

## INTEGRATING RISK MANAGEMENT INTO QUALITY SYSTEMS FOR SUSTAINABLE WINE TOURISM DESTINATIONS: A STRATEGIC MODEL FOR ROMANIA

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**Abstract:** *Sustainable development is essential nowadays. Climatic instability or the irresponsible use of natural resources indicate the need to adopt an efficient destination management system. Successful wine tourism destinations have demonstrated that by integrating quality, innovation and risk management, sustainable and competitive brands can be created. Romania has not yet become a recognized wine tourism destination. This study analyzes data from tourism reports, Romanian National Institute of Statistics and websites of local businesses to assess the importance of integrating risk and quality management for Romanian wine tourism destinations. Statistical, Swot and multicriterial analysis were performed. Findings show that Dealu Mare region leads with strong quality systems, Târnave region has a low exposure for climatic risks and Murfatlar region it's prone for meteorological hazards. A model of resilience for Romania as wine tourism destination was proposed.*

**Key words:** *enotourism, quality management, resilience, risk integration, sustainable rural development*

### INTRODUCTION

Sustainable development has moved from an abstract aspect to an operational requirement [15] as reflected in the world tourism policy frameworks. In this context, climate change represents an important risk for tourism and viticulture. As a result, a necessity to approach resilience and sustainable development when it comes to destination management is shaped. All these elements justify the need to integrate sustainability and resilience into tourism development. On the other hand, rural regions could be places where tourism can have a great influence in terms of economic development or social progress. Enotourism also called wine tourism has been promoted as a development economic model that could protect the cultural heritage and include environmental responsibility. Some studies have even shown that plenty of wine regions use enotourism as a tool to benefit financially, while community is more interested in preservation of natural resources and of the cultural assets [3]. Several countries (e.g., Italy, France or Spain) have shown that quality management (QM), cultural and natural resources protection and coordinated destination policies could enhance the recognition of wine regions if there is support from governance bodies, sustainability frameworks and niche tourism development strategies [13]. J. Carlsen mentioned in 2004 that a problem often encountered in the research is the lack of strategic theoretical frameworks which include production and services in a unified setting, since enotourism is addressing both sectors [4]. Carlsen also proposed a frame based on regional branding, tourism tendencies, marketing and infrastructure. In this context, the aim of this paper is to assess the sustainability and resilience of three Romanian enotourism destinations performance using trends, climate vulnerability indicators, and structure factors. These elements show if a destination can adapt to climate change, variations of tourism demand, maintain service quality, support economic progress and cope with international competition on a long-term basis; they are in accordance with OECD policies and the Framework for Sustainability of Tourism elaborated by UN [13,15]. The major objective was evaluating the resilience of Dealu Mare, Târnave and Murfatlar wine regions as touristic destinations by combining

tourism trends, climate vulnerability, and destination development frameworks, whilst considering their patterns in the context of well-known international development models. In this context, QM is extremely important due to the benefits that it can bring by determining outstanding practices for sustainable development in viticulture and tourism, drawing financial expenditures for acquiring modern winery equipment, supporting the environment friendly procedures, helping with the maintenance of the vineyard's areas, diminishing the negative effects of industrial and tourism waste etc. [7]. On the other hand, for tourism destinations QM is essential because it can help in achieving tourists' satisfaction, which further influences a destination to become more popular, successful and reputable [5]. But destination performance has a crucial driver- digitalization, as one study elaborated by G. Myrovali et al. (2025) showed [11]. The study demonstrates that visitor satisfaction and tourism attractivity are increasing when territorial policies assist the use of digital instruments and they are included in coherent and strategic policy frameworks. L. Abeba (2024) showed the importance of innovation and integration of digital tools within tourism sector, promoting the idea that both aspects are fundamental in developing a competitive and sustainable tourism destination [1]. Without using innovative solutions (e.g., practices that help in protecting natural resources) the impact on natural environment cannot be diminished and wineries or tourism businesses cannot align with the requirements of modern tourists that aim to have a small influence on it. Z.M.V. Alotaibi et al (2024) highlights that without well-built policy frameworks sustainable measures cannot be implemented in tourism industry and moreover it is not possible to respect the standards related to environment protection [2]. As a consequence, sustainable practices no matter if they are related to environment, economy or social system, help build the resilience of a wine tourism destination. Successful enotourism destinations from Europe have created models for destination management that integrated production, services, and environmentally sustainable practices as shown by a survey conducted by Hochschule Geisenheim University, but the climate vulnerability assessment is missing [14]. Currently, practices of the wineries around the world, reflect only in a partial manner the integrated, long-term approaches that define most successful enotourism regions from Europe. But all these aspects together help support the achievement of visitor satisfaction, powerful branding and socio-economic resilience for the long term. In Romania, enotourism is developing in an unstable way and the performance of wine tourism destinations remains uneven. Romanian National Strategy (2023-2035) underlines the necessity for diversification or increasing quality for services but doesn't integrate in a clear structured way risk management [17]. It mentions instead the inequality of people living in the rural areas due to missed economic opportunities, the lack of integration of digital tools and the need to have strategic approaches using innovation. It briefly suggests that future investments should aim to support building the resilience for climate changes and to consider sustainability as a general framework. The main approach shown is to address known issues and solve them, but quality cannot depend solely on visitor satisfaction or improving infrastructure. The addressed research questions were: How much does the diversification and quality of winery tourism services influence tourism performance in Romanian destinations? and How do climate related stress factors and quality-risk exposure affect the resilience of the wine tourism destinations from this country?. This study proposes the development of a strategic framework integrating risk management into enotourism quality systems in Romania.

## **MATERIALS AND METHODS**

For this study, qualitative analysis of several tourism reports and academic publications, were used to evaluate the importance of integrating risk and QM for

Romanian wine tourism destinations. Economic and tourist indicators data was collected from the National Institute of Statistics (INSSE) for the period 2019-2023. Administrative units were used. INSSE county level indicators were aggregated into the wine region level according to the geographical specification documents for the designation of origin defining each wine region. Websites of local businesses were analyzed to assess enotourism related services, sustainability communications, and digital promotion strategies across thirty-five wine producers from Dealu Mare, Târnave and Murfatlar wine regions. The wineries were selected based on tourism activity, public visibility and data availability, excluding non-tourism-oriented producers. Digital presence was measured through producers' websites and their profiles on social media (Facebook- Meta) and Google maps (location-based visibility), using presence-based scoring for the latest available date (October 2025). Environmental certification was verified based on sustainability compliance statements available on wineries' official pages (e.g., Sustainable Agriculture *Rainforest Alliance*, Regenerative Agriculture etc.). The regions have various evolution profiles. Data for climatic parameters (e.g., Temperature at 2 meters high (°C), Maximum Temperature at 2 meters high (°C), Minimum Temperature at 2 meters high (°C), No. of Hot days (>35°C), Total Precipitations (mm/year) was downloaded from National Aeronautics and Space Administration (NASA) [18], in October 2025, using region representative geographic coordinates, mapped to corresponding wine regions, at the native gridded resolution of the database.



**Figure 1. The proposed RWTD Model for Romania**

Data was extracted for 2019-2023 period of time and processed as averages or cumulative values. Multicriterial (MCA), Swot and statistical analysis were used to identify the resilience and performance regarding quality and development capability of the chosen destinations. MCA analysis assessed destinations by using weighted criteria and had as result a comparative score and ranking (1-3-5 scoring), reflecting their relative importance, where 1 stands for low performance or high vulnerability, 3 means medium performance, and 5 represents high performance or low vulnerability. Weights were verified by basic sensitivity check. An MCA Matrix was elaborated that provided information data for the Quality-Risk Matrix (QR Matrix). From the Swot analysis a

strategic diagnosis was elaborated. To appreciate the relationships between tourism activity, economic performance, wineries evolution and climatic conditions statistical analysis was used (Pearson correlation method, JASP software (Version 0.19.3; Jasp Team, 2024) [10]. To determine how strong and in which direction the relationships developed, two-tailed tests were used, and the statistical significance was assessed at a threshold of 0.05 level. A QR matrix was then developed to evaluate vulnerabilities, influence and control capacity of the three Romanian wine regions which gave the final resilience score. Four quality dimensions and three risk elements (used as standards in destination resilience) were taken into account for the evaluation of each wine region. The Matrix was created using international risk management and ISO guidelines [8,16]. A framework for integrating quality and risk management was proposed which is organized around five important themes: quality, innovation, digitalization, sustainability and risk (Figure 1). All these themes were applied in an interconnected way to obtain the “Resilient Wine Tourism Destination model” (RWTDM Model) for Romania. Present research underlined that resilience (known as the ability of a wine tourism destination to adapt to climatic, economic, operational etc. disturbances) is a result of an efficient and well-built QM system in wine tourism.

### RESEARCH RESULTS AND DISCUSSIONS

An analysis of sustainable and resilient wine tourism development management frameworks was performed. The results indicated that France, Italy and Spain have strong quality systems, sustainability practices and coordinated destination strategies.

#### 1. European strategic frameworks

The most important findings showed three merging categories of priorities: to assure quality and competitive advantage; to improve sustainability and progress towards usage of digital tools; to promote resilience for climate and economic risks.

Table 1.

Strategic frameworks in France, Italy and Spain

Analyzed Country	Quality and competitive advantage	Sustainability and progress towards usage of digital tools	Resilience for climate and economic risks
France	Strong national certification for enhancing <i>service standards</i> ; accent on the <i>quality of tourist experience</i>	The <i>use of digital tools</i> is growing when it comes to promoting the destination; <i>sustainability</i> aimed at conservation of heritage and use of <i>eco-labels</i>	National framework has included <i>risk assessment</i> ; has strategies aiming the <i>protection of natural and cultural resources</i> ; touch on <i>climate vulnerability</i>
Italy	The strategy on a national level aims to promote <i>tourism product diversity</i> ; accent on <i>cultural and natural resources</i>	Adoption of <i>digital tools</i> is a priority when it comes to destination management; <i>sustainability</i> is used as a main idea	The <i>long-term planning and regional coordination</i> is aimed; touch on <i>economic resilience</i> and capacity to be flexible as a destination
Spain	Powerful and well-coordinated destination governance; accent on <i>quality of services and branding</i>	Is considered a Smart Tourism Destination; <i>technologies</i> are included in the <i>management and design of the tourists' experiences</i>	Main idea promoted is <i>climatic risks exposure</i> ; procedures to <i>adapt and innovate</i> are taken into considerations (planned)

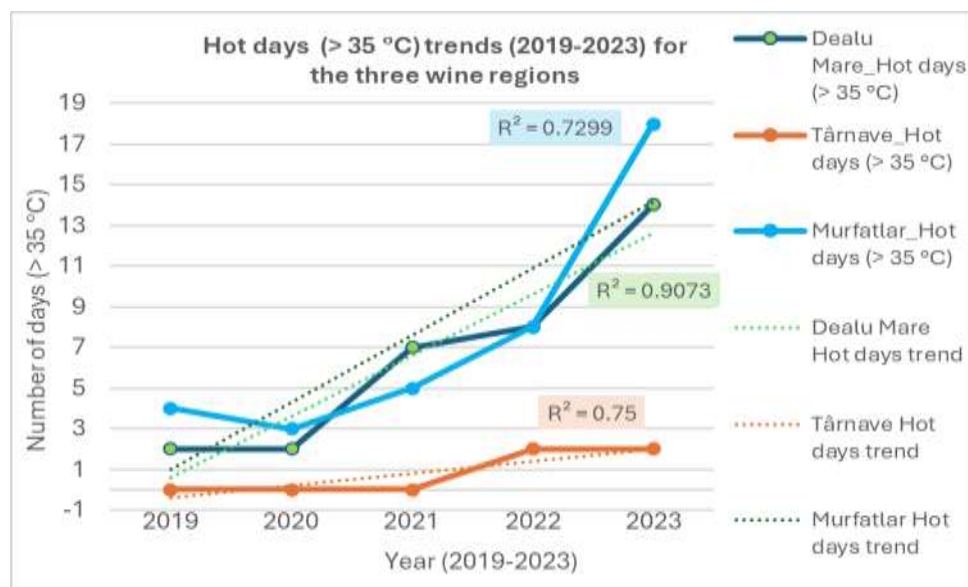
Source: OECD, 2020 [13].

The analysis showed that ensuring quality and reducing risks are two concepts connected when managing a wine tourism destination that is prosperous (e.g., rigorous quality control rules apply for French wines with protected denomination along with the involvement of community). All models show that being constantly competitive revolves around quality systems that include regulated risk planning. As for Romania, enotourism is

still depending mostly on the particular reputation of wineries, while the QM and risk integration is still not regulated efficiently. An ONVPV report shows Romania as an important wine producer [9] but lacks collaboration between wineries and authorities.

## 2. Trends analysis and statistical correlations for Romanian destinations

An analysis of trends related to tourism; wineries services and climate exposure was performed for a period of 5 years. Factors such as arrivals, overnights, accommodation units, average temperature, number of hot days and total annual precipitations were taken into consideration. The indicators representing wineries with tourism services and digital presence were used and measured only once (in the latest available year, 2025) to show capacity of the region and not necessarily the change over the years. The results for tourism trends indicate that tourist flows/1000 residents are constantly increasing in all analyzed regions showing strong destination resilience even when unfavorable external conditions are met. For accommodation capacity there is a solid growing trend indicating that infrastructure is developing in response to the tourist demand, which is intensifying the capacity for adaptation on a long term. The results for climate trends show that the temperatures are rising, and the number of hot days are increasing across regions. This situation can destabilize agriculture activities and create disturbances for the long-term destination's resilience. Murfatlar and Dealu Mare have a solid growth of the number of extremely hot days, reflecting a higher exposure to heat-related risks that could influence both viticulture and tourists' comfort. Annual precipitations are variable and instable indicating potential risks for vineyards' health, possibly affecting wine quality. This means that there is a growing vulnerability and a need for strategies that protect vineyards.



**Figure 2. Trends in the number of extreme heat days (> 35°C) in Dealu Mare, Târnave and Murfatlar wine regions during 2019-2023 period**

Source: NASA, 2025, [18]

Tourist arrivals and overnight stays are highly correlated ( $r = 0.99$ ), indicating that higher visitation levels are directly associated with longer stays in Romanian enotourism destinations (Figure 3). While, precipitations show a strong negative association with tourism performance, particularly with arrivals ( $r = -0.74$ ) and overnight stays ( $r = -0.83$ ), indicating the potential vulnerability of enotourism destinations to adverse climatic conditions. Also, wineries offering tourism services are strongly associated with Eco-certifications ( $r = 0.89$ ), suggesting that more diversified wine tourism services tend to

occur at the same time with sustainability practices. It seems that sustainable practices have become a strategic resilience instrument.

Variable	V	ARR (pers)	OVR (nights)	ACC (units)	WWS	WAC	DIG	ECO	Avg. T (°C)	Avg. max. T (°C)	HD (>35 °C)	PP (mm/yr)
ARR (pers)	r	—										
	p	—										
OVR (nights)	r	0.99	—									
	p	0.092	—									
ACC (units)	r	0.838	0.751	—								
	p	0.367	0.459	—								
WWS	r	0.063	0.206	-0.491	—							
	p	0.96	0.868	0.673	—							
WAC	r	-0.675	-0.562	-0.968	0.693	—						
	p	0.528	0.62	0.161	0.512	—						
DIG	r	0.115	0.257	-0.445	0.999*	0.655	—					
	p	0.926	0.835	0.707	0.033	0.546	—					
ECO	r	-0.397	-0.261	-0.833	0.891	0.945	0.133	—				
	p	0.74	0.832	0.373	0.3	0.212	0.915	—				
Avg. T (°C)	r	0.653	0.755	0.135	0.797	0.117	0.827	0.436	—			
	p	0.547	0.455	0.914	0.413	0.925	0.38	0.713	—			
Avg. max. T (°C)	r	0.641	0.745	0.119	0.806	0.133	0.836	0.45	1.000*	—		
	p	0.557	0.465	0.924	0.403	0.915	0.369	0.703	0.01	—		
HD (>35 °C)	r	0.428	0.553	-0.134	0.929	0.377	0.947	0.66	0.964	0.968	—	
	p	0.718	0.627	0.915	0.241	0.754	0.208	0.541	0.172	0.161	—	
PP (mm/yr)	r	-0.744	-0.833	-0.26	-0.713	0.01	-0.749	-0.317	-0.992	-0.99	-0.922	—
	p	0.466	0.374	0.832	0.494	0.993	0.461	0.794	0.081	0.092	0.253	—

\* p < .05, \*\* p < .01, \*\*\* p < .001

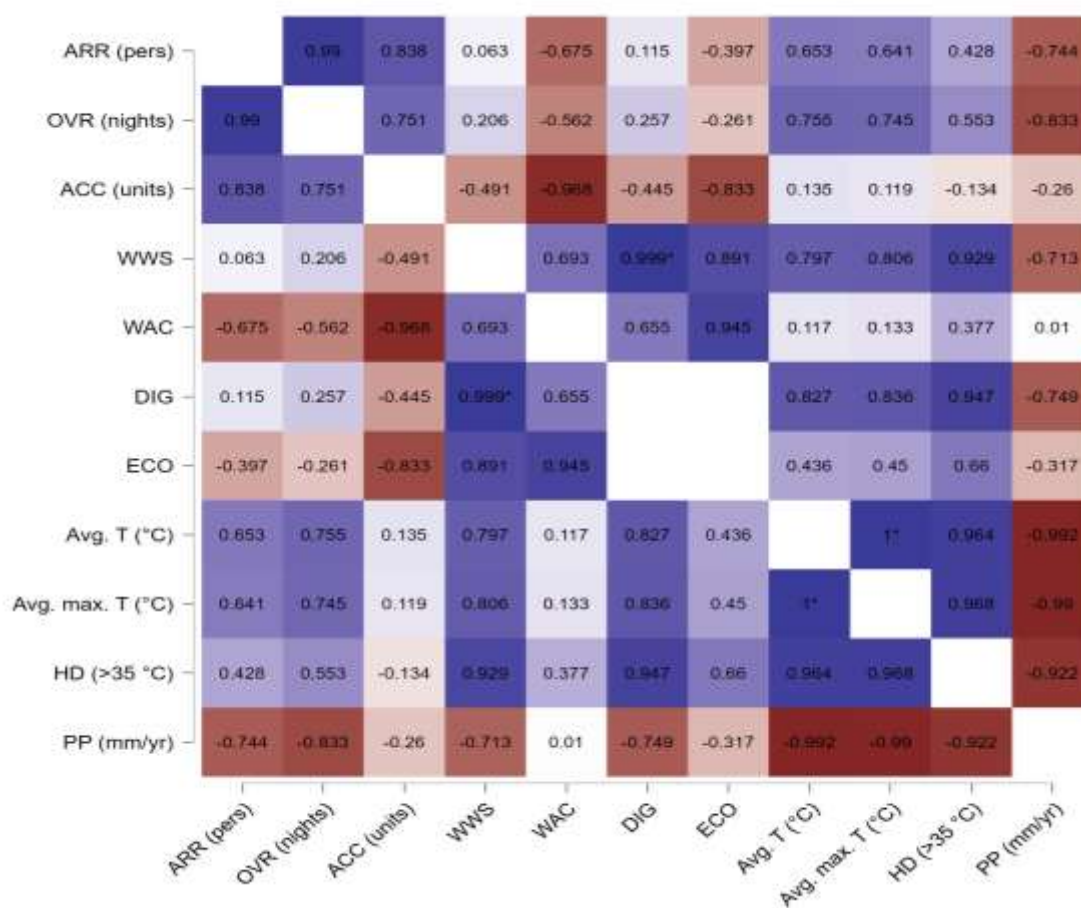
Note: V = variable pair; r = Pearson correlation coefficient; p = significance level.

**Figure 3. Pearson’s correlation coefficients between tourism performance, digital visibility, Eco-certifications and climate variables in Romanian wine regions (2019-2023)**

Source: Jasp, 2024, [10]

Following parameters were considered: ARR (pers) represents Arrivals/1000 Residents 5 years average (2019-2023) in the regions’ counties; OVR (nights) represents Overnights/1000 Residents 5 years average (2019-2023) in the regions’ counties; ACC (units) represents No. of accommodation units 5 years average in the wine regions’ counties (2019-2023); WWS represents Total No. of wineries that offer tourism services (e.g., tours) in the selected wine regions (measured once, October 2025); WAC represents Total No. of wineries that offer accommodation services in the selected wine regions (measured once, October 2025); DIG represents Total No. of Digital presences of wineries on producers’ websites and their profiles on social media (Facebook-Meta) and Google maps (measured once, October 2025); ECO represents Total No. of Wineries that have Eco-certifications (measured once, October 2025); Avg. T (°C) represents Average of temperature/ 5 years in the wine regions at 2 meters high (2019-2023); Avg. max. T (°C)

represents Average of maximum temperature/ 5 years in the wine regions at 2 meters high (2019-2023); HD (>35 °C) represents Average Hot days (>35 °C)/ 5 years calculated for the three wine regions (2019-2023); and PP (mm/yr) represents Average of total precipitations/ year for the three wine regions (2019-2023). The correlation heat map (Figure 4) confirms the discovered relationships, showing clusters of strong positive associations among tourism performance and winery related variables, and also it indicates negative correlations between climate stress indicators and tourism outcomes.



Note: Values represent Pearson correlation coefficients (r); blue indicates positive and red negative correlations.

**Figure 4. Pearson correlation heat map showing the relationships between tourism performance indicators, winery tourism services, digital presence, eco-certifications and climate stress variables for the three analyzed Romanian wine regions (2019-2023)**

Source: Jasp, 2024, [10]

Three important patterns were observed from the statistical correlations: the development of wineries and of the services offered by these are associated with higher touristic performance suggesting that wineries play an important role in supporting enotourism resilience, certain risks related to climate (e.g., precipitations) are negatively associated with the performance of enotourism and with some variables tied to the activity of wineries suggesting that there is a climatic vulnerability of destinations, and the Eco-certifications are strongly associated with tourism diversity services of wineries and with the existence of accommodations facilities.

### 3. Resilience evaluation of the Romanian wine tourism destinations

The MCA Matrix was created to estimate resilience and risk vulnerability. The results were compared in order to determine which region has highest potential to evolve as a resilient wine destination. The 1-3-5 scores were derived from region-level averages (e.g., arrivals, overnight stays and accommodation units) for 2019-2023 period, reported in Annex1.

**Table 2.**

**MCA Matrix for the analyzed regions**

Category of indicator	Indicator	Wine regions		
		Dealu Mare	Târnave	Murfatlar
Tourism activities	Tourist Arrivals/ 1000 residents (average of 5 years)- Tourist pressure risk indicator	1	3	5
	Overnight Stays/ 1000 residents (average of 5 years)- Tourism performance risk indicator	1	3	5
	Accommodation Units (average of 5 years)- Wine region readiness for receiving tourists risk indicator	1	3	5
Economy and Employment	Employment In Agriculture (average of 5 years)- Rural integration risk indicator	5	3	1
	Employment In Tourism (average of 5 years)- Ability to provide quality services risk indicator	1	3	5
Wineries level of development	Wineries That Organize Tours/Visits- Wineries' tourism readiness risk indicator	5	5	1
	Wineries That Offer Tasting Services-Wineries' tourism readiness risk indicator	5	3	5
	Wineries That Offer Accommodation Services-Wineries' tourism readiness risk indicator	5	3	1
Digitalization & Marketing	Total Number Of Digital Presences - Digital visibility and online communication risk indicator	5	1	3
Sustainability	Wineries With Eco-Certifications- Involvement in protecting the environment and sustainable management practices risk indicator	5	1	3
Climate Factors	Average Temperature (°C), (2019-2023)-Climate resilience risk indicator	3	5	1
	Average Maximum Temperature (°C), (2019-2023)-Heat stress risk indicator	3	5	1
	Average Minimum Temperature (°C), (2019-2023)-Frost risk indicator	3	1	5
	Hot days (>35 °C) (average of 5 years)- Extreme heat risk indicator	3	5	1
	Annual Precipitations (mm/year) (average of 5 years)- Grapevine diseases and grapes quality risks indicator	5	1	3

Source: Author's own calculation based on INNSE, NASA POWER, and wineries' online data information

The results show that Murfatlar is leading with 7189 avg. overnight stays, while Dealu Mare records the lowest number (1121 avg.). For accommodation capacity, the most developed infrastructure belongs to Murfatlar with 1224 units avg., while Dealu Mare has the lowest development (569 avg.). Târnave scores the highest climatic resilience score. In general, the least heatwaves the better for the vine, being considered a higher resilience. As for Târnave the values show almost no heatwaves risk (4 hot days), while Murfatlar is considered to be the most exposed with 38 hot days/5 years, followed closely by Dealu Mare (33 hot days). Also, it is known that moderate rainfall gives the best resilience to a wine region destination, as a result Dealu Mare reflects a medium balanced rainfall which could be considered optimal for viticulture (601 mm/year avg.), while Târnave has an increased exposure to disease and low grape quality by dilution of substances from grapes (710 mm/year avg.). Murfatlar tends to be potentially dry in terms of annual precipitations

average for 5 years (488 mm/year avg). In conclusion, Dealu Mare region could be characterized by good level of winery services, strong digital presence, most involved in sustainable practices, care for the environment and proper balance for annual precipitations which are very important for climate associated risks. For Târnave region we find the best conditions for climate resilience. As for Murfatlar region, the tourism demand is high and the climate specific to cold season is mild, but there is a low development of enotourism, and the area is the most prone to heat stress risks. Some results are confirmed by S. Nastasa et. al (2025) in her research [12].

#### 4. Quality Risk Matrix for the Romanian destinations

The findings confirm that in wine tourism, resilience is a consequence of applied QM for the destination and the ability to forecast, manage and diminish risks.

Table 3.

QR Matrix of the analyzed Romanian wine regions

Region	Quality dimensions	Risk dimensions		
		Vulnerability	Impact on tourism	Ability to prevent, adapt or respond to risks
Dealu Mare	Infrastructure & Tourism services	<b>Low</b> (Highest number of winery services, plenty tastings and tours)	<b>Low</b> (Wine tourism offer is well-developed which gives competitiveness advantage)	<b>High</b> (Tourism infrastructure is well developed)
	Digital Tools & Online visibility	<b>Low</b> (Good online presence, leader for digital visibility)	<b>Low</b> (Solid visibility diminishes the risk of losing tourists)	<b>High</b> (Good control capacity - intensive use of websites, reservation platforms and social media pages)
	Sustainability practices	<b>Low</b> (The most eco-certifications rates are in Dealu Mare)	<b>Low</b> (Sustainable practices help build the reputation of wineries)	<b>High</b> (Control capacity is done well due to the use of environmental standards)
	Climate exposure	<b>Moderate to high</b> (Developing heat stress, region has plenty of very hot weather days)	<b>Moderate</b> (There could be differences in grape quality over the years due to hot weather)	<b>Moderate</b> (Pretty difficult to control due to limited adaptations methods available)
Târnave	Infrastructure & Tourism services	<b>Moderate</b> (Less services offered by wineries and far less tastings and accommodation options)	<b>Moderate</b> (Due to limited services tourists could be spending less money or even choose short stay trips)	<b>Moderate</b> (Control capacity needs improvement due to weaker infrastructure and services offer)
	Digital Tools & Online visibility	<b>High</b> (The region has the lowest presence online)	<b>High</b> (Due to the fact that in general modern tourists use heavily online resources for reservations)	<b>Low to moderate</b> (Control capacity could be improved easily if proper strategies are applied)
	Sustainability practices	<b>High</b> (The region has the least eco-certifications)	<b>High</b> (Sustainable practices impact the reputation and image of wineries)	<b>Low</b> (Pretty difficult to pursue wineries to adapt environmental standards)
	Climate exposure	<b>Low</b> (Insignificant number of very hot days, in general cooler temperatures)	<b>Low</b> (Almost no climate stress on viticulture, fit for producing good quality white wines)	<b>High</b> (Favorable natural resilience)
Murfatlar	Infrastructure & Tourism services	<b>Low to moderate</b> (Weak offer of tours and accommodation services for wine tourism)	<b>Moderate to high</b> (Limited competitiveness advantage for wine tourism destination)	<b>High</b> (There is plenty of potential for improvement, but proper investments are required)
	Digital Tools & Online visibility	<b>Moderate</b> (Less digital visibility than Dealu Mare)	<b>Moderate</b> (Online communication and digital visibility could impact the number of enotourists visiting the region)	<b>Moderate</b> (Active use of social media pages by wineries, but too little presence on booking platforms)

	Sustainability practices	<b>Moderate to high</b> (Less eco-certifications then Dealu Mare)	<b>High</b> (More and more tourists prefer to choose wineries that adopt sustainable practices)	<b>Low</b> (Encounters limited acceptance of environmental standards)
	Climate exposure	<b>High</b> (The region is prone to serious risks related to extreme hot weather and temperatures)	<b>High</b> (Grape's quality could be heavily impacted along with tourists' level of comfort)	<b>Low</b> (It's pretty difficult to adapt to these climate changes; costing important amounts of money)

Source: Author's own elaboration based on MCA results, international risk management and ISO principles ISO 31000:2018 and correlation analysis

The greatest ability to prevent, adapt or respond to risks has been attributed to Dealu Mare region, which had the highest number of quality services and the most reduced exposure to vulnerability, despite the fact that it encounters a moderate to high risk for heat related climatic stress. As for Târnave region, it has a solid natural resilience (e.g., reduced climatic risk) but lowest sustainability practices. Moreover, the region needs to attract investments in tourism infrastructure and for the better use of digital tools. Murfatlar region has the highest vulnerability to climatic risks and requires serious and urgent measures to be taken in order to diminish the negative effects on wine quality and tourists' comfort. The matrix shows important and consistent patterns where the regions with better development of wineries and better online visibility have a greater performance of tourism. This suggests that diversification of winery services is an essential element for destination resilience. The climatic vulnerability variables have a negative correlation with tourism and wineries indicators, implying that hazards related to climate play a crucial role for wine tourism development. Our findings were confirmed also by N.D. Chauvin [6].

### 5. Swot analysis and strategic recommendations

The Swot analysis (Table 4) indicates what measures are essential to be taken in order to enhance the resilience and sustainability of these regions.

The results show particular resilience levels across regions. Dealu Mare is the most mature wine region destination when it comes to the use of online tools, practices that protect the environment and services variousness. Târnave has a good climate stability and could be promoted as a premium white wine region. Murfatlar could be considered the most vulnerable region for climate, despite the high level of tourists' arrivals. For the region of Dealu Mare climatic risk-related measures should become a priority (e.g., canopy shading). For Târnave wine region, digital transformation should be a priority while it can be presented to tourists as a climate resilient destination. At last, for Murfatlar it is crucial to take measures to diminish the effect of heat-related risk (e.g., advanced irrigation systems). Tourism services offered by wineries are recommended to be diversified. For country level development, a National Wine Tourism Resilience Strategy that is based on the five analyzed dimensions could be beneficial for achieving destination competitiveness or implementing these concepts into the country's crucial documents (e.g., Tourism Master Plan).

Table 4.

## Swot Analysis of Dealu Mare, Târnave and Murfatlar wine regions

SWOT Aspect	Dealu Mare Wine Region	Târnave Wine Region	Murfatlar Wine Region
<b>Strengths</b>	<ul style="list-style-type: none"> <li>-Online visibility of the region is very good;</li> <li>-Wineries' services are diversified;</li> <li>-Plenty of wineries from the region have eco-certifications;</li> <li>-The region has moderate risks related to climate;</li> <li>-Climate suitability for high quality red wines;</li> </ul>	<ul style="list-style-type: none"> <li>-The region is resilient in terms of climatic risks;</li> <li>-Pretty good online presence of wineries from this region;</li> <li>-Region's climate is suitable for the production of high-quality white wines;</li> <li>-Climate conditions are supporting tourists' comfort</li> </ul>	<ul style="list-style-type: none"> <li>-Tourism demand has the best recorded numbers here;</li> <li>-Online visibility is moderate, but better than other regions;</li> <li>-Climate is warmer, which is suitable for some particular grape varieties' cultivation</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>-Developing heat stress, region has plenty of very hot weather days;</li> <li>-The region has less tourists that are visiting in comparison to other wine regions;</li> <li>-Smallest number of accommodation units characterizes the region</li> </ul>	<ul style="list-style-type: none"> <li>-Digital presence of wineries is the lowest;</li> <li>-Minimum number of wineries with eco-certifications;</li> <li>-Annual precipitations exceed the optimal interval presenting risk for grape composition dilution and vines disease appearance</li> </ul>	<ul style="list-style-type: none"> <li>-The region is the most exposed to climatic stress-related risks;</li> <li>-Wine tourism accommodations are few in this region;</li> <li>-Employment in agriculture for this region is very low;</li> <li>-The lowest number of tours organized by wineries;</li> <li>-The regions has strong seasonal tourism</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>-There is a good potential for producing premium red wines;</li> <li>-Capability to increase promotion related to sustainability practices,</li> <li>-Possibility to draw enotourists due to digital marketing level of development</li> </ul>	<ul style="list-style-type: none"> <li>-The region could be promoted as a premium white wine region;</li> <li>-Opportunity to develop wine routes by combining enotourism with cultural tourism;</li> <li>-Good number of wineries that organize tours and visits</li> </ul>	<ul style="list-style-type: none"> <li>-Tourist arrivals are increasing lately, which gives the opportunity to include winery visits;</li> <li>-Implementing practices that protect the vine from drought could help in supporting the production of quality wines</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>-High competition with other wine regions that are promoted in a more efficient way;</li> <li>-Climate instability is rising lately;</li> <li>-Difficulty in finding tourism services qualified personnel</li> </ul>	<ul style="list-style-type: none"> <li>-Working people in rural areas are harder to find due to migration of population to cities;</li> <li>-Strong competition from Dealu Mare Region;</li> <li>-Tourists are more interested in cultural routes rather than wine routes in areas such as Târnave</li> </ul>	<ul style="list-style-type: none"> <li>-Climate changes affect more and more vineyards yields and grape quality;</li> <li>-Romanian tourists are attracted mostly to the seaside due to lack of traditions to visit wineries</li> </ul>

Source: Author's own elaboration based on MCA results, correlation analysis and QR Matrix

## CONCLUSIONS

The findings demonstrate that sustainability-oriented practices strengthen wine tourism resilience, as Eco-certified wineries are consistently associated with more diversified tourism services ( $r = 0.891$ ) and a higher likelihood of offering accommodation ( $r = 0.945$ ). At the same time, climate related pressures undermines tourism performance with precipitation showing strong negative associations with both tourist arrivals ( $r = -0.744$ ) and overnight stay ( $r = -0.833$ ), emphasizing climate risk as major constraint for resilient wine tourism development. Our study points out that through the integration of QM with risk management a resilient wine tourism destination framework could be built that is possible to help a country like Romania gain competitive advantage and visibility. Well-developed countries have already various good practices and well-built strategic policy frameworks which show that sustainability, innovation and risk planning are crucial for tourism destination management. In this context, the theoretical framework proposed ("Resilient Wine Tourism Destination model") based on five crucial dimensions is possible to bring adaptability, improvement of services, tourist satisfaction and resilience for the

tourism destination. QM would allow the anticipation, the adaptability to changes, the maintenance of constant quality standards throughout crisis time, helping tourism destinations to obtain long-term success and value for travelers and local communities. The limitations of this study lie in the use of secondary data sources and aggregated county-level indicators mapped to wine regions, which may confuse local heterogeneity; several composite indicators (e.g., tourism offers of wineries) and the weighting scheme applied to the MCA matrix involve some degree of subjectivity. Some parameters were measured at a single point of time, which may not fully capture dynamics over time. The present research offers a transformation of data analysis into a conceptual framework that can be used for development of strategic policies for enotourism underdeveloped regions.

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