on the pillars of sustainability. This determines the criticality of the social element for the sustainability of the sector.

Table 6. Quantitative assessment of the social pillar. Source: Field research 2018-2019.

<i>Descriptive statistics</i>	<i>Value</i>
Average	4.15
Standard error	0.14
Median	4.01
Fashion	3.73
Standard deviation	1.11
Sampling variation	1.23
Kartosis	0.22
Download	0.72
Scope	5.10
At least	2.39
Maximum	7.5
Amount	257.51
Number	62
Confidence interval (95.0%)	0.28

The distribution of social evaluations shows that the largest number of farms receive a score between 3 and 4 (Fig. 41), which confirms the conclusion that a significant part of producers experience very serious problems in the social area of their business. The highest score is 7.5, and only 4 farms received a score higher than 6.



Figure 3. Distribution of social assessments of farms. Source: Field research 2018-2019.

It should be noted that the coefficient of withdrawal of the distribution of holdings is a positive value, which means that the middle is located in the lower half of the scale and the majority of holdings are located in this part of the scale. The positive mole rate, in turn, illustrates the greater sharpness of the peak distribution and the greater concentration of holdings around the pointed area at the expense of the distribution on the rest of the scale. In conclusion of the analysis of the social pillar of sustainability of the wine sector, it can be summarized that a significant number of social factors that create risks for the development of the sector have been identified. Among them the following stand out with the highest degree of significance:

- the low level of production certification;
- gender inequality;
- not the significant use of consulting services;
- lack of association between producers.

Analysis of the institutional pillar of sustainability

In forming the generalized assessment of the institutional pillar, 4 indicators were used, covering institutional relationships arising from the implementation of economic activity in the sector. The results of the descriptive analysis are presented in Table 18. The average score of the institutional pillar is the highest among all scores and amounts to 8.06, which is a sign that there are no significant problems of an institutional nature in the sector. The average score of the surveyed farms of 8.06 indicates that the resilience of economic entities in the institutional environment is growing steadily. The standard measurement error is insignificant, 0.15, which is less than 2%, which indicates that there is very little variance and deviation from these values in the individual stability assessments.

The high values of the assessments are a sign that the production structures in the sector are currently able to adapt well to the peculiarities of the institutional environment, which is an important prerequisite for the development of farms. The high value of the median in the group determines that sustainability is ensured for almost all producers from an institutional point of view. The minimum value of the indicator of 5.20 is a sign of the lack of significant problems in the field of institutional relations, which is a good prerequisite for the development of viticulture. The total of all the assessments of the institutional indicators amounts to 500.03, which compared to the results of the other three pillars ranks this aspect of sustainability as the best controlled and managed by the farms. This result is almost twice as high as the estimates of the social and economic pillars, which determines the presence of significant disparities in the elements of sustainable development of the wine sector. At the same time, it should be noted that the high performance of farms in terms of institutional issues indicates their good adaptability and understanding of the specifics and institutional environment, which can lead to reduced efficiency and underutilization of the external environment as a result of the low level of use of external services, capital and recourse to market transactions with other partners.

Table 7. Quantitative assessment of the institutional pillar

<i>Descriptive statistics</i>	<i>Value</i>
Average	8.06

Standard error	0.15
Median	8.25
Fashion	9.5
Standard deviation	1.20
Sampling variation	1.44
Kartosis	-0.74
Download	-0.38
Scope	4.69
At least	5.20
Maximum	9.90
Amount	500.03
Number	62
Confidence interval (95.0%)	0.30

Source: Field research 2018-2019.

The distribution of the institutional scores shows that most farms receive scores above the average (Fig. 4) and the elongation of the curve in the left half of the scale, while the mole rate is one of the highest compared to the other pillars outlining the plateau shape of the curve ridge. A large number of producers also receive ratings close to the maximum, which ensures that the institutional element of their sustainable development is guaranteed.

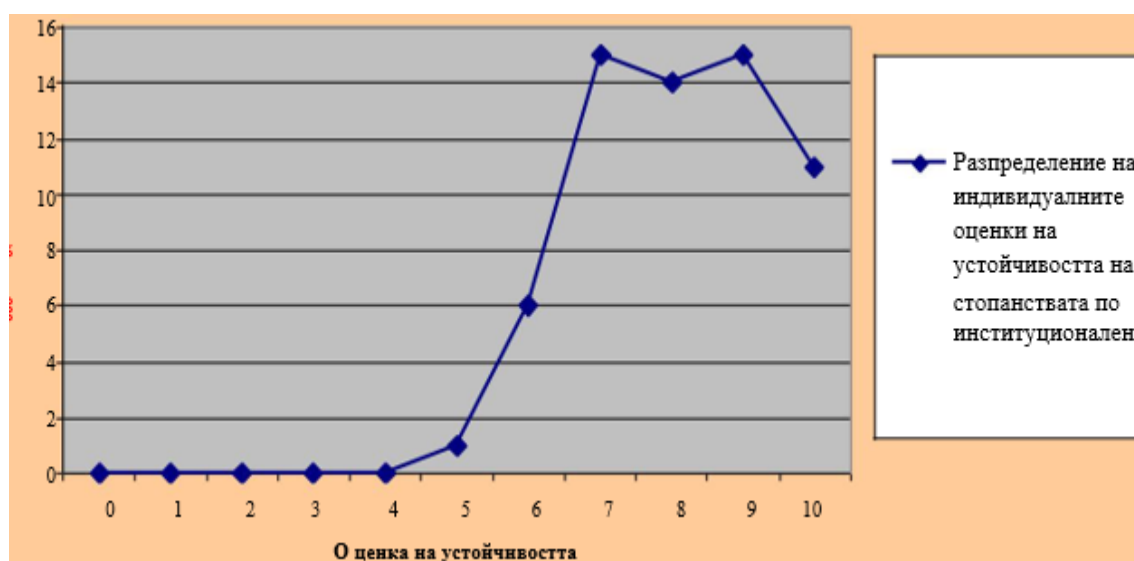


Figure 4. Distribution of institutional assessments by holdings. Source: Field research 2018-2019.

It can be summarized that only the supply of raw materials and the relationships arising from their use create risks for a small part of the farms. These are mainly small farms located in areas with poorly developed infrastructure and do not have a significant impact on the development of the sector. The greatest contribution to the reported high values of sustainability in the institutional pillar has the settled ownership rights over the resources and the optimization of the administrative and managerial services of the business. This applies mainly to property rights to fixed capital and to a lesser extent to land. The machinery and equipment used by the farmers is mainly acquired with their own resources,

Formation of a comprehensive sustainability assessment

In forming the unified sustainability assessment, the summarized assessments under the four pillars of sustainability were used. The weight of each of these four indicators is the same because the sustainability of the system is a complex state determined by the functioning and position of all characteristics of wine production, such as ecology, social environment, economic results and institutional conditions. Equality between economic, social, environmental and institutional factors ensures that none of these aspects of sustainability will be given priority and dominance because sustainability is seen in its holistic nature and no higher priority can be given to one of these pillars at the expense of to another because they, acting in their entirety,

The results of the descriptive analysis of the summarized assessments are presented in Table 8. The average assessment for the whole surveyed population is 6.37, which is a sign that in the sector the state of sustainability of production units is favorably stable, but there are obstacles and problems hindering its development. potential.

Table 8. Overall sustainability assessment

<i>Descriptive statistics</i>	<i>Value</i>
Average	6.37
Standard error	0.10
Median	6.25
Fashion	6.26
Standard deviation	0.76
Sampling variation	0.59
Kartosis	-0.06
Download	-0.29
Scope	3.37
At least	4.33
Maximum	7.71
Amount	394.94
Number	62
Confidence interval (95.0%)	0.19

Source: Field research 2018-2019.

The presence of low scores, as the minimum score of some farms of 4.33 indicates that there is a significant percentage of farms in the sector where overall sustainability is impaired, albeit to a minimal extent. The lack of very high marks shows that it is difficult to see companies in which the resilience and flexibility of the system is in excellent and growing to excellent condition. The value of the median in the group determines that the resilience of half of the studied producers is in the lower half of the scale where resilience is to varying degrees impaired and endangered. There are farms that need to largely adjust their economic behavior so as to ensure their survival and future development. The total amount of all uniform assessments of the holdings amounts to 394.94, which, compared to the results of the individual pillars, assigns to the institutional and environmental pillars the role of compensators for the problems that the sector is experiencing in the social sphere. This result, close to the sum of the estimates of the economic pillar, determines the role of the latter as a decisive factor in the development of the sector. Based on the descriptive analysis, significant disparities in the elements of sustainable development of the wine sector are identified.

From table. 8 it can be seen that the coefficients of krtosis and elongation are negative, similar to these values calculated for the individual pillars of stability and thus revealing the balance

and flatness in the distribution of the individual values. The coefficient of krtosis is -0.06, which in a visual image represents an elliptical curve extending between the two vertices of the scale.

Table 9 shows the results of the correlation analysis of the factors determining the sustainability of the wine sector. The influence of each element of resilience, which is characterized by a number of indicators, has been studied. The main divisions made for the needs of this analysis were used as factorial indicators in the performance of the correlation analysis, namely classification of the holdings by legal status, by territorial location and by area.

Table 9. Results of the factorial correlation analysis on the individual pillars of stability

Correlation analysis sustainability factors: legal status and zoning	<i>Economical onka assessment of sustainability area, tta</i>	<i>Score by pillar surrounding Wednesday</i>	<i>Score by social pillar</i>	<i>Score by institutional pillar</i>	<i>Complete Evaluation of sustainability tta</i>
Multiple regression	0.34	0.37	0.32	0.33	0.45
Correlation coefficient R2	0.11	0.13	0.10	0.11	0.20
Adapted R2	0.07	0.09	0.06	0.06	0.16
Standard error	1.29	1.11	1.07	1.16	0.70
Observed units	62	62	62	62	62

Source: Field research 2018-2019.

With the correlation analysis a study was made for the interaction and determination of these three factors for the calculated and established values, both for the individual pillars and for the overall stability index. The correlation analysis shows that the greatest influence of these factors has in the formation of the overall assessment of stability, measured as 0.45, while for all other elements, the correlation coefficient ranges between 0.32 - 0.37. With regard to R2, the interdependence between the factor group and the individual dependent variables is even lower, between 0.1 - 0.2, which suggests that the stability is weakly dependent on these factors. The information gathered also shows that the same type of holdings differ significantly in their level of sustainability,

Very often one can see small and medium-sized farms, which show relatively high values of sustainability compared to large and large farms, while the latter results fluctuate in different extremes and which experience some difficulties in the social sphere and the field of environment. As a result of the impact of the EU's common agricultural policy, there has been some improvement in the economic viability of wine businesses. Our country is a newly admitted member for negotiations for EU accession and in the future, the economic aspect of sustainability will be strengthened, influenced by the financial assistance of the Union. Each economic condition of a branch or economic sector is determined by the political situation of the country. Receiving subsidies for the development of agriculture and in particular of the wine sector of our country requires reforms and the establishment of effective institutions working to achieve sustainable development of the sector. This determines the strong influence of the institutional pillar in the sustainability of the wine sector.

The social and economic aspects of sustainability hide more risks and weaknesses in the sector. In general, there is a polarization of producers in terms of their resilience indices. The number of small vineyards predominates. Their size is increasing very slowly due to the high investment costs for creating new vineyards, which are required by farmers. The slow turnover of capital invested in this type of activity, the high risk of natural factors, deter farmers from growing the size of the managed vineyards. This leads to lower mechanization of production, which determines its higher labor intensity and poorer working conditions. All these factors determine for the farmer a lower standard of living as well as lower job satisfaction. The relatively high assessment of sustainability on the "environmental" pillar determines the good ecological condition of the wine sector, which is largely due to the unsatisfactory mechanization of work processes and the lower load of chemical plantations. The lower technological level of production leads to a smaller size of production areas and the use of more manual labor, where there are problems in terms of pay and age and qualification levels.

Productivity, environmental friendliness, economic viability and social responsibility, considered in their unity, are the basis of the concept of sustainability in the wine sector. The pursuit of sustainable development of the sector requires the achievement of compromises regarding the priorities in the implementation of one or another of the components of sustainability. The complex nature of each of the elements of sustainability and their different content, according to the hierarchical level at which they are considered, determine the different degree of their interdependence.

Overall assessment of the sustainability of holdings by size of holdings

The overall assessment of the sustainability of the surveyed farms according to their size comes to show how the individual units are presented in terms of sustainability in its holistic whole and what differences exist between the individual groups. The farms in this analysis are divided into four groups: small, medium, large and large. Small farms are defined as those cultivating up to 10 decares of vineyards, medium farms cover farms between 11 - 100 decares, large ones from 101 - 500 decares, while large farms are qualified as those with more than 501 decares. vineyards. The chosen qualification fully corresponds to the real economic structure in the country,

The holdings in the separate groups covered by the survey are not the same number, as the group of large farms with 25 subjects is the most numerous, and the group of small farms is the smallest, with only 6. Nevertheless, the study can claim to be representative, covering most of the observed and disseminated specifics and characteristics found in individual groups of farms. Although small farms are the most common fraction in the structure of production units in the country, they are relatively homogeneous, show slight differences between them, share almost the same practices and market behavior, so that even with a small number of surveyed sites, specific and typical features are established. For the other groups,

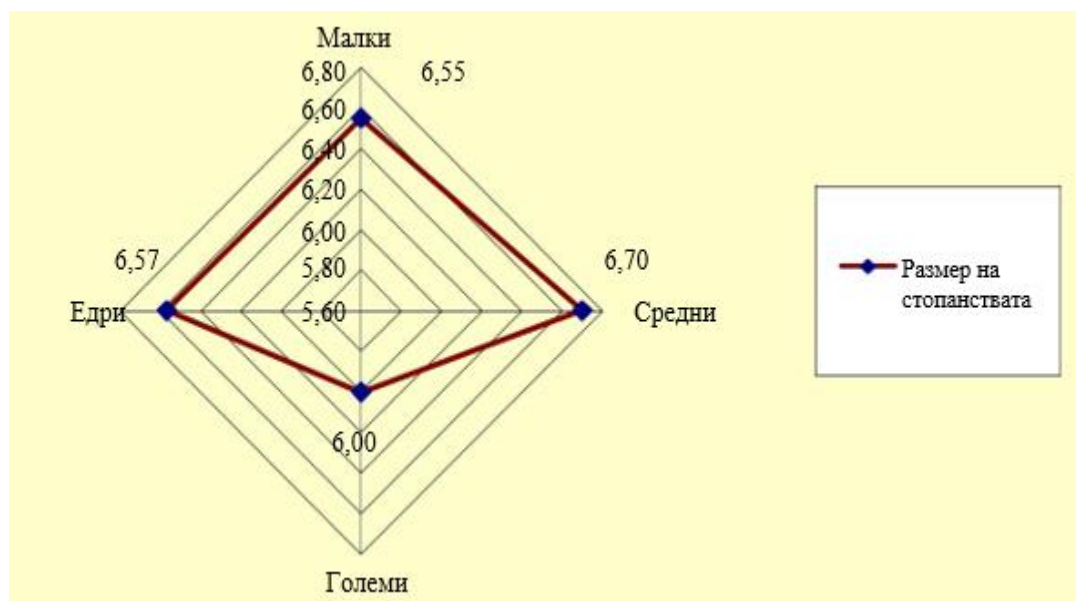


Figure 5. Overall assessment of the sustainability of farms according to their size. Source: Field research 2018-2019.

The diagram in fig. 5 shows that significant differences between the different groups of holdings are not observed, as with the exception of the large holdings, the other groups have close sustainability assessments. Small, medium and large farms maintain the stability of their production systems in a stable state with values from 6.55 to 6.70, respectively. For these farms, sustainability can be considered stable, but these are average values, and there are also farms that have lower performance scores. In these three groups, the sustainability score is higher than the average resistance calculated for all farms of 6.37, which indicates their higher sustainability compared to the average. Only in the group of large farms, the overall sustainability assessment is 6,

According to the calculated estimates for the overall sustainability of the holdings, it is clear that the large holdings have the lowest score, which stands out against the background of the relatively higher scores obtained in the other groups. This is explained by the great diversity of the farms covered by this group, which play a significant role in the sector. These farms are one of the largest producers and suppliers of grapes for wine production and the lower assessment of sustainability raises some concerns. However, despite the fact that these values are lower than in the other groups, as well as the average values of SIt, the sustainability in these farms is quite favorable and is not at risk, although it is far from the excellent values. Large farms show low values of sustainability assessments in relation to the economic and social pillar, which is due to their weaknesses in terms of economic indicators and especially social ones. These farms have problems in finding channels for the sale of products, as well as show weaknesses in financial indicators for efficiency and profitability. Many of these farms do not have their own processing plants and wine cellars, which would enable them to obtain a better and more favorable price for the grapes produced. These farms, which are relatively large wine-growing units, have in recent years begun to gradually improve the age structure of the vineyards with the planting of new plantations,

B at the same time, the creation of new plantations, leading to an increase in the assessment of these holdings in terms of environmental indicators, causes a decrease in the levels measuring the economic and financial performance of the holdings and the results concerning the economic pillar move and fluctuate at lower levels. This is due to the fact that in the first few years of the creation of a new plantation, harvesting of vineyards is not carried out, they are not fruitful, which leads to a lack of production and economic income and revenue. Another feature that is mainly

found in large farms, but is also observed in large farms is the use of credit lines and borrowed capital, which leads to greater indebtedness of these production entities and very often the cost of borrowed capital is higher than the resulting return. This is also one of the main factors that explains the lower performance of large farms in calculating SIt. Medium and large holdings receive the highest measurements of an overall sustainability assessment, due to better indicators relating to institutional indicators, as well as key indicators and sub-indicators in the field of environment and economic performance. They have well-qualified and trained staff and specialists, maintain a stable and successful marketing system for the sale of products and achieve good ratios related to indicators of economic return, efficiency, indebtedness, profitability, etc. The large wine production units pursue a clear and promising policy in the field of creating new plantations and maintaining a favorable balance of vineyards according to their age structure, which contributes to their higher assessment of environmental indicators.

Small farms, despite having comparable to other groups low assessments of sustainability in terms of environmental indicators and to some extent in the institutional pillar, manage to show very good results in certain indicators. They achieve one of the highest incomes as well as the lowest cost levels for the grapes produced. This is due to the good care and the strong interest and motivation of these farmers to take care of their crops and to optimize cost levels. They can achieve this because the areas they serve are relatively small, rely predominantly on their own labor in the care of vineyards and carry out in a better way the phytosanitary and technological measures for the maintenance of these plantations.

Table 10. Mean values and variance of the overall assessment of sustainability by size of holdings

assessments	knows	Average value of the assessment for sustainability	Absolute value of the dispersion the average	Relative value of the dispersion
Medium complete sustainability dispersion				
Small farms		6.55	00.10	1%
Medium farms		6.70	00.25	3%
Large farms		6.00	0.45	7%
Large farms		6.57	00.12	1%
Average value		6.45		

Source: Field research under the ASVTWI project - 2008 - 2012

Table 10 shows that the average value of the size stability estimate is 6.45, which slightly exceeds the overall SIt stability estimate due to the unweighted calculation method. At the same time, the absolute value of the variance from this average ranges from 0.10 in small farms to 0.45 in large farms. In relative terms, the variance varies from 1% for small farms to 7% for large farms, which shows that there are no significant deviations and approximately all farms show a homogeneous distribution and sustainability estimates are quite comparable. A variance of up to 15% is considered to be a distribution that is quite homogeneous and homogeneous and in which the individual values are close and no stratification exists.

The variance in large farms significantly exceeds the deviations in the other groups of farms, as the measured average score in these farms is the only average sustainability score, which is below the average calculated score of the farms. The average sustainability score for large and small farms is quite identical to 6.57 and 6.55, which shows the lack of differences between these types of farms given the holistic resilience. Small farms show very good results in the field of economic indicators, while large farms reveal their comparative advantages in the field of institutional and environmental indicators. Small farms rely exclusively on direct sales of the wine produced on their farms from their own vineyards, as the prices for the sale of this wine are very good. They have limited wine production, which they manage to sell on the direct market, and by adding good productivity and minimizing costs, these good results are achieved in terms of economic indicators. The measured average overall SIt sustainability score of 6.45 for holdings grouped by size allows to conclude that the resilience and flexibility of the system is favorably balanced, the holdings manage to maintain and balance the critical sustainability parameters, such as low relative variance values confirm the absence of significant differences between the groups. which they manage to realize on the direct market and by adding to that the good productivity and minimization of the costs, these good results are achieved in terms of economic indicators. The measured average overall SIt sustainability score of 6.45 for holdings grouped by size allows to conclude that the resilience and flexibility of the system is favorably balanced, the holdings manage to maintain and balance the critical sustainability parameters, such as low relative variance values confirm the absence of significant differences between the groups. which they manage to realize on the direct market and by adding to that the good productivity and minimization of the costs, these good results are achieved in terms of economic indicators. The measured average overall SIt sustainability score of 6.45 for holdings grouped by size allows to conclude that the resilience and flexibility of the system is favorably balanced, the holdings manage to maintain and balance the critical sustainability parameters, such as low relative variance values confirm the absence of significant differences between the groups.

Overall assessment of the sustainability of farms by legal statute

The overall assessment of the sustainability of the surveyed farms by legal status, similar to the assessment of sustainability by size, shows the differences that are observed between different forms of management and organization of production units. In the study, the legal form of farms is divided and divided into five groups, which generally and fully cover the common legal structures, both regulated in the legislative environment and in real, practical life.

In the study, farms are divided into five types of farms - individuals, sole proprietors, limited liability companies, joint stock companies and cooperatives. There are other admissible legal entities in our legislation, which are not found and covered in the study itself, which at the same time are not so common and are not widespread.

The analysis of farms by legal status comes to emphasize how the individual legal and organizational forms deal with the issues underlying the formulation of sustainability. The main assumption is that farms that have professional management and organizational structure with a full staff of technical, agronomic, economic staff and where a development program is followed, the overall sustainability index is higher. In small farms, owned and most often managed by individuals, the values for the overall sustainability assessment may not be very high, due to the limitations that these farms experience, both in finding finance for the creation of new plantations and in the functioning of farms relevant to institutional and economic indicators. Hypothesis,

C the study of the results of the individual legal forms with regard to the overall assessment of sustainability, certain conclusions can be made as to which forms prove to be more

appropriate and appropriate and which are more endangered and vulnerable. The relationship between the legal form and the results not only in terms of measuring sustainability, but also in other indicators related to the environmental, economic and social performance of production units, is ambiguous and proven.

Certain legal forms are a sign of certain characteristics that business units possess, which characteristics relate to both size and technology, management tools and capabilities. All these signs are reflected, both directly, for example in the implementation of agro-technical measures, and indirectly, for example in the monitoring of indicators of institutional sustainability. A joint stock company that has more capital is much more likely to build a better management structure and perform better in terms of working with control and other institutions than, for example, a sole trader or an individual. At the same time, the large capital that joint stock companies usually hold contributes to better access to European and national funds,

The other advantages that very often AD and OOD, as well as cooperatives can have is the access to external financing, to get a lower price credit lines, which is indirectly reflected in the indicators measuring the sustainability of the economic pillar.

In FIG. 6 shows the distribution of the calculated overall assessment of the sustainability of SIIt of the holdings by legal status. The assessments of the five legal forms covered range from 5.85 for cooperatives to 6.63 for Limited Liability Companies. The other legal entities are located between these two poles, and with the exception of the sole traders, the other companies gravitate around similar values. According to the qualitative assessment, which is adopted for the interpretation of the obtained quantitative assessment, ET and Cooperatives have values closer to 6 than to 7, which allows us to conclude that the sustainability and flexibility of production systems is favorably balanced. In the case of natural persons AD and in the case of limited liability companies, the sustainability and flexibility of economic entities must be perceived as stable.

Limited liability companies show and receive the highest overall sustainability rating of 6.63, which comes to show that from an organizational point of view, these are the most suitable and sustainable production units. The Ltd. covered in the study belong to groups of different sizes, the predominant part being large agricultural holdings, as in some of them the individual measured assessment of sustainability reaches 7.79, which is the highest obtained individual value of SIIt. The individual survey of the farms shows that the combination of large and organized farms, such as Ltd. leads to the highest values of sustainability.

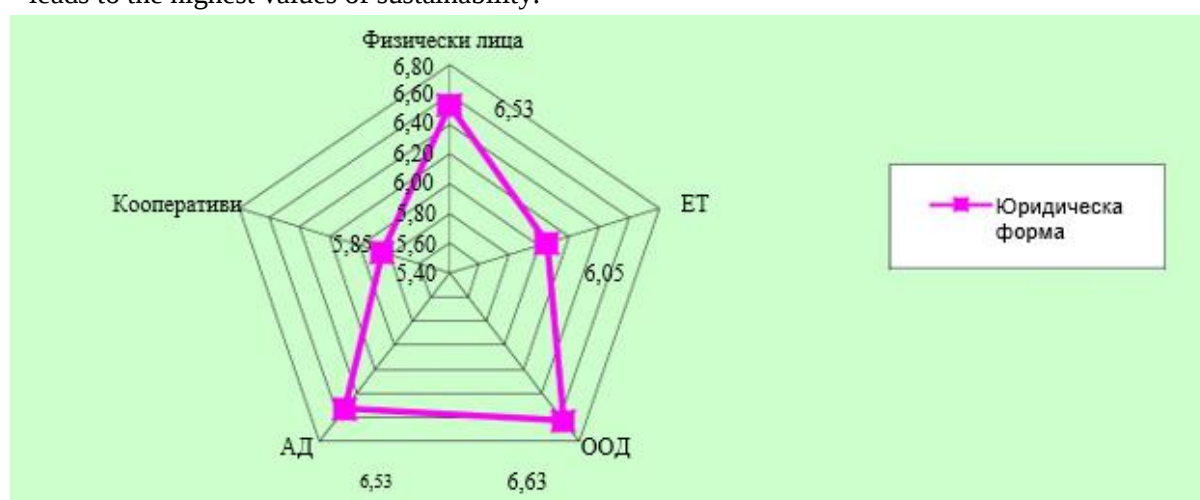


Figure 6. Overall assessment of the sustainability of farms in legal form. Source: Field research: 2018-2019.

Naturally, the reason for the observed high values of sustainability in these production entities is not only the size but also the form in which they are organized. On the other hand, there is a clear relationship between size and shape, with the largest farms in the study being Limited Liability Companies. Another interesting fact is that Ltd., which belong to the group of large and medium-sized farms show a relatively low overall assessment of sustainability, which falls to 5.05 at which levels, sustainability is already falling to moderately balanced, which is a pre-risk level of sustainability.

The other legal form, which, like Ltd., shows relatively high values of SI are the Joint Stock Companies. AD are a common form, especially among large and large production units, and in the study it is the combination of large farms organized as AD that gives the highest individual values of overall sustainability. This is the significant difference between OOD and AD, as in AD, the farms belonging to the group of large farms show a lower assessment of sustainability than large farms.

It is interesting for AD that according to the institutional pillar, AD, especially in the group of large farms, achieve lower average values of sustainability, which also affects SI. These farms are prone to problems arising from the distribution and settlement of property rights, and you can see companies where there is a large group of minority owners who hold a large share in the capital of companies.

This is generally considered to be a weakness and a risk to the sustainable functioning of the system. Under the other pillars, JSCs have some comparative advantages in the area of the economic pillar, compared to the other forms, which is especially true for those belonging to the large farms. This is especially due to the better individual indicators taking into account the finding and staffing, financial indicators, marketing opportunities for sales.

C The lowest overall assessment of sustainability is characterized by cooperative structures in which the problems are heterogeneous, with respect to the social pillar, very low individual values are observed. These farms lag significantly behind the average wages, especially the seasonally employed, are quite isolated and almost do not resort to foreign experts and technical assistance, they are often dominated by workers of retirement age. In terms of economic and environmental indicators, cooperatives also lag significantly behind other legal organizations, as the financial results, as well as all results related to marketing, sales, yield and unit costs are quite aggravated.

Table 11. Average values and variance of the overall assessment of sustainability by legal status of holdings

Medium assessments of complete sustainability-dispersion	it h n d	Average value of the assessment for sustainability	Absolute value of the dispersion the average	Relative value of the dispersion
Individuals		6.53	0.21	3%
Sole traders		6.05	0.27	-4%
Ltd.		6.63	0.31	4%
Joint stock companies		6.53	0.21	3%
Cooperation		5.85	-0.47	-8%

Average value	6.31		
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Source: Field research 2018-2019.

IN Table 11 shows that the variance of individual legal entities from the average value is relatively low, but also exceeds in absolute and relative value, the measured variance of the grouping of production units by size. The average SIt value of holdings divided according to their legal status is 6.31, which is lower than the average by size division and at the same time lower than the average value of the overall sustainability assessment of 6.37. Here, as mentioned, the average value of the overall stability of the cooperative form, in which the deviation from the average is 0.47, is impressive. This deviation represents an 8% difference from the average value of the whole group, which reveals the significant problems of the cooperatives operating in the wine sub-sector.

Although this variance is the highest measured in this division, the deviation shown is far from the critical values, which start at 15% and do not give grounds to draw conclusions about serious discrepancies and contrasts regarding the sustainability of cooperatives. The range of variance between the highest positive and negative values, respectively observed in OOD, measured at levels of 0.31 and in cooperatives, of 0.47, represents a deviation of 12%, which also shows that no dichotomous differences are observed. In the case of sole proprietorships and cooperatives, the values of the holdings belonging to them are below the average measured assessment for all legal forms, while the other three types of holdings - individuals, Ltd. and joint stock companies have assessments that are above the average for the whole population.

The relatively homogeneous distribution of the holdings around the average shows that the individual forms more or less do not differ significantly from each other in their state measuring stability. The legal form cannot be considered as a factor that determines the level of stability in this production, while at the same time that there is a certain regularity and certain groups of legal forms show lower results than the average values. This is evidence of some structural and organizational problems that, albeit to a small extent, affect their holistic resilience.

Prospects for the development of Macedonian viticulture and winemaking

The main directions in the development of the sector in our country are related at least until the end of 2019 to the current in the country National Program for support of the wine sector. The SWOT analysis (Fig. 7) shows that there is potential for development in the sector, but it is related to its operation in a highly competitive environment. There is a tendency to increase the consumption of wine worldwide. The traditions of our country in the production of wines from local and introduced varieties is one of the strongest advantages of the sector this aspect. Favorable agro-climatic conditions resulting from the territorial location of the country are also a strong point for the sector. A certain threat, but at the same time an advantage can be considered the membership of our country in the EU. The reform of the wine sector coincided with our accession to the Community. This fact has both positive and negative aspects. Countries such as Greece, Spain, France, Italy are developing the wine sector in terms of clear rules and regulations to which our country has yet to adapt. On the one hand, this is a serious challenge, but on the other hand it puts the sector in conditions that stimulate its competitiveness.

Only by building a modern structure of the sub-sector can the influence on the market be increased, the roles can be specified and the efficient use of resources can be ensured. Northern Macedonia has a small share of the total area planted with vines worldwide. Therefore, given the lack of funds and the general economic situation in the country, the ban on planting in force in the EU until 2010, and the high probability that this policy will be maintained, the guidelines for the development of the sector are mainly in improving the condition and varietal structure of vines.

plantations without significantly increasing their area. This would significantly improve the economic efficiency and profitability of the operation of vineyards.

Only wines with guaranteed quality control have a chance to be sold on international markets. Our country has varieties that have their own specifics and originality and would have a good reception both in the old markets and in new attractive destinations. It is necessary to rely not on large quantities and batches, which are not high in price, but on the contrary - efforts should be focused on the production of quality wines with a Protected Geographical Indication and a Protected Indication of Origin. The introduction of quality management systems through the implementation of a stimulating state policy is mandatory.

Internally, industry control and professional ethics, along with strict adherence to the rules of fair competition, must be activated in the short term to improve the image of the industry. Ensuring fair competition is done by protecting all indications of the strictly defined nature of grape and wine products and indicating the origin of certain table wines, and in particular quality wines produced in certain regions.

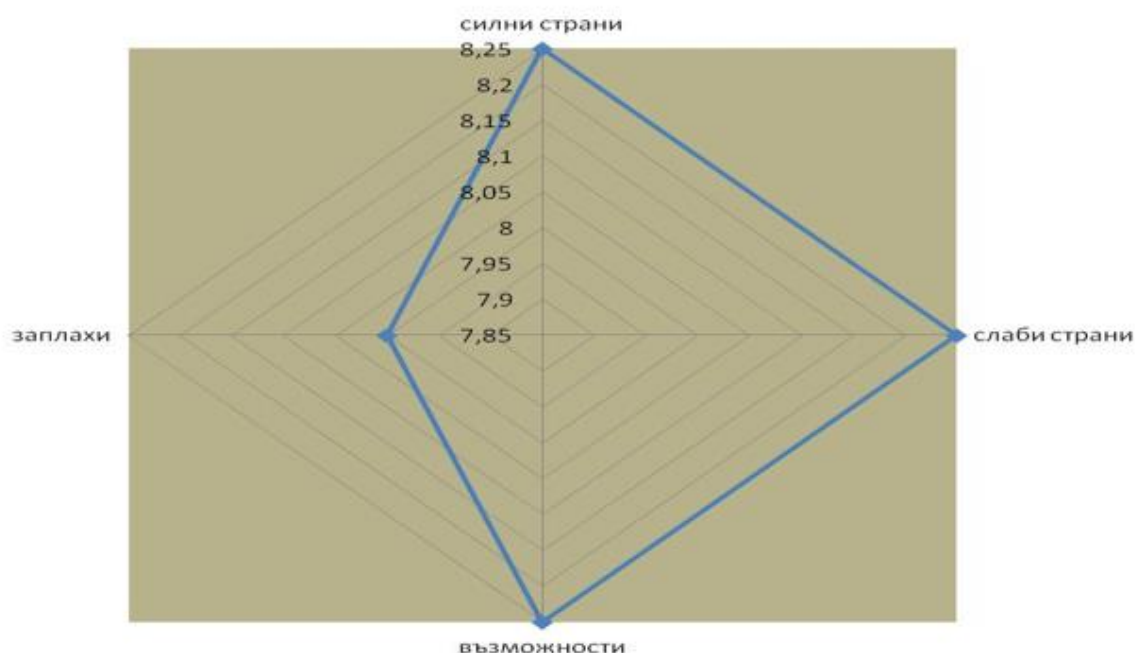


Figure 7. SWOT - analysis of the wine sector. Source: own.

It is clear that the Macedonian wine industry is currently producing its highest quality wines in 20 years. This fact alone is not enough to attract the consumer's attention.

C In view of the successful development of the sector over the next decade, Northern Macedonia must adapt to the tastes of its customers, meet the needs of its target markets and not be guided by its production. Northern Macedonia cannot expect people to find the new and improved face of its wine industry - there is too much competition for the consumer's attention, his time, his portfolio and the shelf position.

Macedonian wine needs a lot of participation in various wine forums and exhibitions, to win medals in international competitions, so that potential buyers can feel that something is happening and there is development. In this regard, clearer cooperation is needed between the Macedonian Wine Board established in 2010 and the National Viticulture Branch Organization. This cooperation is likely to lead to the adoption of an updated and harmonized with the new European regulations in the sector Wine Act.

The more important goal to be achieved in the industry is to develop an adequate and effective marketing strategy for Macedonian wine. This strategy must include local varieties, which, as already mentioned, have their worthy place on the local and international market.

Another important goal on the agenda is the inclusion of our country in international organizations that have their own weight and international role. The first steps in this regard were made this year, when our country took part in a congress of the OIV / International Organization of Vine and Wine /.

Table 12. Strengths and weaknesses, opportunities and threats for the development of the wine sector. Source: Own.

Силни страни	Слаби страни	Възможности	Заплахи
Наличие на традиции в лозарството и винарството. Благоприятни почвено-климатични условия за развитие на лозовата култура.	Влошена възрастова структура на насажденията	Здравословен аспект при умерената консумация на вино	Глобализация на световния пазар на виното. Силен конкурентен натиск.
Наличие на подходяща сортова структура	Недостатъчно ниво на иновации	Членство в ЕС	Членство в ЕС, наличие на ограничение за права за засаждане.
Актуализиран закон за виното и спиртните напитки	Недостатъчно ниво на финансиране на лозарството и винарството	Устояване на позициите на вече съществуващите пазари, завземане на позиции на нови пазари	Промени в климата и околната среда.
Високо квалифицирани експерти	Липса на пазарна ориентираност на произвежданите вина	Активна маркетингова стратегия за македонското вино.	Липса на координация между лозарството и винарството

Our country is not a member of the Association of European Vine Regions / AREV /. Due to the constant organizational obstacles to the possible real membership, the organization agreed, with some compromise with their internal documents, to the National Viticulture Branch Organization to become an observer member, namely to maintain open relations with Northern Macedonia. Unfortunately, eight years proved to be an insufficient time to join any of the Macedonian regions. Romania, meanwhile, has prepared and joined five of its regions and has twice hosted a session of the association.

CONCLUSION AND SUMMARY

Viticulture and wine production are strategically important for our country sub-sectors of agriculture and food industry. The centuries-old traditions deeply connected with the way of life and

culture of the Macedonian population, the appropriate soil and climatic conditions for growing vines, the scientific achievements implemented in practice and last but not least the protectionist state policy are the main preconditions for establishing our country as a typical wine country. in the international aspect. Currently, the development of the wine sector is related to solving some major problems that have arisen as a result of the reforms carried out during the transition to a market economy, namely the reduced area of vineyards, deteriorating age and varietal structure, lack of quality raw materials for production. of wine,

At present, the adverse effects on the global economy resulting from the onset of the global health and economic crisis are also affecting the development of the wine sector worldwide. Preliminary analyzes by the International Organization of Vine and Wine show a decline in wine consumption, with a projected decrease compared to 2017 could reach 2 million hl. The decrease is mainly due to the continuing downward trend in wine consumption within the EU-27. However, OIV experts note that the impact of the global economic crisis on consumer demand is different for different market segments, with the most significant decline in the consumption of wines from high price niches.

The analysis of the state of the wine sector in northern Macedonia outlines a number of problems that hinder the effective integration along the chain "production of raw materials - processing". The still unresolved issues related to the small size and fragmented ownership of the vineyards, the deteriorating age and irrational varietal structure of the plantations are largely at the root of the lack of quality raw material for processing. This, in turn, leads to unsatisfactory quality of the wine produced and, accordingly, its realization in the low price market segments. The ongoing processes of globalization in the world economy and in particular in the wine markets, leading to intensified competition,

IV. Publications

Списък на публикациите на Мария Саша Дукоска													
Nr	Title	Publication date	Place	Autors	Journal	ISSN	Volume	Issue	Pages	URL	Points Authors	Points/Authors	
1	"Geopolitical Doctrine of the Russian Federation"	2014	Skopje, R. North Macedonia	Marija Dukoska & Sasha Dukoski	Macedonian political science journal, e-Process	ISSN 1857-9167	2	1	98-106	https://cdca9488-1ffa-4eda-8850-daaca575e894.filesusr.com/ugd/36d9a1_6e577ff1d82a425f9b0bba0694949e73a.pdf	10	2	5
2	"Freedom of conscience and religion in the Republic of Macedonia with special reference to religious communities and religious groups - Dervish orders"	2015	Skopje, R. North Macedonia	Marija Dukoska & Sasha Dukoski	Macedonian political science journal, e-Process	ISSN 1857-9167	4	1	41-55	https://cdca9488-1ffa-4eda-8850-daaca575e894.filesusr.com/ugd/36d9a1_89908aed5502492e95e84fe61100599a.pdf	10	2	5
3	"Civil law in the medieval Macedonian state"	2016	Skopje, R. North Macedonia	Marija Dukoska & Sasha Dukoski	Macedonian political science journal, e-Proceeding of papers	ISSN 1785-6812	6	1	260-270	https://cdca9488-1ffa-4eda-8850-daaca575e894.filesusr.com/ugd/36d9a1_c35256cd7c46449e8b72a372a036d08.pdf	10	2	5
4	"Binding arbitration clause in consumers agreements"	2016	Bansko, R. Bulgaria	Marija Dukoska, Sasha Dukoski & Marija Veljanova	International Journal scientific papers vol.12.2, 8-th International Scientific conference Knowledge – capital of the future, Bansko – Bulgaria 8-10 april 2016	ISSN 1857-92	12.2	1	104-106	https://www.ikm.mk/12.2.pdf	10	3	3.3333333
5	"Principles of the international agreements on investments"	2018	Bitola, R. North Macedonia	Marija Dukoska & Sasha Dukoski	Conference proceedings, volume II, International scientific conference "TOWARDS A BETTER FUTURE: THE RULE OF LAW, DEMOCRACY AND POLYCENTRIC DEVELOPMENT"	ISBN 978-608-4670-01-8(V.2)	2	1	145-151	http://pik.uklo.edu.mk/portal/upload/fajlovi/conference_proceedings_vol2.pdf	10	2	5
6	"Legal framework of the rules on the electricity market in the European Union"	2018	Bitola, R. North Macedonia	Sasha Dukoski, Svetlana Veljanoska & Marija Dukoska	Conference proceedings, volume II, International Scientific Conference "Security, Political and Legal Challenges of the Modern World"	ISBN 978-9999-870-79-8	2	1	112-118	http://transcrip.pravo.unizg.hr/wp-content/uploads/2019/01/22_Agenda-Bitola-2018.pdf	10	3	3.3333333
7	"Comparative overview of the regulation of concentrations in the United States-European Union –Republic of Macedonia"	2018	Bitola, R. North Macedonia	Sasha Dukoski, Svetlana Veljanoska & Marija Dukoska	University "St. Kliment Ohridski" Bitola, HORIZONS INTERNATIONAL SCIENTIFIC JOURNAL, Series A, Social Sciences and Humanities, Volume 22	ISSN 1857-9884	22	1	175-185	http://uklo.edu.mk/filemanager/HORIZONT%202018/Serija%20A/koncentracii%20rud%20p15.pdf	10	3	3.3333333
8	"Conditions for the validity of agreements"	2019	Bitola, R. North Macedonia	Sasha Dukoski, Svetlana Veljanoska & Marija Dukoska	Conference proceedings, volume II, International scientific conference "TOWARDS A BETTER FUTURE: DEMOCRACY, EU INTEGRATION AND CRIMINAL JUSTICE"	ISBN 978-608-4670-05-6 (V.2)	2	1	171-176	http://eprints.uklo.edu.mk/1864/	10	3	3.3333333
9	"Regulation and management of market concentrations in the United States – European Union"	2019	Belgrade, R. Serbia	Marija Dukoska	INTERNATIONAL Scientific Conference Employment, education and entrepreneurship (8-9.2019; Beograd) Republic of Serbia	ISSN 978-86-6069-173-8	8	1	336-340	http://www.eee-conference.com_img/arhiva/2019/a2019_sa_naslovnom.pdf	10	1	10
10												43.3333333	

V. Contribution

The following contribution moments of scientific and applied nature can be highlighted in the dissertation:

1. The essence of sustainable development and the sustainability of agriculture, as well as in particular viticulture, has been clarified;
2. A conceptual framework has been developed to assess the main factors determining the sustainable development of viticulture in Northern Macedonia;
3. The orality of the wine sector by its separate components (pillars) is analyzed and evaluated;
4. The needs of the vineyards regarding their sustainable development in the future have been identified;
5. The opportunities for sustainable development of the sector in the future have been identified