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MARKETING AND INNOVATION IN THE ROMANIAN WINE MARKET

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Abstract

The present research is focused on the link between entrepreneurship and rural economic growth in the direction and intensity of the net influence of farmers' entrepreneurial activities on rural economic development in Romania. This research delves into land use for grape production, a key element in Romania's wine processing industry. It examines the dynamics between consumption, production, and import in the wine market, noting in particular the increase in imports after Romania accedes to the European Union. In addition, it considers the impact of viticulture on land use amid food competition concerns. The study aims to elucidate the relationships between wine production, import, and consumption and assesses the capacity of domestic production to meet consumption demands. Using regression analysis of data on wine consumption, production, and import, the research uncovers significant findings. It reveals that a one-unit increase in wine consumption correlates with a 0.13-unit increase in both wine production and imports. This study contributes to a deeper understanding of the interaction between wine consumption, production, and import, helping predictive modeling and identifying sustainable entrepreneurial paths in the grape processing sector in Romania, given the considerable wine production potential.

Key words**:** *entrepreneurship, wine industries, products, Romania*

INTRODUCTION

As economic development enters the new normal, Romania is in a crucial period of transition from a largely agricultural country to a strong agricultural country. However, changes in the global economic landscape, the emergence of the new technological revolution, Covid-19, and the war in Ukraine, have had a huge impact on agricultural production and rural socio-economic development due to the severe employment situation from the countryside and market disruptions caused to farmers.

For this reason, the inferior position of agricultural and rural development gradually became prominent. In particular, the shortage of leading agricultural management experience, the insufficient side effects of agricultural industrialization, and the insufficient power of traditional agricultural transformation are becoming more and more complicated.

Romania is one of the main producers of wine grapes in the EU27. As Eurostat reports show, Italy, France, Spain, Germany, Portugal and Romania are the main European producers of grapes and wine grapes, as well as suppliers to the global market. This ranking has not changed since 2013. Italy, Spain, and France accounted for 78% of European grape production. interdependencies and dynamics of these markets comprehensively. This research aims to explore the intricate relationships between the grape and wine markets of five countries: Romania, Bulgaria, Hungary, Moldova, and Serbia. These nations share a significant interconnectedness in their market dynamics, with changes in one country profoundly impacting the others and reverberating throughout the global grape and wine market. Therefore, it becomes imperative to conduct a thorough investigation into these interdependencies [6, 11].

According to official data published by NIS in Romania [14], in rural areas the employment

rate was 63.1 in 2020 (compared to the EU-27 average of 68.1) and in the case of young people (20-24 years old)) the occupancy rate is 50.3% (compared to the average of 53.6%). In addition, agricultural GDP accounted for only 4% of the country's total economic output in 2021, while labor productivity in agriculture was only a quarter of labor productivity in industry + construction and services.

Therefore, issues related to agriculture, rural areas, and rural people, represent the crucial foundation in Romania, there is an urgent need to look for new driving forces to support the high-quality development of agriculture, to promote sustained economic growth and stability in rural areas.

The Romanian wine industry plays a key role not only in the world market but also in the national economy. The interplay between the food industry, including grape production underscores the diversity and complexity of Romania's agricultural sector. Moreover, it emphasizes the interconnectedness of various sub-sectors within the broader food industry. Policies and strategies aimed at supporting and enhancing these sectors can have far-reaching implications for the overall economic growth and sustainability of Romania. Additionally, fostering innovation, improving efficiency, and promoting sustainability practices within these industries can further bolster their contributions to the economy while ensuring their long-term viability.

In Romania, the beer processing industry will generate, in 2022, 26.1% of the number of products obtained by the food industry, followed by wheat flour processing at 22% and only 12.6% goes to meat processing. Wines for consumption represented 5.9% of the total amount of food industry production in Romania [14].

The pandemic and the war in Ukraine have not left their mark on the sector and therefore increased productivity levels have been recorded. This situation can be traced through the increase in the number of both processing units and employees, while the value of production remained the same.

The results are consistent with those found in agriculture, where grape growing was not affected by the pandemic and the war in Ukraine, financial crises that have seriously affected other categories of farmers, traders, and seed processors through lower liquidity and increased financing costs. In 2021, a Romanian drank 2.6 liters more wine compared to 2020, reaching an average of 23.7 liters according to NIS data [14].

The work aims to evaluate the wine market and analyze the manifestations of producers and consumers of wine products in Romania in the last 15 years.

MATERIALS AND METHODS

In terms of research methodology, given that innovation and entrepreneurship are closely related in both temporal and spatial dimensions, it is necessary to consider spatial influencing factors. However, the existing studies do not overcome the spatial barrier and conduct a deep analysis of the effects of rural entrepreneurship in the surrounding areas, which may lead to an incorrect estimation error to some extent. Based on this perspective, this paper seeks to investigate the possible influences of rural entrepreneurship on agriculture and rural economic growth from an innovation-based perspective.

By sorting through the existing literature, this research provides three main contributions: first, this paper considered innovation and entrepreneurship in the unified analysis framework and tried to build a comprehensive indicator to identify the capacity of rural innovative entrepreneurship on "Schumpeter's theory of innovation". Second, this paper empirically discussed the relationship between rural innovation, entrepreneurial capacity, and rural economic performance based on a spatial methodological framework at the provincial level, at the same time the factors of geographic location, and economic attributes were considered in the model, market, and level of urbanization. Also, this paper deeply investigated the problem of heterogeneity in the heterogeneity of wine-growing areas, including grape-producing areas, consuming areas, production areas, and

trade balance providing a new perspective for related research.

In analyzing the relationship between consumption and domestic production using a linear regression model, the goal is to identify the parameters that characterize the dependency between these variables. In this context, consumption represents the dependent variable (y), while domestic production serves as the independent or explanatory variable (x).

The linear regression model aims to establish a linear relationship between the independent variable (domestic production) and the dependent variable (consumption). The model can be expressed mathematically as:

$y=\beta_0 +\beta_1 x+\varepsilon$

Where:

y represents the dependent variable (consumption).

x represents the independent variable (domestic production).

$\beta_0$is the intercept, which represents the value of y when x is zero.

β_1 is the slope coefficient, which indicates the change in y for a unit change in x.

ε represents the error term, which captures the difference between the observed and predicted values of y.

The goal of regression analysis is to estimate the coefficients β_0 and β_1 that best fit the observed data. This is typically done using a method such as ordinary least squares (OLS), which minimizes the sum of the squared differences between the observed and predicted values of y.

Once the regression model is estimated, it can be used to make predictions about consumption based on the level of domestic production. Additionally, statistical tests can be performed to assess the significance of the estimated coefficients and the overall fit of the model.

By analyzing the quantitative relationships between consumption and domestic production using a linear regression model, researchers can gain insights into the dependency between these variables and make informed decisions regarding policy, planning, and resource allocation in the context of the food industry.

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This hypothesis suggests that the research seeks to investigate whether the level of domestic production is sufficient to meet the consumption demands. It aims to explore the relationship between consumption and both domestic production and imports separately to understand the extent to which domestic production contributes to meeting consumption needs compared to imported goods.

The paper investigates the grape wine market with a focused examination of its key components: supply and demand. In the context of food supply, the research considers factors such as land use and the agricultural area available for grape cultivation, as well as the quantities and yields obtained from these lands. However, it acknowledges that food products, including grapes for winemaking, are part of the global market, where local supply is influenced by various components of the trade balance, including production, stocks, demand, imports, and exports.

Specifically, the supply analysis in this paper aims to closely monitor two primary factors: production and imports. By scrutinizing these elements, the research seeks to gain insights into the dynamics of the grape wine market, particularly in terms of how local production and imports contribute to meeting the demand for wine. Understanding the interplay between production and importation is essential for assessing the sufficiency of domestic supply, identifying potential gaps, and gauging the market's responsiveness to changes in demand.

Through this supply analysis, the paper aims to provide a comprehensive view of the grape wine market, shedding light on the factors driving supply dynamics and their implications for market stability, competitiveness, and sustainability. By examining production and import trends, the research contributes to a deeper understanding

of the market forces shaping the grape wine industry, thereby informing strategic decision-making and policy formulation within this sector. [11] likely refers to a source providing insights into consumer preferences and behavior regarding purchasing decisions. According to this source, quality emerges as the most critical factor influencing consumer choices, with 96% of European consumers prioritizing it over other determinants. Following quality, price ranks as the second most significant determinant, with 91% of consumers considering it important, while environmental impact is also a significant factor, with 84% of consumers taking it into account when making purchasing decisions.

In the context of the research, the demand analysis employs a quantitative approach to monitor both consumption and exports, which are identified as the main destinations for the products. Consumption patterns vary across geographical regions and countries due to diverse economic, social, and cultural factors. Additionally, factors such as population diets and the availability of food influence food consumption trends.

By examining consumption and export trends, the research aims to gain a comprehensive understanding of the demand side of the grape wine market. This analysis allows researchers to identify patterns, trends, and factors driving consumer behavior and market dynamics. Understanding consumer preferences and behaviors is crucial for businesses and policymakers in developing effective marketing strategies, product innovations, and trade policies to meet consumer demand and enhance market competitiveness.

RESULTS AND DISCUSSIONS

Indeed, the literature offers various conceptual and analytical models that aid in comprehending the intricate relationships between consumption, production, and import in the context of markets such as the grape wine industry [5]. They investigated the relationships between imports and consumption in different regions. The level and intensity of cause-effect relationships between food consumption and prices were analyzed. These analyses typically involve the use of various econometric techniques to investigate the relationships between trade (exports and imports) and consumption [1] Some prominent econometric analyses in this area include:

Gravity Models: Gravity models are widely used in international trade analysis to explain bilateral trade flows between countries. These models are based on the gravitational analogy, where trade between two countries is influenced by their economic sizes (measured by GDP), the distance between them, and other factors such as trade policies, cultural ties, and institutional arrangements. Econometric estimation of gravity models allows researchers to quantify the impact of these factors on trade flows[3].

Import Demand and Export Supply Models: These models focus on estimating the determinants of import demand and export supply for a particular country or industry. Econometric analysis of import demand models helps identify factors influencing a country's imports, such as income levels, prices, exchange rates, and domestic production. Export supply models, on the other hand, examine the determinants of a country's exports, including factors like domestic production capacity, foreign demand, and trade policies [4].

Time-Series Analysis: Time-series econometric techniques, such as vector autoregression (VAR) models, error correction models (ECM), and cointegration analysis, are used to analyze the dynamics of trade, exports, imports, and consumption over time. These models allow researchers to identify long-term relationships and short-term dynamics among these variables, as well as to assess the impact of shocks and policy changes on trade patterns [6].

Panel Data Analysis: Panel data econometrics, which combines cross-sectional and time-series data, is often employed to study trade, exports, imports, and consumption across multiple countries or regions. Panel data models, such as fixed effects, random effects, and dynamic panel models, enable researchers to control for unobserved heterogeneity and

time-varying factors, providing more robust estimates of the relationships of interest.

Structural Models: Structural econometric models, such as computable general equilibrium (CGE) models and partial equilibrium models, simulate the effects of policy changes, trade agreements, and other shocks on trade patterns, exports, imports, and consumption. These models are often used by policymakers and international organizations to assess the potential impacts of trade policies and agreements on various economic outcomes.

The importance of rural innovation and entrepreneurial capacity has received widespread attention from all sectors of society, especially the rural workforce [5].

However, we occupy the penultimate place at the European level in terms of the sustainability of entrepreneurial initiatives: more than half of the newly established companies do not manage to survive the critical period of 42 months (they close or suspend their activity). It is without a doubt that rural entrepreneurship is conducive to stimulating the enthusiasm and creativity of farmers that provide endogenous support of the power of high talents for rural revitalization and common prosperity in Romania.

Based on the knowledge of rural reality and the complex and interconnected nature of agricultural sectors, the impact of innovative entrepreneurial activities in rural areas on economic growth is elusive. From one perspective, scholars generally agree that entrepreneurship is an important means of increasing agricultural economic performance and stimulating rural economic growth with the growth of entrepreneurial activity worldwide in recent years. Innovative entrepreneurial activities contribute to the stimulation of a thriving market, which promotes the diversification of cultures and reduces their dependence on a single market, thus increasing their incomes and business models [12].

In addition, in rural areas, innovative entrepreneurs in the agricultural sector can bring new technologies and practices to improve farm productivity and efficiency, leading to increased yields and profitability. Meanwhile, the entrepreneurial activities of farmers provide new jobs both on and off the farm, which is conducive to stopping rural migration and the development of new business forms and new models, such as the digital countryside, tourism agriculture, and rural complex.

This is beneficial for strengthening rural communities and sustaining rural livelihoods. Thus, innovative farmer entrepreneurship can play a key role in improving the well-being of rural communities to a large extent. While entrepreneurial activities can contribute to economic growth and development in rural areas, it is essential to carefully consider their potential negative impacts and adopt policies and strategies that promote sustainable and inclusive rural development. This requires balancing economic objectives with social and environmental considerations, empowering local communities, and fostering resilient and diversified rural economies. For example, excessive competition in the entrepreneurial process may hurt the development of local non-established businesses and exacerbate the pressure on the local economic environment due to the condition of limited market access.

In addition, it is worth noting that agricultural entrepreneurship can present several environmental problems and social challenges, such as soil degradation, agricultural land abandonment, water pollution, resource wastage, displacement of local communities, and other social conflicts. The first five companies in the grape wine processing industry in Romania represent 90% of the total revenues from this sector.

The impact of technological innovation on economic growth

The Schumpeterian theory of endogenous growth emphasizes that technological innovation is the fundamental source of power for long-term economic growth. In recent years, the promotion effect of technological innovation on the economy has become a hot spot for researchers. Technological innovation is also conducive to the efficiency of enterprise management and factor allocation, thereby promoting economic growth.

The impact of entrepreneurship on economic growth

The entrepreneurial phenomenon first appeared in the 18th century, with the deepening of research, the connection between entrepreneurship and economic growth was gradually confirmed by many scholars. However, the views of different scholars not only have certain similarities but also have differences to this effect.

[2] also divided entrepreneurship into innovative entrepreneurship and general entrepreneurship internationally, indicating that innovative entrepreneurship has multidimensional effects such as improving economic growth and facilitating the modernization of industrial structure, while the multidimensional effects of general entrepreneurship are very limited.

These studies highlight the multifaceted nature of the relationship between entrepreneurship and economic growth, suggesting that various factors, including public spending, access to finance, and institutional quality, interact to influence the impact of entrepreneurship on overall economic performance.

Additionally, [7] argued that entrepreneurship can spur innovation and technological advancements, leading to productivity gains and long-term economic growth. By fostering competition, experimentation, and knowledge creation, entrepreneurial activities contribute to the dynamism and resilience of economies, ultimately driving innovation-led growth.

[2] also indicated that returning home to start businesses can facilitate the modulation of the rural industrial structure and the integrated development of primary, secondary, and tertiary industries. However, some research reflects that the correlation between entrepreneurship and economic expansion is negative. For example, [2] stated that the influence of entrepreneurial activities on economic growth has an obvious heterogeneity in different provinces, some regions are significantly positive, while others are the opposite. In addition, [17]'s research concluded that opportunistic entrepreneurship has a significant impact on local regional economic development, but may inhibit the economic growth of nearby regions, while demand-driven entrepreneurship has the opposite influence. The knowledge spillover effect brought about by entrepreneurial activities is also one of the important reasons for its positive impact on economic growth.

The impact of innovative entrepreneurship on ecological development

The influences of innovative farmer entrepreneurship on sustainable agriculture and rural ecological development are also important and complex. On the one hand, the innovative entrepreneurship of farmers can lead to the creation of new and sustainable agricultural practices that can mitigate the negative impact of agriculture on the environment.

The existing literature has deeply investigated the impact of innovation or entrepreneurship on economic development, laying a solid foundation for the research of this paper. First, most studies tend to investigate the impact of innovation and entrepreneurship on economic expansion from a theoretical level and take innovation and entrepreneurship as separate individuals, rarely considering them as a unitary whole. Second, the few studies that look at innovation and entrepreneurship as a unified indicator are mostly done at the macroeconomic level, without focusing on agricultural and rural economic development. Finally, only a few studies consider the spatial effect of innovation and entrepreneurship on economic development, but they are based on the traditional geographic distance matrix and do not consider the economic level, marketization, urbanization, and other factors that may affect the effect of space. Therefore, this study took innovation and entrepreneurship as a unitary whole and tried to measure its level in rural areas. Moreover, considering the spatial effect characteristics of innovation and entrepreneurship, economic geography, market matrix, and urbanization matrix were constructed to comprehensively explore their impact on regional agricultural and rural economic development from different perspectives.

The study highlights Romania's significant potential in wine grape production, indicating favorable conditions for cultivating grapes

suitable for winemaking. Moreover, it points out that Romania, along with other countries in the region, possesses sectors with high potential in various agricultural products.

The transformations of the food viticulture system and its implications on land use have been discussed by [7]. Other aspects of the influences of the production and use of secondary production as biofuels are noted in studies such as [7].

Starting from the review of specialized literature and statistical data that show the great potential of grape cultivation in Romania, we assume one of the study hypotheses:

H1: Romania possesses potential for domestic wine production.

In 2022, the number of companies working in the wine industry is 222, down from 236 in 2008. Moreover, the decline in the number of domestic wine producers has likely facilitated an increase in wine imports. This shift towards imports may have adverse effects on the Romanian economy. Importing wine from other countries could lead to a drain on foreign exchange reserves, loss of domestic market share for local producers, and reduced opportunities for employment and income generation within the domestic wine industry.

Therefore, it is reasonable to conclude that there is potential for domestic wine production to satisfy grape wine consumption in Romania. However, the decline in the number of wine-producing companies suggests a need for further examination of factors contributing to this trend, such as market dynamics, regulatory challenges, and competitive pressures. Addressing these issues could help revitalize the domestic wine industry, enhance its competitiveness, and promote economic growth and sustainability in Romania.

This is why, in this research, we test the following hypothesis:

H2: Romania may have an abundance of grapes available for winemaking, but lacks the infrastructure or capability to process these grapes into finished wine products to meet domestic demand.

As with other studies [1] Addressing the constraints in processing capacity within Romania's wine industry would require a concerted effort from various stakeholders, including government agencies, industry associations, and private sector investors. Investing in modernizing infrastructure, promoting technology transfer and innovation, streamlining regulatory processes, and supporting skills development and training initiatives could help unlock the full potential of Romania's grape supply and reduce reliance on wine imports. Additionally, fostering collaboration and partnerships between domestic producers and international counterparts could facilitate knowledge exchange and capacity building in the wine processing sector.

This leads to the need to test the following hypothesis:

H3: More significant interactions are found between wine consumption and imports compared to wine consumption and production.

Statistical data on consumption and export, as components of demand, as well as production and imports, as components of supply, are presented in Table 1.

Table 1. Trends in production, import, export, and consumption of grape wines in Romania, 2008-2022

	2008	2009	2010	2011	2012	2013	2014	2015
Production of wine for consumption (100 l)	5,369,189	4,957,315	3,287,241	4,058,168	3,310,612	5,113,232	3,749,862	3,627,609
Export	63,671,411	62,298,593	61,040,758	67,121,084	77,203,985	83,503,535	86,357,800	107,091,401
Consumption per capita	25.8	23.4	22.2	21.3	21.1	21.7	22.6	19
Import	139,136,765	68,375,785	93,226,388	217,879,612	193,366,130	175,917,999	159,791,821	198,768,426

Source: author's calculation based on data [14], [9] (2024)

Table 1. Trends in production, import, export, and consumption of grape wines in Romania, 2008-2022 (continued)

	2016	2017	2018	2019	2020	2021	2022
Production of wine for consumption (100 l)	3,266,669	4,264,144	5,088,202	3,808,430	3,959,703	4,451,149	3,787,502
Export	101,170,773	122,372,463	143,289,931	146,514,441	149,485,547	168,097,966	174,789,500
Consumption per capita	18	21.8	23.8	23.4	21.1	23.7	23.3
Import	223,500,749	271,019,671	291,995,479	298,406,696	340,871,647	457,823,276	578,415,214

Source: author's calculation based on data [14], [9] (2024)

In Romania, the grape wine market dropped in 2022, to a volume of 9.4 million hl, of which 3.7 million hl from domestic production and 5.7 million hl from import.

The relationship between grape wine production and wine consumption is direct and linear and can be expressed as: yx= 231,855x - 994,885.27 (Fig. 1).

R is the multiple correlation coefficient, in this case, the simple correlation between x and y. R recorded 0.64, which means that there is a strong relationship between grape wine production and consumption, given the data from 2008–2022.

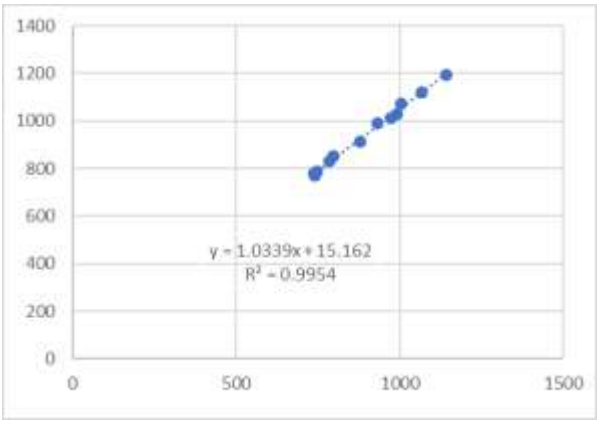

Fig. 1. Scatterplot between grape wine productions vs. grape wine consumption, 2008–2022
Source: Own determination.

R-squared is the coefficient of determination, which shows the validity of the chosen model and explains the variation of y. Its value is far from 1, indicating that the model is well chosen, final consumption, x, explains 0.41 percent of the variation in wine production, y. Adjusted R-squared is a degrees-of-freedom-corrected coefficient of determination with the same significance as R^2. The standard error expresses how much the observed average values yi deviate from the theoretical values in the expectation of the regression line y (in this case by + 15.162). Observations (n) represents the number of observations, in this case, n equals 12.

Final consumption is an extremely important factor in the evolution of wine production. It is observed that the value of the free term is very small, which allows us to say that the factors that were not taken into account in building the model have a relatively large influence on the evolution of wine production. The negative value of the free term reveals that the variables that were not included in the econometric model harm the development of production.

Once the relationship between consumption and production is established, the relationship between consumption and import is subsequently analyzed, trying to find the dependence between consumption, as a dependent variable, and import, as an independent variable. The illustration shows that the relationship between wine import and wine consumption is direct and linear and can be expressed as y = 0,0498x + 5.0494 (Fig. 2).

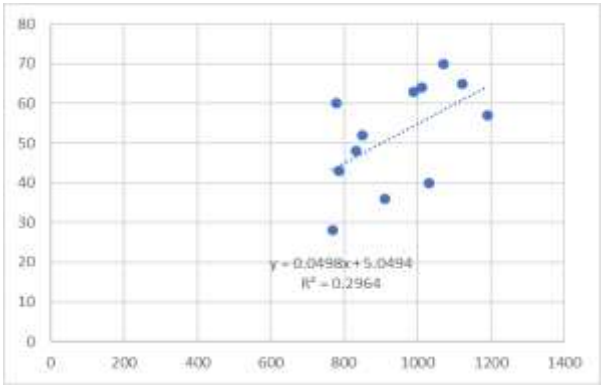

Fig. 2. Scatter diagram between wine imports vs. wine consumption, in the period 2008–2022

Source: Own determination.

Multiple R, the correlation coefficient between the value of wine imports and the final consumption recorded in Romania in the period 2008–2022, is 0.54, showing that there is a very close relationship between the two variables. R-squared, R^2 is the coefficient of determination, which shows the validity of the chosen model and explains the variation of y. In the analyzed case, it has a value far from 1, indicating that the model is well chosen, and the variable x, consumption, explains the variation of the variable y, import, in proportion to 0.29%.

The table of coefficients contains the estimated values of coefficients a and b. As a result, the estimated dependence between consumption and import can be illustrated by the model:

Consumption = 0,0498* Import + 5.0494.

The regression model is validated by the F-statistic test values (0.4198781-much higher than the reference value considered valid in the analysis of econometric models) and the near-zero degree of risk (reflected in the significance value of the F-test). The upper and lower limits of the confidence interval for the parameter are the lower 95% limit and the upper 95% limit. Threshold limits of 0.05 are calculated automatically, regardless of the regression initialization procedure.

As the data shows, wine consumption can be covered by domestic production, except for the years 2007, 2008, and 2009, when the level of production is lower than the level of consumption (Table 1).

This restricts the ability to support consumption through production alone, and consequently, imports have been needed to fill the gap. This situation began in 2007, when Romania joined the European Union, and the products of all member states competed on a single common market.

The hypothesis is supported by other studies [4] which reveal that the European food market has seen an impressive increase in import competition, coming primarily from multilateral and bilateral trade agreements, as well as from the expansion towards the Center and the East.

The year 2007 was the time when the wine produced in other member states was sold in Romania because it was more competitive in price than the wine obtained by domestic producers. This hypothesis is also illustrated by other researchers [10], who state that domestic crops have much higher production costs than imported ones.

National competition authorities have highlighted unfair competitive practices, expressing concern about the negative impact on consumer choice and product innovation in the long term. In such circumstances, as a natural reaction, certain restrictive regulations regarding the originally proclaimed freedom were implemented.

Wine grape production in Romania after 2008

Starting from 2010, wine production becomes more stable and begins to exceed consumption again. In 2014, production peaked at 454,476 tons, almost double the level of consumption. The fluctuating trend of wine production is mainly caused by fluctuations in grape production, and not by the land under vines (Fig. 3).

Along with cereals, grapevine is a species that has seen a significant expansion of plant structure on a farm. The harvested area of grapes has a constant trend of around 170 thousand hectares, in the analyzed period, while the average production of grapes reached a peak of 6,447 kg/ha in 2018, then decreased to 5,019 kg/ha in 2022 reaching the level of the 2010s.

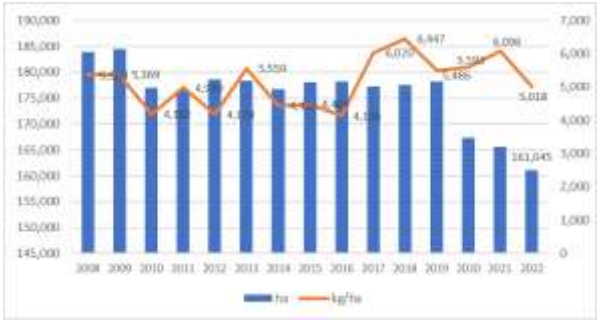

Fig. 3. The area occupied by vineyards per fruit and the average production of grapes, in Romania, 2008-2022
Source: NIS, 2024 [14].

Romania, as a wine-growing country, ranks 5th in terms of vineyard area and 6th in terms of grape and wine production in the European Union. The area cultivated with vines

occupies about 1.4% of the entire agricultural area of the country. In 2014, grape production decreased by 20.8% compared to 2013, due to the decrease in yield per hectare, both in grafted vineyards (-11.7%) and in hybrid vineyards (-30, 4%) [13].

While productions and exports have seen oscillating trends, grape imports have grown steadily and slowly over the period 2010-2021 from 28 thousand tons to 78 thousand tons. Another distinctive observation is that availabilities for consumption are in step with the oscillating trend of production. This could be one reason why imports are needed to smooth out fluctuations.

In the coming period, the harvested area is expected to reach 160 thousand ha, and harvests are estimated to increase, leading to an estimated total grape production of 1,100 thousand tons in 2022.

What draws our attention in Fig. 4 is the significantly fluctuating trend of the quantities of grapes available for consumption.

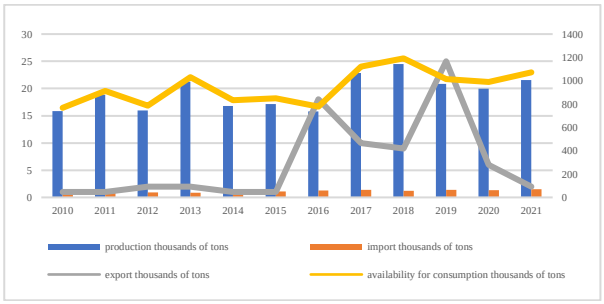

Fig. 4. Grape production, import, export, and availability for consumption, 2010–2021
Source: NIS, 2024 [14].

Their main destinations are the grape processing industry and the cannery industry. Since human consumption of grapes is stable, the quantities of grapes supplied as raw materials for the wine industry are also stable; the oscillating trend corresponds to the remaining quantities of grapes that supply the cannery industry.

These results are supported by other researchers [11] who studied the competition between food and fuel and who found that, since the beginning of 2000, the areas cultivated with fruits have increased continuously, in Romania, in competition with the areas cultivated with cereals. Romania has an agricultural area of 23 million ha, of which 209 thousand ha are vineyards and orchards (0.87%) [14]. Among European countries, Romania ranks sixth in terms of agricultural area, after Ukraine, France, Great Britain, Germany, and Poland. Arable land is mostly used for cereal crops, they occupy 72% of the arable area.

Although the areas cultivated with different crops have seen variations in their trends from 1990 to 2022, however, on average, they have increased more or less, as evidenced by statistical data. We could see that the area cultivated with canola had the most spectacular rate of change, with the area increasing by 112% per year over 26 years. The area cultivated with rape started to increase in 1999 when it tripled from 27 thousand hectares in 1998–83.6 thousand hectares in 1999. It reached a peak of 537 thousand hectares in 2010 and then stabilized around 300– 400 thousand hectares. As shown by other studies [6], the main cause of the decrease in the area cultivated with rapeseed in 2011 was the fact that Romanian farmers, after the low price obtained in 2011 for rapeseed due to the large supply, decided to rethink the production structure.

The area cultivated with vineyards and orchards has decreased at an average rate of 20% in the last 26 years. It has stabilized at around 161,000 ha. In addition to canola and sunflower, high levels of average annual rates of change were recorded for oats (4.82%), vegetables (4.43%), maize (4.22%), and wheat (3.74%). Low levels of average annual rates of change were recorded for sugar beet (0.64%), rye (0.86%), rice (1.11%), beans (1.38%) and barley (2.49%). We assume that areas under canola and sunflower have replaced areas under sugar beet, rye, rice, beans, and barley.

Consumption of grape wine

Grape wine consumption fluctuated between 25 and 19 liters per person per year (Fig. 5), which places Romania among the main wine consumers in Europe [8].

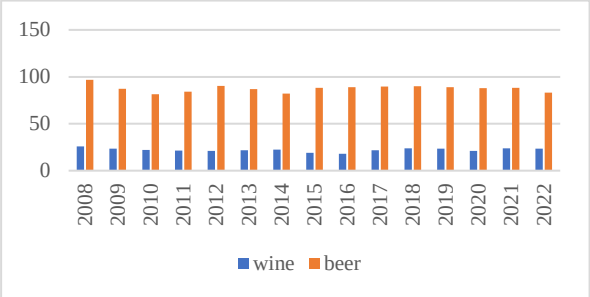

Fig. 5. Consumption of the main wine products in Romania
Source: NIS, 2024 [14]

Consumers prefer beer in consumption, respectively 83 l/person/year. However, the two major beer processors have recorded negative economic results in the last three years. We believe that this situation was generated by the rapid process of globalization. Moreover, Romania's beer processing facilities, which hold significant market shares of 40%, 27%, and 10%, are threatened by impending imports. As other studies have reported, the food market is highly concentrated.

CONCLUSIONS

Specifically, the study focuses on the grape wine market in Romania, providing an overview of its dynamics and interrelationships between key factors. It examines the relationships between consumption, representing the primary component of demand, and production and import, which are key components of supply within the grape wine market.

By analyzing these relationships, the research seeks to uncover insights into the drivers of supply and demand within the Romanian grape wine market. It aims to identify patterns, trends, and factors influencing consumption, production, and import dynamics over the study period.

Through a dynamic and spatio-temporal perspective, the research contributes to a deeper understanding of the evolving landscape of rural economic development and entrepreneurial activities among farmers in Romania. By leveraging statistical data and analytical methods, the study provides valuable insights for policymakers, stakeholders, and researchers interested in promoting sustainable economic growth and innovation in rural areas, particularly within the grape wine industry.

Overall, the empirical evidence presented in the study provides valuable insights into the spatial distribution, effects, and drivers of rural innovative entrepreneurship. By understanding the heterogeneity of entrepreneurial dynamics across regions and the interconnectedness of innovation and entrepreneurship, policymakers and stakeholders can design targeted interventions to foster entrepreneurship, promote rural development, and create a conducive environment for sustainable economic growth in rural areas. This result validates the hypothesis (H1) that wine consumption can be satisfied by domestic production in Romania.

Moreover, the study identifies heterogeneous effects of rural innovative entrepreneurship in regions with different grain production patterns and household income levels. This suggests that the impact and dynamics of entrepreneurial activities vary depending on local agricultural characteristics and economic conditions.

For example, regions specializing in grain production may experience different opportunities and challenges compared to areas with diverse agricultural activities. Importantly, the research emphasizes the importance of integrating farmer innovation and entrepreneurship deeply. It highlights the synergistic relationship between innovation and entrepreneurship in rural areas, suggesting that fostering a culture of innovation among farmers can drive entrepreneurial activities and vice versa. Furthermore, the study underscores the need for differentiated and specialized incentives to support rural entrepreneurship, especially in the context of evolving economic conditions. Tailored policies and programs that consider the unique characteristics and challenges of different regions can effectively stimulate entrepreneurial activities, promote economic development, and enhance rural livelihoods. We notice a certain tendency to decrease cultivated areas and at the same time a reduction in the number of companies

working in the wine industry. The decrease in the number of wine-producing companies in Romania has indeed paved the way for an increase in wine imports into the Romanian market. This outcome supports hypothesis H2, which posits that the rise in wine imports is primarily due to Romania's insufficient processing capacity rather than a shortage of grapes.

The findings align with the NIS 2024 reports, which suggest that Romania's limited processing capacity may lead to the export of surplus grapes to other countries. This implies that while Romania may have ample grape production, the lack of adequate processing facilities constrains its ability to fully utilize its grape supply for domestic wine production

Another conclusion of the study is that consumption has a more significant influence on imports compared to its influence on production, as shown by the results of the regression model. The results of the study support hypothesis H3, indicating that there are more significant reactions between wine consumption and imports compared to consumption and domestic production. This finding helps explain the rapid increase in wine imports in Romania, driven by rising consumption levels. Importantly, these results have practical implications, particularly in identifying investment opportunities within the grape processing industry in Romania.

Traditionally, leading grape-producing countries are also major wine producers. However, countries like Moldova, France, Hungary, and Spain, which are not among the top grape producers, have significant wine industries. This suggests that a strong grape processing industry can drive wine production and competitiveness, regardless of absolute grape production levels.

Given Romania's ample potential as a grape supplier and the high demand for grape wine, the study concludes that there are substantial investment opportunities within Romania's grape processing industry. By leveraging its abundant grape resources and responding to growing consumer demand, Romania can position itself as a competitive player in the global wine market.

These findings suggest that investment in modernizing and expanding grape processing facilities, improving production techniques, and enhancing quality standards could help unlock the full potential of Romania's grape industry. Moreover, fostering innovation, promoting collaboration between stakeholders, and creating an enabling business environment is essential to capitalize on these investment opportunities effectively.

Overall, the study underscores the importance of strategic investments in the grape processing industry to harness Romania's potential as a grape supplier and meet the growing global demand for wine. By seizing these opportunities, Romania can enhance its economic competitiveness, create jobs, and contribute to the development of its rural areas

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