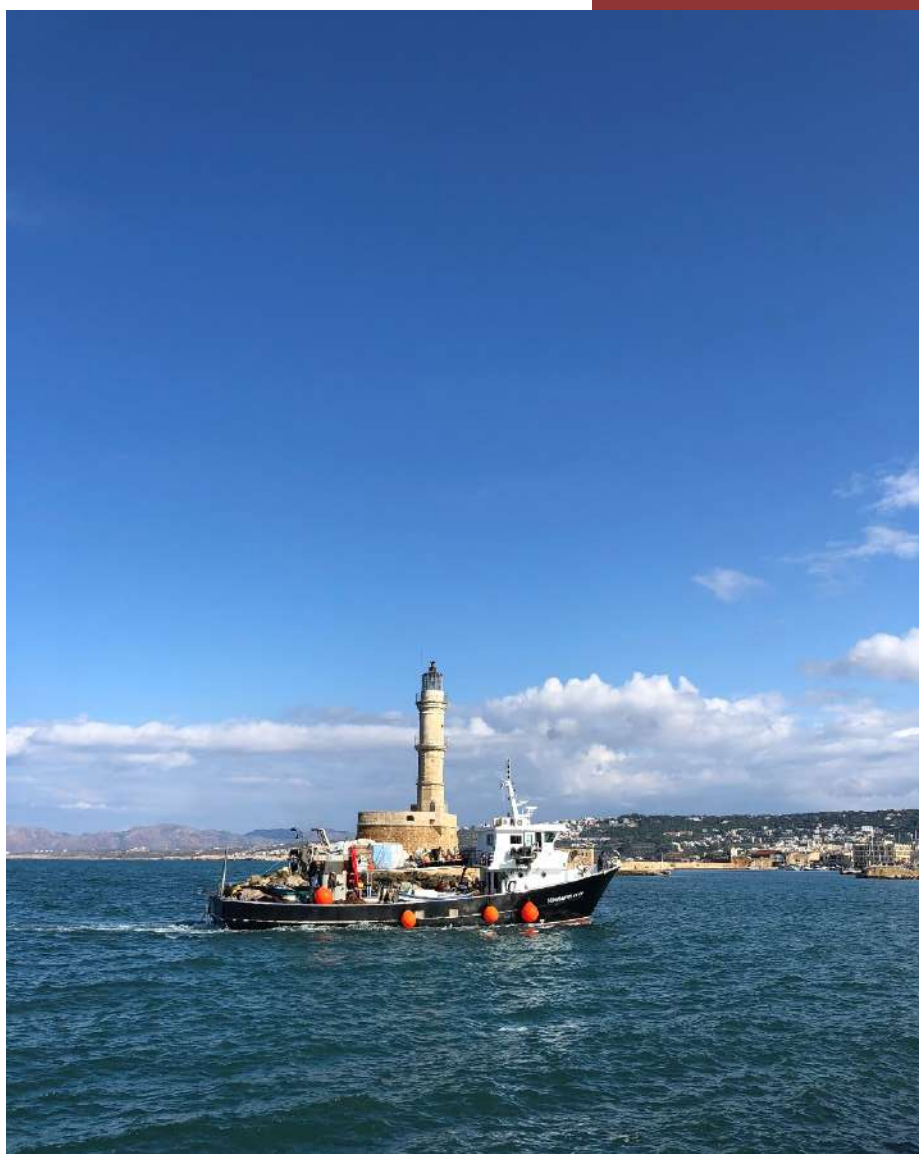




**2<sup>nd</sup> conference, May 2023 CIHEAM**

# **BOOK OF ABSTRACTS**



**Title**

Book of Abstracts, Second Conference of the EuAWE - European Association of Wine Economists

**Editing Committee**

Jean-Marie CARDEBAT, Anne-Sophie MASURE, Mélissa JACQUEMET

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European Association of Wine Economists (EuAWE)

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# Committees

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## **BOARD**

**Jean-Marie Cardebat** | *Université de Bordeaux – INSEEC, France*  
**Raul Compes** | *Director CIHEAM Zaragoza, Spain*  
**João Rebelo** | *Universidade de Trás-os-Montes e Alto Douro, Portugal*  
**Luca Rossetto** | *Università di Padova, Italy*  
**Günter Schamel** | *Free University of Bozen-Bolzano, Italy*  
**Lara Agnoli** | *Burgundy School of Business, France*  
**Bernd Frick** | *Universität Paderborn, Germany*  
**Davide Gaeta** | *Università di Verona, Italy*  
**Eric Giraud-Héraud** | *INRA, France*  
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**Katrin Simon Elorz** | *Universidad pública de Navarra, Spain*

## **SCIENTIFIC COMMITTEE**

**Olivier Bargain** | *Université de Bordeaux, France*  
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**Stefano Castriota** | *Università di Pisa, Italy*  
**Benoit Faye** | *INSEEC SBE, France*  
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**Pierre Régibeau** | *Chief Economist of DG Competition European Union (University of Essex), UK*  
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**Jean-Philippe Weisskopf** | *Ecole hôtelière de Lausanne, Switzerland*  
**Angelo Zago** | *Università di Verona, Italy*

## **LOCAL ORGANIZING COMMITTEE**

**Raul Compes** | *Director CIHEAM Zaragoza, Spain*  
**Nikos Georgantzis** | *Burgundy School of Business, France*  
**Katerina Karapatakis** | *Mediterranean Agronomic Institute Of Chania*  
**Argyro Zervou** | *Mediterranean Agronomic Institute Of Chania*



# Program

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May 28

**16:00 – 19:00: WELCOME RECEPTION AND REGISTRATION (MAICH)**

May 29

**08:30 – 10:30 : Parallel Sessions**

**Parallel Session I - Sustainability, Environment & Organic –Room: Pythagoras I Chair : Chiara Mazzocchi (University of Milan)**

**57: The winery between sustainability and terroir: the Sagrantino DOCG case study**

*Chiara Mazzocchi (University of Milan), Stefano Corsi (University of Milan), Diego Grazia (University of Milan)*

**19: Leadership, motivation, and creativity with an environmental perspective: the perfect cocktail for green innovation in the wine industry**

*Eduardo Sanchez-Garcia (University of Alicante), Javier Martinez-Falco (University of Alicante), Luis-Antonio Millan-Tudela (University of Alicante), Bartolomé Marco-Lajara (University of Alicante)*

**21: Market acceptance of Fungus – resistant grape varieties (FRGV) – A mixed methods project in Germany**

*Christoph Kiefer (Geisenheim University), Gergely SZOLNOKI (Geisenheim University)*

**25: The moderating role of company size in the implementation of proactive environmental strategy**

*Marcos CARCHANO (University of Castilla-La-Mancha), Immaculada CARRASCO (University of Castilla-La-Mancha), Angela GONZALEZ (University of Castilla-La-Mancha)*

**39: The impacts of climate change on the wine sector in Nordic countries**

*Zalan MARO (University of Budapest), Jeremias Mate Balogh (University of Budapest)*

**52: Towards a sustainable wine industry: Insights from Italian wine cooperatives**

*Giulia Gastaldello (Free University of Bozen-Bolzano), Isabel Schaufele Elbers (Free University of Bozen-Bolzano), Angelo Zago (University of Verona), Umberto Nizza (University of Verona), Guenter Schamel (Free University of Bozen-Bolzano)*

**Parallel Session II - Experts & Hedonic -Room: Demokritus I Chair : Bernd Frick (Paderborn University)**

**1: Gender differences in expert Evaluations: Are Women (really) More Lenient?**

*Bernd Frick (Paderborn University), Daniel Kaimann(Paderborn University), Clarissa Spiess Bru (Paderborn University)*

**2: Judging Reliability at Wine and Water Competitions**

*Elena C. Berg (University of Paris), Michael Mascha (Fine Water Academy), Kevin W. Capehart (California State University)*

**6: How do consumers relate to wine quality? A case of red wines from Apulia according to Vivino**

*Mengting Yu (University of Tuscia), Luigi Palumbo (University of Tuscia), Enrico Mazzoli (University of Tuscia)*

**14: The value of potency in cannabis, wine, and spirits: A hedonic price approach**

*Robin Goldstein (UC Davis), Ian Xu (UC Davis), Jarrett Hart (UC Davis), Daniel A. Summer (UC Davis)*

**79: Sounds too Feminine? Brand Gender and the Impact on Professional Critics**

*Daniel Kaimann(Paderborn University), Clarissa Spiess Bru (Paderborn University)*

**78: Does the Tasting Note Matter? Language Categories and Their Impact on Professional Ratings and Prices**

*Clarissa Spiess Bru (Paderborn University)*

**10:30 : 10:40: Coffee break - Hallway**

**10:40 – 12:20 : PLENARY SESSION – ROOM ARISTOTLE**

### **Panorama of the greek wine industry**

**Panagiotis Kalaitzis, PhD, Head of Molecular Biology & Biotechnology Laboratory Mediterranean Agronomic Institute of Chania**

*Panagiotis Kalaitzis holds a PhD from University of Maryland - College Park, USA and the interdisciplinary programme on Molecular & Cell Biology and is currently Studies & Research Coordinator of the Horticultural Genetics & Biotechnology Department at the Mediterranean Agronomic Institute of Chania (MAICH) in Crete, Greece and director of the Laboratory of Molecular biology & biotechnology. MAICH is one of the constituent Institutes of the International Organization CIHEAM (International Center for Advanced Mediterranean Agronomic Studies), an Intergovernmental Organization. The research interests focus on the characterization of the physiological significance of genes involved in the biosynthesis of cell wall glycoproteins such prolyl 4 hydroxylases and Arabinogalactan proteins (AGPs) and particularly on developmental programmes such as fruit ripening, abscission and abiotic stresses such as salinity and waterlogging in olive. He authored and co-authored more than 65 publications and coordinated or participated in more than 35 European and National research and development programs. Moreover, his group has extensive experience on olive oil authentication using DNA-based approaches and plant phenomics using image analysis algorithms in olive, tomato and recently on grape seeds. His laboratory trained more than 140 Master of Science students the last 24 years while more than 50 of them continued for PhD studies and currently work in plant sciences and other fields in various European countries and America. Greek wines and wine tasting might be considered an additional activity.*

*Discutant: Nikos Georgantzis (Burgundy School of Business)*

### **The OIV and the vitivinicultural sector: New challenges in production and trade in the face of new global issues**

**Alejandro Fuentes Espinoza,**

**Head of Unit "Economy and Law" at International Organisation of Vine and Wine**

*Agricultural engineer and with a PhD in economics, Mr. Fuentes Espinoza has worked for more than 20 years in the private sector and research in the agri-food sector, with a specialization in the vine and wine sector. His work at the international level has focused on the development, implementation and coordination of projects, mainly on the issues of environment, climate change, sustainability and resilience, food security and consumer behavior. In 2018, he joined the International Organisation of Vine and Wine (OIV) as Head of the Viticulture Unit and today he holds the position of Head of the Economics and Law Unit. Within the OIV he is in charge of aspects of sustainability, regulations and economic issues of the sector. Since 2020, he has also been appointed as a member of the Scientific and Technical Committee of the international initiative "4 per 1000" on sustainable soil management.*

*Discutant : Jean-Marie Cardebat (Université de Bordeaux))*

**12:20 – 13:50 : Lunch**

**13:50 – 15:50 : Parallel sessions**

**Parallel Session III – Marketing -Room: Pythagoras I Chair : Jacqueline Dutton (University of Melbourne)**

**11: Extending the Theory of Planned Behaviour to explore wine consumers intention and behaviour towards online wine experiences**

*Giulia GASTALDELLO (Free University of Bozen-Bolzano), Luca Rossetto (University of Padova), Elisa GIAMPIETRI (University of Padova)*

**31: Eco-innovations in Hungarian wineries**

*Valeria Lekics (Hungarian University), Imre Ferto (Hungarian University)*

**36: Developing a Blockchain-based Framework for Improving Customers' Loyalty to the Wine Brand: A Case Study**

*Parisa Sabbagh (University of Palermo), Mariantonietta Fiore (University of Foggia), Nino Adamashvili (University of Foggia), Maria Crescimanno (University of Palermo), Antonino Galati (University of Palermo)*

**54: User-Generated Content and Relevance of Sustainability Attributes for Wine Consumers**

*Miguel Angel Gomez-Borja ((University of Castilla-La-Mancha), Immaculada Carrasco (University of Castilla-La-Mancha), Juan-Sebastian Castillo (University of Castilla-La-Mancha)*

**56: The Relevance of Wine Branding: A Bibliometric Analysis of Wine and Brand**

*Stefano Corsi (University of Milan), Riccardo Saracino (University of Milan), Emilano Villanueva (Eastern Connecticut State University)*

**63: A life's work – Brian Croser's influence on identifying terroir and geographical indications in Australia**

*Jacqueline Dutton (University of Melbourne)*

**Parallel Session IV – Territories, Sustainability & Tourism - Room: Demokritos I Chair : Sofia GOUVEIA (UTAD)**

**73: Evaluating the contribution of landscape diversity to the beauty of German wine landscapes, using eye tracking**

*Maximilian Tafel (Hochschule Geisenheim University), Kristyna Kohoutkova (Hochschule Geisenheim University), Eckhard Jedicke (Hochschule Geisenheim University), Anne-Katrin Kleih (Mendel University)*

**75: Impact of regional location on specialized degree programs' performance: the case of the French wine-producing regions**

*Jean-Marie Cardebat (University of Bordeaux), Olivier Guyottot (Inseec Business School), Mahmoud Hassan (University of Bordeaux)*

**27: Better together: classic method sustainable wines**

*Martin Prokes (Mendel University in Brno)*

**66: Assessing true cost of wine and its impact on customers willingness-to-pay**

*Philippe Masset (EHL Hospitality Business School), Carlos Martin-Rios (EHL Hospitality Business School), Bastien Christinet (Haute école de viticulture et oenologie de Changins), Alexandre Mondoux (Haute école de viticulture et oenologie de Changins)*

**58: Emerging wine tourism in island destinations: Empirical insights from Cret**

*Maria Alebaki (Hellenic Agricultural Organization), Stella Kladou (Hellenic Mediterranean University), Maria Psimouli (The American College of Greece)*

**10: Total factor productivity in the presence of spatial dependence and transient and persistent inefficiency**

*Samuel Faria (UTAD), Sofia GOUVEIA (UTAD), José Alberto Fuinhas (University of Coimbra), Joao Rebelo (UTAD)*

**16:00 – 17:40: Parallel sessions**

**Parallel Session V – Consumers - Room: Pythagoras I Chair : Lara Agnoli (Burgundy School of Business)**

**40: Gender and participation in the AECS. The case of Hungarian wine grape farms**

*Imre Ferto (Hungarian University of Life Sciences), Lajos Barath (Center for Economic and Regional Studies, Budapest), Zoltan Bakucs (University of Óbuda)*

**3: Is there a corruption-effect on champagne consumption?**

*Omer Gokcekus (Seton Hall University), Mehmet Londozi (Creditwest Bank)*

**8: Quality perception of Hungarian wines in foreign markets: The case of Tokaj region**

*Jeremias Mate Balogh (University of Budapest), Mengting Yu (University of Tuscia), Luigi Palumbo (University of Tuscia)*

**9: Impact of Education and Group on Performance in Blind Tastings, an Experimental Approach**

*Magalie Dubois (Burgundy School of Business), Lara Agnoli (Burgundy School of Business), Nikolaos Georgantzis (Burgundy School of Business), Steve Charters (Burgundy School of Business), Jean-Christian Tisserand (Burgundy School of Business)*

**69: Communication styles on Italian wineries websites**

*Francesca Gori (University of Bologna), Giulia Maesano (University of Bologna), Alessandra Castellini (University of Bologna), Maurizio Canavari (University of Bologna)*

**Parallel Session VI – Industrial Organization & Management -**

**Room: Demokritos I Chair : Davide Gaeta (University of Verona)**

**23: Collective Reputation Effects: Empirical Evidence from the Austrian Wine Market**

*Dieter Pennerstorff (Johannes Kepler University Linz), Daniela Rroshi (Vienna University of Economics and Business), Christoph Weiss (Vienna University of Economics and Business)*

**41: Successes and Failures by PDOs as Collective Brands for Italian Wine**

*Julian Alston (University of California), Davide Gaeta (University of Verona)*

**43: Are cooperatives doomed to produce only low quality wine? Not quite...**

*Angelo Zago (University of Verona), Umberto Nizza (University of Verona), Giulia Gastaldello (Free University of Bozen-Bolzano), Guenter Schamel (Free University of Bozen-Bolzano)*

**45: Terroir, terroir, are thou in Bordeaux ? A spatial hedonic regression analysis for Bordeaux wines**

*Angelo Zago (University of Verona), Francesca Rossi (University of Verona)*

**53: Whose bubbles are these? Winery brand versus Territorial brand**

*Chiara Mazzocchi (University of Milan), Stefano Corsi (University of Milan), Riccardo Saracino (University of Milan)*

**20:00 – 22:30 : Dinner at the ANTIGONI restaurant at the old Venetian Port**

May 30

**08:30 – 10:10 : Parallel Session**

**Parallel Session VII – Sustainability, Environment & Organic -Room: Pythagoras I Chair : Guenter Schamel (Free University of Bozen-Bolzano)**

**46: Price impacts of ecofriendly attributes on cheap standard wines and quality wines: a comparison between hedonic model investigations**

*Massimo Canali (University of Bologna), Valentina Suprani (University of Bologna), Caetano Luiz Beber (University of Bologna), Giulio Malorgio (University of Bologna)*

**44: Developing a hierarchical integrated framework to evaluate sustainability performance in the wine industry**

*Ana Trigo (UTAD), Ana Marta Costa (UTAD), Rui Fragoso (University of Évora)*

**60: Clusters and sustainability: an approach from the Spanish wine sector and its designations of origin**

*Juan José Juste-Carrion (University of Valladolid), Guillermo Mendizabal (University of Valladolid)*

**61: What is natural wine?**

*Robin Goldstein (UC Davis), Magalie Dubois (Burgundy School of Business)*

**Parallel Session VIII– International Trade & Macro- Room: Demokritos I Chair : Angelo Zago (University of Verona)**

**15: EU wine exporters competing in a changing international market**

*Anna Carbone (University of Tuscia), Roberto Henke (Research Center for Policies and Bioeconomy, ROME)*

**28: Heterogeneity and diversification strategies in exports: The case of the protected Spanish wine industry**

*Jacobo Nunez (University of Madrid), David Martin Barroso (University of Madrid), Juan A. Nunez Serrano (University of Madrid), Francisco Velazquez (University of Madrid)*

**37: The impact of markups on export behaviour: Firm level evidence from Hungarian wine industry**

*Imre Ferto (Hungarian University of Life Sciences), Gergely Csurilla (Center for Economic and Regional Studies, Budapest), Zoltan Bakucs (University of Óbuda)*

**38: Measuring the impact of natural disasters on wine exports: Investigations at the level of French 'départements'**

*Alex Bao (University of Bordeaux)*

**42: International Trade in Sparkling Wines. Is Prosecco Different?**

*Angelo Zago (University of Verona), Diego Lubian (University of Verona), Umberto Nizza (University of Verona)*

**10:10 – 10:20 : Coffee Break**

**10:20 – 12:20 : Parallel Session**

**Parallel Session IX– Sustainability & Risk Management - Room: Pythagoras I Chair : Jean-Marie Cardebat (University of Bordeaux)**

**72: Sustainability-oriented innovations and productivity in the Italian wine industry: Does dynamic capabilities matter**

*Luca Camanzi (University of Bologna), Pier Paolo Miglietta (University of Salento) Giulio Paolo Agnusdei (University of Salento), Sofia Formica (University of Bologna), Giulio Malorgio (University of Bologna)*

**74: Do South African consumers prefer local eco-certified wines**

*Radu Mihailescu (University of Applied Sciences, Rengerslaan), Britta Niklas (Ruhr University Bochum), Adeline Alonso Ugaglia (Bordeaux Sciences Agro), Daniel Moscovici (Stockton University), Jeff Gow (University of Southern Queensland)*

**62: A Dynamic Model of Sustainable Development in the Wine Sector**

*Guenther Schamel (Free University of Bozen-Bolzano), Stefan Franz Schubert (Free University of Bozen-Bolzano)*

**65: From Risk to Reward: The Strategic Advantages of Diversifying Grape Varietals**

*Philippe Masset (EHL Hospitality Business School), Louis Jordi (University of Bordeaux), Jean-Philippe Weisskopf (EHL Hospitality Business School)*

**71: Evaluating Strategies for Adaptation to Climate Change in the wine sector**

*Simonetta De Leo (Centre for Agricultural Policies and Bio-economy,Rome) Antonella Di Fonzo (Centre for Agricultural Policies and Bio-economy,Rome), Sabrina Giuca (Centre for Agricultural Policies and Bio-economy,Rome), Marco Gaito (Centre for Agricultural Policies and Bio-economy,Rome), Guido Bonati (Centre for Agricultural Policies and Bio-economy,Rome)*

**77: The financialization of the bulk wine market : issues and limits of the launch of a futures market**

*Jean-Marie Cardebat (University of Bordeaux), Catherine Lis Castiblanco (University of Bordeaux), Yves Jegourel (University of Bordeaux), Jean-Marc Figuet (University of Bordeaux)*

**Parallel Session X– Industrial Organization & Management -Room: Demokritus I Chair : Nikos Georgantzis (Burgundy School of Business)**

**33: Technology-based regional wine development: A multi-purpose agrobot design for grape harvest automation**

*Aikaterina Karampatea (International Hellenic University), Elisavet Bouloumpasi (International Hellenic University), Eleftherios Karapatzak (International Hellenic University), Emmanouil Tziolas (International Hellenic University), Stavros Pavlidis (International Hellenic University), Stefanos Koundouras (University of Thessaloniki), Spyridon Mamalis (International Hellenic University), Chris Lytridis (International Hellenic University), Vassilis G. Karburlasos (International Hellenic University)*

**48: The effect of weather and non-climatic inputs on mean yield and production risk : the case of French wine grapes**

*Louis Jordi (University of Bordeaux), Catherine Lis-Castiblanco (University of Bordeaux)*

**5: Simulation of the potential economic effect of a change from AOC to PDO in a wine-growing region in Switzerland**

*Alexandre Mondoux (Haute école de viticulture et oenologie de Changins), Bastien Christinet (Haute école de viticulture et oenologie de Changins), Roxane Fenal (Haute école de viticulture et oenologie de Changins), Olivier Viret (Direction Générale de l'Agriculture, de la Viticulture et des Affaire Vétérinaires du Canton de Vaud)*

**32: Is wine made in drama deserving of protected designations of origin (pdo) recognition?**

*Aikaterina Karampatea (International Hellenic University), Elisavet Bouloumpasi (International Hellenic University), Andriana Skendi (International Hellenic University), Spyridon Mamalis (International Hellenic University), Georgia Tseine ((International Hellenic University), Sofia Giorouki (International Hellenic University)*



**34: The role of the geographical indication signs in increasing the market price for red wines. Evidence from the Italian market**

*Lucas Rossetto (University of Padova), Alice Stiletto (University of Padova), Leonardo Cei (University of Padova)*

**59: Characterising governance, innovations and sustainability in the French wine industry: a comparison between Cooperatives and Investor Owned Firms**

*Louis-Antoine Saisset (University of Montpellier), Leila Temri (University of Montpellier), Thalia Astruc (Institut Agro Montpellier), Iciar Pavez (University of Montpellier)*

**12:20 – 13:50 : LUNCH**

**13:50 – 15:30 : Parallel Session**

**Parallel Session XI– Consumers & Demand - Room: Pythagoras I Chair : Joao Rebelo (UTAD)**

**13: Predictive modelling of willingness to pay for Portuguese sparkling wine consumers**

*Joao Rebelo (UTAD), Mario Gonzalez Pereira (UTAD), Norberto Jorge Goncalves, Lina Lourenco Gomes (UTAD), Tania Goncalves (UTAD)*

**29: A structural demand model of fine wines' characteristics: Does buyers' heterogeneity matter?**

*Benoit Faye (Inseec Business School), Eric Le Fur (Inseec Business School)*

**22: It's all about sparkling wine - consumer trend analysis of sparkling wine in Germany**

*Christoph Kiefer (Geisenheim University), Gergely Szolnoki (Geisenheim University)*

**49: The role of behavioural antecedents and consumption occasions in green innovation acceptance: the case of wine in can**

*Lara Agnoli (Burgundy School of Business), Azzurra Annunziata (University of Naples), Efi Vasileiou (University of York), Nikos Georgantzis (Burgundy School of Business)*

**50: Exploring Relative Inflation Through the Vehicle of Champagne - Measuring the Experience of Luxury Inflation**

*Paul Merton (Ethos Wines Group, Cambridge)*

**Parallel Session XII– Industrial Organization & Management -Room: Demokritos I Chair : Raul Compes (Instituto Agronómico Mediterráneo)**

**35: Impact of resource allocation and diversification strategies on performance measures in the post-Covid period: an application to Spanish wineries**

*Katrin Simon-Elorz (Universidad Pública de Navarra); Teresa García López de Meneses (Universidad Pública de Navarra), Andrea Ollo López (Universidad Pública de Navarra)*

**76: Determinants of blockchain technology adoption: the case of the Italian wine supply chain**

*Nicolas Santori (Polytechnic University of Marche, Ancona), Deborah Bentivoglio (Polytechnic University of Marche, Ancona), Giulia Chiaraluce (Polytechnic University of Marche, Ancona), Adele Finco (Polytechnic University of Marche, Ancona), Giacomo Staffolani (Polytechnic University of Marche, Ancona), Giulia Rafaiani (Polytechnic University of Marche, Ancona), Roberto Tonelli (University of Cagliari), Ruggiero Sardaro (University of Foggia), Piermichele La Sala (University of Foggia), Francesco Conto (University of Foggia)*

**67: Spanish wine routes. Differences, similarities and consequent strategic implications**

*Bartolomé Marco-Lajara (University of Alicante), Luis A. Millan-Tudela (University of Alicante), Javier Martinez-Falco (University of Alicante), Eduardo Sanchez-Garcia (University of Alicante)*

**68: An industrial policy for territorial development: the case of the wine industry of Aragon (Spain)**

*Vicente Pinilla (University of Zaragoza), Raul Compes (Instituto Agronómico Mediterráneo)*

**80 : A proposal for the generation of supra-appellation of origin in the case of Spanish wine based on consumer perceptions**

*David Martin Barroso (University of Madrid), Jacobo Nunez (University of Madrid), Juan A. Nunez Serrano (University of Madrid), Francisco Velazquez (University of Madrid)*

**15:30 – 15:40 : Coffee Break**

**15:40 – 17:20 : Parallel Session**

**Parallel Session XIII– Territories & Tourism - Room: Pythagoras I Chair :** *Immaculada Carrasco University of Castilla-La Mancha*

**17: The Effect of Winery Video Content on Consumer Perceptions of Wine Quality and Prices**

*Natalia Velikova (Texas Tech University), Tatiana Chameeva (KEDGE Business School), Marc Faget (KEDGE Business School), Bogdan Olevskyi (Texas Tech University)*

**20: The effect of wine tourism on the sustainable performance: Evidence of the Spanish wine industry**

*Javier Martinez-Falco (University of Alicante), Eduardo Sanchez-Garcia (University of Alicante), Luis-Antonio Millan-Tudela (University of Alicante), Bartolomé Marco-Lajara (University of Alicante)*

**26: Factors affecting the wine experience: the case of Urla vineyard (wine) route, Turkey**

*Nuray Turker (Karabuk University Safranbolu), Ozde Erkoc (Independent Scholar)*

**30: Issues at stake when monitoring wine tourism activities' economic performance**

*Claire Lamoureux (KEDGE Business School), Tatiana Bouzdine-Chameeva (KEDGE Business School), Vincent Maymo (IAE Bordeaux)*

**51: Territorial and Demographic Implications of the Viti-vinicultural Economy in Europe: The Case of Castilla-La Mancha (Spain)**

*Immaculada Carrasco University of Castilla-La Mancha, Sebastian Castillo (University of Castilla-La Mancha), Maria Carmen Cortijo (University of Castilla-La Mancha), German Andres Cevallos (University of Castilla-La Mancha)*

**Parallel Session XIV– Regulation & History -Room: Demokritus I Chair :** *Stefano Castriota (University of Pisa)*

**16: A methodological investigation of the literature on moderate alcohol consumption**

*Stefano Castriota (University of Pisa), Paolo Frumento (University of Pisa), Francesco Suppressa (University of Siena)*

**18: Innovation and European Wine Regulation**

*Tilman Reinhardt (University of Bayreuth), Yasmine Ambrogio (University of Bayreuth), Laura Springer (University of Bayreuth)*

**55: The adoption of fungus-resistance grapevines: an analysis of producers approach in the Italian region of Veneto**

*Francesca Bastioli (University of Padua), Valentina Di Chiara (University of Padua), Eugenio Pomarici (University of Padua)*

**4: Wine and first wave globalisation: a case study in reception**

*Graham Harding (University of Oxford)*

**64: Emperors as kingmakers: A rare illustration of both instant and lasting Veblen effects**

*Olivier Bargain (University of Bordeaux), Robin Goldstein (UC Davis), Olivier Baron (University of Bordeaux), Maria C. Lo Bue*

**May 31**

**Visit of the Manousakis winery (wine tasting and lunch) and the Karavitakis winery (wine tasting)**

**Transport by bus**



# Parallel session I -

Sustainability, Environment & Organic

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# The winery between sustainability and terroir: the Sagrantino DOCG case study

*Chiara Mazzocchi (University of Milan), Stefano Corsi (University of Milan), Diego Grazia (University of Milan)*

## Introduction

The wine sector is one of the most relevant engines for the economic development in many specialized areas and contributes to it in terms of employment and companies revenues (Bigliardi and Galati, 2013), but also by protecting and valorizing the landscape, by promoting the local gastronomy, by attracting visitors and tourists. The wine represents a set of values, symbols, and traditions rooted in the area in which the winery is based, and when the wineries have good reputation in the market they concur to enhance the value of the area. At the same time, wine production can contribute to soil, water, and air pollution, reduction of agrobiodiversity and industrial diversification by excessive focus which drains resources from other sectors, etc.

Although the relationship between wineries and their territory is a well known topic, the literature on how wine businesses the strategy reflect on the rural development is rather scarce and requires further, more in-depth studies of all aspects of the business. Indeed, case study method is appropriate for this topic because it allow to compare the wine production to other sectors and to understand its specific mechanisms and dynamics (Orth et al., 2007).

The aim of this research is to fill this gap up. Our paper analyses how a strategy based on the combination of tradition and innovation can benefit the wineries and the territories where they are located. In particular, it identifies which business model could be adopted in order to pursue both the environmental sustainability and the rural development, by combining environmental oriented practices and typicity. This research is based on a qualitative methodology and focuses on one case study. We analysed Arnaldo Caprai winery, an internationally recognised Italian wine company, characterized by a highly innovative business approach and a strong link with the territory. The case study is relevant as it indicates that sustainability and rural development can coexist in order to achieve competitiveness and market success, and their interaction can provide a spill over that involves other wineries and companies.

## Methodology

According to the work of Pucci et al. (2020) we have developed the research as a longitudinal case study (Howard-Grenville, Metzger, & Meyer, 2013), to show the way in which a company involves its stakeholders in producing sustainable territory development.

As a primary source of data, we have employed interviews and informal speeches with Marco Caprai, the winery owner, and with other fundamental professional figures who over the years have helped to implement and support corporate strategies relating to the creation of value in the area and the increase in sustainability.

We have interviewed our respondents regarding key events and major investment decisions that had occurred in the past, using interviews recorded and transcribed, fields notes, internal reports, and several visits to the winery. Specifically, some of the research group have known Arnaldo Caprai since early 2000, participating in various events.

Moreover, we have collected data coming from the specialized press and the video channel. The different data are triangulated for ensuring internal validity of multiple sources data (Creswell, 2009; Yin, 2013). The data have been analyzed by both grounded theory and temporal bracketing. Firstly, we

have identified the key events witnessing the sustainable project and investments made by the company, basing our discussion on the three main phases of existence, survival, success (Pucci et al., 2020, Churchill and Lewis, 1983). Then, we have explained how the winery has developed sustainability and territorial development in each of the three periods.

We have based our analysis by using the approach by Gioia et al. (2013). According to the grounded theory, we define first-order concepts and successively, aggregating concepts, second-order issues, and at the end, by iterating data, we find the aggregate dimensions. Then, we have linked the emerged themes using “temporal bracketing”, connecting the action of previous periods to changes in subsequent periods.

## **Results and conclusions**

The results of the iteration of data are three synthetic dimensions: i) Supporting territorial development; ii) Wine quality and agricultural sustainability challenges; iii) Values communication and stakeholder engagement.

The main results show that a winery can involve multiple stakeholders becoming the driving force pushing for the territorial development, thanks to their investments in the territory and to the diffusion of its values strictly rooted in the area. Furthermore, sustainability is a crucial asset of winery strategy to guarantee the consumers’ adhesion to winery values and increase their loyalty

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# **Leadership, motivation, and creativity with an environmental perspective: the perfect cocktail for green innovation in the wine industry**

*Eduardo Sanchez-Garcia (University of Alicante), Javier Martinez-Falco (University of Alicante), Luis-Antonio Millan-Tudela (University of Alicante), Bartolomé Marco-Lajara (University of Alicante)*

Businesses are increasingly striving to foster environmentally responsible practices and establish environmentally conscious brands. To achieve this, they adopt environmentally conscious strategies, relying on their knowledge, leadership, and capabilities to enhance corporate governance and operational outcomes from an ecological standpoint (Song et al., 2020). As a result, various industries are now shifting their focus towards greener approaches, recognizing the significance of innovation, leadership, motivation, and creativity in this pursuit (Shahzad et al., 2020). Nevertheless, the sustainability of our current development model faces challenges due to the impact of climate change (Berbegal et al., 2019; Millan-Tudela et al., 2022; Martínez-Falcó et al., 2023). To address the adverse effects of traditional businesses and products, there has been a growing attraction towards green management and corporate culture among both the business community and academia in recent years.

Stakeholders and researchers have exerted pressure on organizations to formulate policies encompassing social, economic, and environmental dimensions (Roscoe et al., 2019; Li & Ramanathan, 2020). Recent studies have highlighted the potential of greening information technology and computing processes to help firms reduce carbon emissions, energy consumption, and waste generation (Bai et al., 2017; Ojo et al., 2019). As a result, the focus of research is now shifting from a broad exploration of green business practices to the specific greening of various aspects within organizations, including creativity and innovation (Zailani et al., 2015; Awan et al., 2019). Within the context of business sustainability, scholars have demonstrated that companies embracing green creativity and innovation can gain a competitive edge by leading the way in environmentally friendly processes and resource efficiency, thus bolstering their reputation and performance (Packalén, 2010; Chen & Chang, 2013; Yong et al., 2019).

Creativity is widely acknowledged as a crucial predictor of improved organizational performance, competitiveness, and customer service activities (Darvishmotevali et al., 2020). Consequently, businesses can leverage their green creativity to develop sustainable technologies that mitigate environmental degradation (Chen & Chang, 2013; Jia et al., 2018; Eide et al., 2020). Moreover, harnessing green creativity enables businesses to enhance their competitive position in an ever evolving and innovative business landscape (Chen, 2008). Nowadays the concept of green creativity has gained prominence as a cognitive ability that enables individuals to implement environmentally responsible solutions (Ali et al., 2020).

This notion revolves around generating innovative and valuable ideas concerning environmental goods, services, or activities, influenced by both individual and collective factors (Chen & Chang, 2013; Song & Yu, 2017; Eide et al., 2020; Pizoń et al., 2023). Consequently, there is an inclination to innovate and adapt existing processes and products to safeguard the environment from potential harm caused by business activities (Ali et al., 2020). Addressing the challenge of global warming through environmental innovation may influence decision-makers to develop eco-friendly and innovative processes and products, thereby minimizing adverse impacts on the surrounding ecosystem (Chen & Chang, 2013). To ensure the sustainability of firms, future research needs to delve into the role of managers, particularly focusing on transformational leadership (Pham et al., 2020; Li et al., 2020). The

success of companies hinges on their ability to utilize resources that are essential, scarce, and difficult for competitors to replicate (Takeuchi et al., 2007).

According to the resource-based perspective, a company's capacity to effectively leverage its strategic resources enables the achievement of comparable tasks in distinct ways, leading to sustained performance and enhanced competitive advantage (Barney & Wright, 1998). From a scholarly perspective, green transformational leadership has been recognized as a pivotal asset influencing environmental performance in businesses (Huang et al., 2021). Several researchers have explored the relationship between green transformational leadership, environmental management systems, and company performance, revealing an indirect impact through various other factors and practices (Roscoe et al., 2019; Li et al., 2020; Pham et al., 2020; Singh et al., 2020). Green transformational leadership can be defined as the managerial behavior that motivates subordinates to achieve environmental objectives, inspiring them to surpass expected levels of environmental performance (Chen & Chang, 2013).

This form of leadership fosters eco-friendly and innovative behavior among employees, thereby enhancing a company's environmental conservation efforts (Mittal & Dhar, 2016; Li et al., 2020). Previous research corroborates that creative behavior, from an environmental perspective, is influenced by leadership and other variables (Jia et al., 2018; Tuan, 2019; Singh et al., 2020). Moreover, managers who hold a positive perception of the company's environmental system exhibit respectful attitudes towards the environment and encourage innovative thinking to achieve corporate environmental conservation goals (Song & Yu, 2018). Motivation also plays a significant role in an organization's level of inventiveness. Green motivation refers to behavior that arises from an intrinsic source, as it inherently brings pleasure and is effective when individuals believe it originates internally (Hagger & Chatzisarantis, 2015).

A concern for improving the current environmental situation can motivate individuals to conserve and care for the environment. This objective can be further supported through the development of goods and services that protect and preserve the natural heritage from human-induced damage. Consequently, affection and enthusiasm for the environment form a natural phenomenon and are integral components of green motivation. When employees possess a strong desire to create environmentally friendly products, they are more likely to generate creative and eco-friendly ideas. Nevertheless, limited attention has been given to the perspective of executives and workers regarding green innovation in organizational-level environmental management studies (Jia et al., 2018; Song & Yu, 2018; Marco-Lajara et al., 2023). Moreover, there is a dearth of empirical evidence in the literature concerning the influence of green transformational leadership on green motivation and creativity and how these factors, in turn, impact green innovation (Ali et al., 2020; Singh et al., 2020).

This research aims to examine how green transformational leadership shapes the development of green innovations within firms. Additionally, the study seeks to explore whether there exists a mediating effect of green motivation and green creativity in this relationship. The ultimate goal is to determine whether green transformational leadership directly and indirectly influences the green innovation performance of companies, using the specified mediating variables. To achieve these objectives, the paper focuses on the wine industry, a sector manufacturing products of significant market value, and facing particular vulnerability to the consequences of accelerated climate change resulting from human actions, particularly the adverse impact of business activities on the environment (Fisher et al., 2018; Berbegal et al., 2019; Fuentes-Fernández et al., 2022; Merkytė et al., 2020; Montalvo-Falcon et al., 2023; Sánchez-García et al., 2023). The paper's structure is as follows: Following this introduction, the subsequent section delves into the relevant literature that forms the foundation for the formulation of hypotheses. The third section outlines the methodology employed, followed by the presentation of the statistical analysis results. Subsequently, the findings are discussed, and conclusions, limitations, and potential avenues for future research are drawn.

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# Market acceptance of Fungus – resistant grape varieties (FRGV) – A mixed methods project in Germany

*Christoph Kiefer (Geisenheim University), Gergely SZOLNOKI (Geisenheim University)*

## Introduction

Fungus-resistant grape varieties (FRGV) are an important field of research in viticulture, as they represent a way of reducing the use of copper-containing pesticides and thus minimising the environmental impact. As early as the 1930s, Decker described the development of resistance to downy and powdery mildew as one of the decisive breeding goals (Decker, 1934). However, the first breeding successes were not achieved until the 1980s (Montaigne et al., 2016). A study by Montaigne et al. (2016) investigates the development and quality of FRGV in different wine-growing regions. The results show that backcrossing with European grape varieties has improved the quality of resistant grape varieties considerably and that they can now be produced in line with the market. Several studies support this results as they have shown that the quality of wines made from FRGV can be considered equivalent to traditional grape varieties (Basler and Pfenninger, 2003; Doye et al., 2005; González-Centeno et al., 2019; Schwab et al., 2000; Sloan et al., 2010; Rousseau et al., 2013; van der Meer and Lévite, 2010; Willer and Zanoli, 2000).

Fechter et al. (2018) investigates the acceptance of resistant grape varieties among winegrowers in Germany and shows that despite the benefits of FRGV, less than 3% of German vineyards are planted with these grapes (DeStatis, 2020). Other wine-growing countries such as France and Italy have major breeding success, but the proportion of resistant grape varieties is also low in these countries (Montaigne et al., 2016). Hence, fungus-resistant grape varieties continue to exist as niche product in a niche market (Casanova-Gascón et al., 2019; Sloan et al., 2010). This results from the general disinterest of producers which could be traced back to the lack of market acceptance by the consumer. According to various studies, this is due to their unusual names and wines with different taste profiles, the high status of "traditional" grape varieties on the German market and the increased advisory effort that fungus-resistant grape varieties require (Doye et al., 2005; Fechter et al., 2018; Sloan et al., 2010). Vecchio et al. (2022) described how neophobia has to be considered another purchase barrier to buying wines from resistant varieties. Therefore, it is necessary to educate consumers to break traditional ways of thinking (Ram and Sheth, 1989).

Overall, the literature suggests that resistant grape varieties are a promising solution to the problem of using copper-containing pesticides in viticulture and that their quality has improved in recent years. However, there are still challenges in the acceptance and dissemination of FRGV by wine producers and consumers. Therefore, perceptions of producers and consumers towards FRGVs are examined to elaborate the driving parameters and barriers regarding the lack of acceptance and to draw practical implications for the producers of fungus resistant grape varieties in Germany.

## Methodology

In order to investigate the acceptance of fungus-resistant grapevine varieties by producers and consumers, a research model was developed comprising several studies. Figure 1 shows a schematic picture of the project process. To capture producer attitudes, a sequential exploratory mixed-methods design model was used. This approach is an experimental design in which qualitative data is collected and analysed in a first step, followed by quantitative research guided by the results of the qualitative study. Finally, the results of the quantitative and qualitative research are compared and interpreted. In the second phase, this approach was transferred to the consumer in order to obtain a basic picture of their attitude towards FRGV.



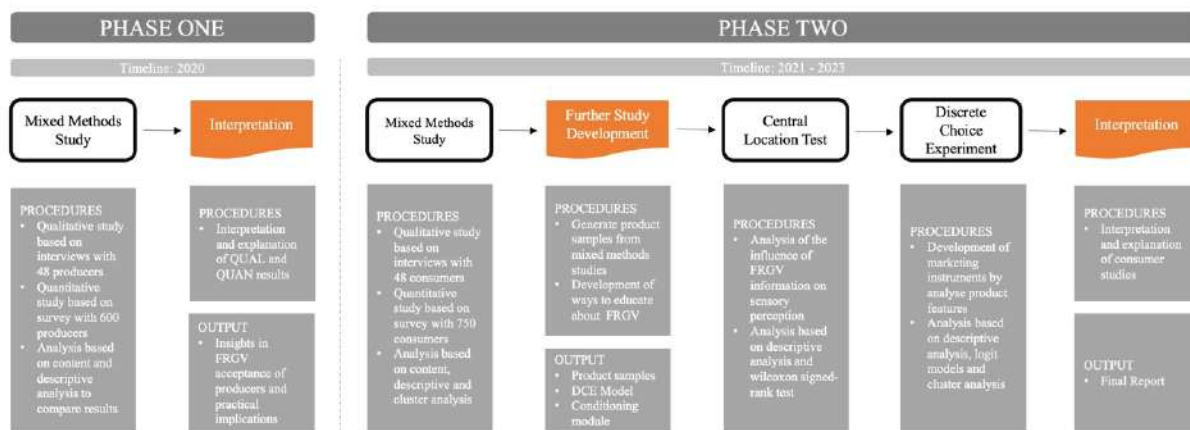


Figure 1: Representation of the project process

Based on the results of the consumer and producer studies, products were developed that form the basis of the following studies. These product samples were developed sensorially and design-wise based on the findings. These product features were particularly relevant in the following studies. In addition, text passages were developed to make a conditioning effect measurable. This conditioning effect is analysed in a two-stage procedure. The first stage looks at the conditioning effect in the sensory context, which is tested with the help of a central location test. The experimental set-up includes four tasting samples, which are blind tasted in the first step and open tasted after conditioning with the help of an adapted newspaper article about the characteristics of FRGV. In the conditioned open tasting, the participants were shown whether the grape variety was resistant and which one it was.

Finally, a discrete choice experiment is conducted. This particular methodology is used to quantitatively measure the benefit, or the purchase decision based on various product attributes such as price or also the label design. In the context of resistant grape varieties, the conditioning effect is also analysed. Again, this is a two-stage model, followed by conditioning after an initial run of the products. Based on this, the same products are evaluated again, and the benefits of the product characteristics are examined. The primary aim is to develop strategic recommendations for marketing actions for producers. This study will be carried out in the later part of 2023.

## Results

There is a high level of acceptance among producers regarding the cultivation and vinification of FRGV. A reduction in pesticide use is a decisive factor in the choice of resistant varieties. However, many producers are not yet aware of how important these varieties will be in the future. Currently, the decision to plant new varieties depends mainly on current market demand. To be economically viable in the future and to meet policy objectives, the use of FRGV is inevitable. However, a major problem for most producers is the lack of customer awareness. With the new FRGV generations, it will be easier for producers to choose these varieties as they have both hybrid variety denominations and adapted flavour profiles. In a market like Germany, which is dominated by grape varieties, these factors are crucial for market entry. The use of a centralised term is controversial but could reap the benefits of an umbrella brand. With the ongoing greening of markets, actively communicating the benefits of these grape varieties is a driver for a rapid increase in awareness and thus promotes a positive impact at different stages of the value chain.

The attractiveness of a grape variety is defined by consumers through four characteristics. In particular, the awareness of a grape variety determines the likelihood of purchase. This is also in line with the results of the producer study. FRGV are still relatively unknown due to their low production volume and young history. However, they can close the awareness gap with traditional grape varieties by using hybrid terms or associating them with aromas or existing grape varieties. Sensory acceptance varies greatly depending on the target group and processing methods. The provision of information

has a positive influence on acceptance and differs in relevance and interest depending on the target group. The influence of information about FRGV on sensor perception results in a positive effect on the quality perception of wines from resistant grape varieties. However, there is no negative effect of conditioning on the quality perception of wine from conventional grape varieties. In general, a fruity sour-sweet balanced style is preferred.

We conclude that it is important to achieve a significant market share can only be a challenging and competitive process, and it requires a combination of effective marketing, high-quality products, and strong industry relationships. The results of the discrete choice experiment will complement the project regarding specific marketing tools.

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# The moderating role of company size in the implementation of proactive environmental strategy

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Growing challenges related to climate change, coupled with green demands from stakeholders have forced wineries to develop and implement new environmental practices and technologies (Galbreath et al., 2016), advancing toward environmentally sustainable farming and production practices (Corbo et al., 2014), developing high quality and environmentally friendly products (De Steur et al., 2020).

In this context, the implementation of green practices emerges as a response to improving the environmental performance of the company (Li et al., 2016). The proactive environmental strategy allows companies to reduce the environmental burden while obtaining a higher financial return (Aragón-Correa and Sharma, 2003) and greater competitive advantage (Dai et al., 2017). The concept of proactive environmental strategies refers to those activities that companies implement to reduce or prevent their environmental impacts (González-Benito and González-Benito, 2005). In the literature on environmental proactivity, several drivers have been identified that influence the implementation of this type of practice, which include regulations (Tang et al., 2017), lobbying (Darnall et al., 2009) and internal motivations (Simpson et al., 2004). Specifically, the search for benefits, cost savings, new market opportunities, higher profits, among others, are the main internal motivations that lead companies to implement environmental processes (Simpson et al., 2004). Similarly, stakeholders' pressure, as external drivers, have been recognized in the literature as a strong driver of environmental activities (Green et al., 1996). The greater the pressure from interest groups, the greater the level of environmental proactivity developed by companies (Aragón-Correa and Rubio-López, 2007).

On the other hand, company size affects environmental performance (Covin et al., 2006) and moderates the relationship between drivers and proactive environmental strategy (González-Benito and González-Benito, 2005). Numerous studies have found evidence that larger companies tend to be more environmentally proactive (Murillo-Luna et al., 2011; Darnall et al., 2010). Larger companies have easier access to external financing necessary for the development of this type of strategy (Aragón-Correa, 1998). However, SMEs enjoy greater flexibility and faster responsiveness (Darnall et al., 2010) thanks to their smaller organizational structure that allows the inclusion of environmental objectives in the company's mission and vision (Larson, 2000).

Given the background literature, this paper wants to examine the relationships among drivers, environmental practices, and financial performance of Spanish wine companies. More concretely, it wants to provide empirical evidence on the moderating effect of company size on the relationships between drivers and environmental practices, as traditionally, company size has been considered only a control variable (Zhuang et al., 2021). Similarly, this work wants to contribute to the debate on the influence of environmental proactivity on the financial performance of the company (Bansal and Song, 2017).

## Materials and methods

We defined a structural equation model (SEM), following the partial least squares (PLS) method for a sample of 241 Spanish wine companies. This technique enables latent variables to be estimated (weighting the components of the constructs) and multiple regressions to be conducted (Henseler et al., 2009), combining principal component analysis and multiple regressions. Furthermore, PLS is a good technique when the information is not abundant or heterogeneous (Hair et al., 2019).

To evaluate the model, we first evaluate the measurement model. The measurement model is analyzed through variable reliability, convergent validity, and discriminant validity. The results meet the conditions described by Hair et al., 2019. Next, we evaluate the structural model, which gives us information about the significance of hypothetical relationships.

## Results

The analysis confirms that internal motivations, external motivations, and regulatory framework have a positive and significant correlation with the proactive environmental strategy. Similarly, the moderating effect of size on the relationships between drivers and the proactive environmental strategy is confirmed. Size negatively moderates the relationship between internal motivations and environmental strategy, that is, the small companies, which enjoy greater flexibility and responsiveness, implement green strategies in search of cost reduction and improvements in competitive advantage. On the other hand, large companies are more influenced by stakeholder pressure and the regulatory framework when developing environmental practices. Finally, the analysis confirms a positive relationship between proactive environmental strategy and financial performance.

## Conclusions

The empirical analysis reveals the internal and external drivers of environmental practices. Size moderates the relationships between drivers and implementation. In this sense, small businesses pay more attention to internal factors, related to capabilities and resources, when undertaking green practices. However, large companies pay greater attention to stakeholder pressure and regulatory framework, with a positive relationship between size and external pressures. Finally, the work contributes to the current debate on the influence of proactive environmental strategy adoption and business performance.

**Keywords:** *environmental proactivity, stakeholder pressure, company size, firm performance*

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# The impacts of climate change on the wine sector in Nordic countries

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**Keywords:** climate change; precipitation, temperature, wine industry; Nordic countries

Over the last 50-60 years, climate change has been playing an increasingly significant role in the lives of humanity, flora and fauna, and this phenomenon also affects global wine production significantly. In recent years, the topic of climate change in the wine industry has been frequently investigated (Decanter 2019; Wine Enthusiast 2020). As the temperature increases, the amount of precipitation decreases, the major wine-producing regions are also affected significantly by climate change, however, depending on location (coastal or continental) these countries are subjected to different types and frequencies of climate events (Blanco-Ward et al., 2007).

Several authors (Hannah et al., 2013; Roehrdanz - Hannah, 2016; White et al., 2006) state that popular wine-growing areas such as Bordeaux or the Napa Valley are in great danger due to climate change and the areas will become less and less suitable for grape growing. In consequence, there are already remarkable changes in wine production (increasing proportion of alcohol, plantation of new heat-tolerant grape varieties, growing wine grapes in cool climates, the boom of wine production in Nordic countries). Wine production is generally considered riskier in cold climate regions, but producers in countries with cooler climates are also investing more and more money in winemaking (Anderson, 2016; Ashenfelter – Storchmann, 2016). But what can be considered a cool climate region or country? According to the literature, there is currently no consensus on this definition. There is agreement that the average temperature, the amount of precipitation, the wind or the sunlight hours all matter (Anderson, 2016; Jones – Schultz, 2016).

Ashenfelter and Storchmann (2016) and Alonso Ugaglia and Peres (2017) provided an extensive literature review on the impact of weather and climate on grapes and wine describing how climate change is likely to affect wine production. In contrast with the existing scientific publications, investigating the effect of climate change in cool climate or Nordic countries using the econometric method is scarce in the wine economic literature. In addition, White et al. (2006) also highlighted the shortcomings of average temperature analyses. The paper aims to investigate the effects of climate change on the wine sector in wine producing countries between 1961 and 2020. More specifically, the study addresses the following research question: how climate change, and its consequences (average temperature change, precipitation change) affect grape and wine production, especially in Nordic countries (countries located north from the wine belt in the northern hemisphere on the Earth). Panel econometrics is applied in this study to measure the effects of climate change (global warming) on the wine industry.

A panel data analysis is applied to explore the effect of climate change on the global wine sector focusing on Nordic wine region of the World. The wine sector data obtained from FAOSTAT (production data) and the Climate Change Knowledge Portal (CCKP) of the World Bank (mean temperature, precipitation) available from 1961 to 2020 ( $t=60$ ). The sample comprises 11 Nordic countries (Belarus, Belgium, Canada, Czech Republic, Germany, Luxembourg, Netherlands, Poland, Russia, Sweden, and the United Kingdom), including a dummy for Nordic countries.

Based on the preliminary results, an increase in temperature has a positive effect, while an increase in precipitation has a negative effect on wine production in the examined countries. Our results are



confirmed by many researchers. The climate change shifts most of the premium wine production north and a need for stronger pest management due to fungal diseases (White et al., 2006), and warmer and longer growing seasons will shift production towards more climate resistant varieties and lower quality wines (Cahill et al., 2007; Ruml et al., 2012). In the main wine-producing countries, it may be a trend for the future that, as the temperature increases, grape growing becomes increasingly impossible (Hannah et al., 2013; Roehrdanz - Hannah, 2016), which may give the Nordic countries an advantage.

By 2050 the global the wine sector might be intensely influenced by the consequences of climate change. Decreasing rainfall, rising average temperature, and extreme weather would also be a problem in major wine-producer countries by the middle of the century. The paper analysed the impacts of climate change on the global wine sector and Nordic wine producer countries, which, also based on our results, can play an increasingly vital role in the world's winemaking.

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# Towards a sustainable wine industry: Insights from Italian wine cooperatives

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**Keywords:** wine; cooperatives; sustainability; challenges

## Extended Abstract

Sustainability has become a relevant issue for the global wine industry, it is indeed one of the greatest challenges in wine production. Wine producers need to balance and integrate all three dimensions of sustainability, i.e. producing environmentally friendly wine in a socially responsible manner while contributing to the economic success in the long-term. There is an ongoing transformation towards more sustainable production methods in Italy but it remains a huge challenge to put sustainability principles into practice for the predominantly small and medium sized wine producers.

Producer organizations (POs) including wine cooperatives (co-ops) take a leading role in implementing sustainable practices. Co-ops are key actors of the Italian wine sector. Indeed, Italian wine co-ops account for about 60% of the national wine production in terms of volume and 40% of the value, corresponding to about 4 million euros turnover (Area Studi Mediobanca, 2022). Usually, they are formed by many producers, often hundreds. The leading wine co-ops in Italy represent 140,000 growers. Thus, they play a vital role in ensuring the survival and in enhancing the competitiveness of small and medium sized agrifood firms (Richter & Hanf, 2021a).

The overall objective of this study is to get insights into the future challenges cooperatives and their members face with regard to the implementation of sustainability practices. A specific focus is directed towards the drives and barriers in the adaption of sustainability certification schemes.

Looking at the literature on the environmental dimension of sustainability, two major issues for grape production are climate change (Droulia & Charalampopoulos, 2021) and the negative impact of using of chemical fertilizers and pesticides (Cataldo et al., 2021). Other areas of environmental concern in wine production are land use issues, water (use and quality), solid waste (organic and inorganic), energy use and greenhouse gas emissions, including the emissions from the transport of wine bottles (Christ & Burritt, 2013).

Social sustainability practices are less developed than environmental ones and not widely adopted (Forbes et al., 2020; Tahon & Batt, 2021). They involve all activities of wine producers within a socio-economic and cultural context, for example, the development of territories and rural areas, concerns with regard to working conditions (respect, equality, safety, health, training, and stability), consumer safety, and health (OIV, 2016). Moreover, socially responsible producer behavior also covers issues related to the circular economy and traceability systems (Toussaint et al., 2021). So far, most sustainability initiatives in the wine sector approach socio-economic aspects in a rather general way (Merli et al., 2018). In recent times, however, social sustainability is getting progressively more important and offers untouched potential for wine producers in gaining a competitive advantage.

Meanwhile, consumer awareness of sustainability issues in wine production is increasing but still relatively low (Mastroberardino et al., 2020; Sok et al., 2021). Wine purchase choices are still predominantly determined by traditional wine attributes like a reputable region or terroir attributes, and (expected) taste (Mastroberardino et al., 2020; Mueller Loose & Remaud, 2013). However, a

literature review on consumer behavior for sustainable wine showed that a considerable consumer segment across different countries is indeed sustainability-oriented, consumes wine more often and is willing to pay higher prices for sustainable wine. Thus, the production and marketing of wine with sustainability attributes is a promising quality differentiation strategy (Schäufele & Hamm, 2017).

To date, only a few studies analyzed the adoption and perception of sustainable practices from the producer's point of view. Recent studies identify a range of possibilities to foster the adoption of sustainability practices in the Italian wine sector (e.g., Steur et al., 2020). Only a few wineries approach sustainability in all stages of wine production. The reduction of phytosanitary measures are among the most important and most common realized sustainable practices among wine producers (Bandinelli et al., 2020; Pizzol et al., 2021). Predominantly, the adoption of sustainability practices is internally driven, e.g., cost savings and higher profits, competitive advantages, marketing positioning, product quality or ethical reasons linked to producers' attitudes. Dominant external drivers are stakeholder pressure, current and future regulations (e.g. export requirements), or consumer demand (Dodds et al., 2013; Golcic, 2021; Santini et al., 2013; Steur et al., 2020). Regarding implementation barriers, there are just a few studies available. According to them, the most important barriers for the predominantly small and medium sized wine producers are labor and investment costs, extra costs for implementation, lacking knowledge, expertise and time to implement the practices (Bandinelli et al., 2020; Dodds et al., 2013; Golcic, 2021; Steur et al., 2020). Moreover, concerns about greenwashing and the abuse of sustainability are crucial issues that need to be addressed further to promote the implementation of sustainability practices (Steur et al., 2020).

This study contributes to the developing body of literature on sustainable solutions adopted, their drivers and the challenges faced by the whole Italian wine sector while offering an updated and comprehensive overview on wine cooperatives. To the best of our knowledge, only a few studies addressed this topic (e.g. Candemir et al., 2021; Richter & Hanf, 2021b).

Specifically, this research builds on semi-structured, in-depth interviews with representatives (managers and presidents) of 19 Italian wine co-operatives operating in northern Italian regions. The interviews focused on future sustainability challenges for the co-op and the sector, the adoption of sustainability certification schemes (schemes applied and how many members or what share of production is certified) as well as present and future strategies regarding sustainability.

The interviews are analyzed through language processing techniques (LPT) like Content Analysis and word clouds (e.g., Goel et al., 2019). Content analysis is a systematic and objective means to make valid inferences from verbal, visual, or written data to describe and quantify specific phenomena (Downe-Wamboldt, 1992). A mix between deductive and inductive approach will be adopted (Seuring & Gold, 2012): information on the three sustainability pillars, i.e., environmental, social, and economic, will be coded based on definitions available from existing literature. Such information will further be classified in draft categories regarding challenges (future and present), and strategies in place. Structural information on each co-op (e.g., age, number of members, hectares, location) will also be considered.

Our results represent the preliminary step towards a study that will involve a large sample of Italian wine co-ops, developed within the EU-Prima "AgriCompet" project. Moreover, they will provide useful information to the sector's stakeholders and policymakers in adequately guiding and fostering the sustainable transition of the Italian wine sector starting from one of its key actors: wine co-ops.

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# Parallel session II-

Experts & Hedonic

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# Gender differences in expert Evaluations: Are Women (really) More Lenient?

*Bernd Frick (Paderborn University), Daniel Kaimann(Paderborn University), Clarissa Spiess Bru (Paderborn University)*

A large body of (mostly experimental) literature shows that men and women differ considerably with respect to competitive orientations, risk aversion, (over- vs. under-)confidence, choking under pressure as well as altruism and other-regarding preferences. This raises the question whether women are also more lenient or more generous in evaluating the performance of others.

In this paper we use data from a particularly prominent US wine journal, the “Wine Enthusiast” (<https://www.winemag.com>), a magazine and website specializing in wines, spirits, food and travel to answer our research question. The magazine was first published in 1988 and today has more than 500,000 readers.

We use a large sample of more than 83,000 tasting notes published in that magazine by 13 distinguished professional critics, of whom 6 are female. Controlling for the experts’ experience, the wines’ country of origin, their grape variety and bottle prices, we find that women are – if anything – less generous when evaluating a particular wine. Detailed analyses reveal that male wine critics provide more homogenous reviews than their female colleagues in the sense that the difference between the least lenient and the most generous women is much larger than the same difference among men.

Thus, controlling for self-selection into a particular field (i.e. wine critics) our study confirms previous findings using data e.g. from professional sports: unobserved heterogeneity drives the results generated in most of the widely cited lab experiments.

# Judging Reliability at Wine and Water Competitions

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**Keywords:** wine competitions, bottled water, blind tasting, expert evaluation

Wine competitions—organized events in which a panel of experts blind taste wines, rate them on a numerical or other scale, and bestow awards to the highest rated entries—continue to attract attention, including from wine economists. A number of studies have examined the 1976 Judgment of Paris, the annual wine competitions at the California State Fair, and other similar competitions.

Those studies have evaluated, among other things, the inter-rater reliability of wine judging as measured by the correlation between different judges' ratings of the same wines. A positive correlation between judges' ratings suggests they identified similar differences among the wines and, moreover, shared similar aesthetic standards when translating perceived differences into ratings. In that case, their collective judgment about the relative quality of the wines might be meaningful.

Previous studies suggest the correlations among wine judges' ratings are generally positive and higher than what would be expected by random chance (Ashton, 2012; Bodington, 2020). Wine judging therefore appears to have a higher inter-rater reliability than pure randomness. Previous studies also suggest that wine judging has a lower inter-rater reliability than what is observed when experts in other fields make judgements specific to their expertise (Ashton, 2012). However, some of the field-specific tasks to which wine judging has been compared—such as meteorologists forecasting hailstorms—seem only vaguely comparable.

This paper provides a new basis of comparison for the inter-rater reliability of wine judging. We analyze a field-specific task that is similar to wine experts blind tasting and rating wine at a wine competition. Specifically, we analyze water experts blind tasting and rating waters at an annual international bottled water competition called the “Fine Water Taste and Design Awards.” The Fine Water competition is divided into two parts, the “Taste Awards” in which judges rate the blind taste of waters, and the “Design Awards” in which the same judges rate the visual design of bottles. Our primary focus will be on the Taste Awards, which is the most similar to a wine competition, but we will also briefly address the Design Awards as another potentially interesting basis for comparison.

Although all water might seem the same, even potable waters vary in terms of their total mineral content (which is measured by “Total Dissolved Solids” or TDS), mineral composition (such as their concentrations of calcium, magnesium, sodium, chloride, phosphorus, and silica), carbonation, pH, and other dimensions (as discussed by Capehart and Berg, 2018, and references therein). A number of studies, mostly conducted in the context of managing municipal water supplies to ensure public safety and satisfaction or understanding consumption patterns for bottled water, suggest that humans taste buds are sensitive to variation in a water's TDS level and mineral composition, at least when mineral levels vary widely enough. Studies also recognize other ways in which humans can be sensitive to water's taste and odor or health effects.

The bottled waters that compete in the Fine Water competition are drawn from specific natural sources, as we will explain. Each source's distinct geology can lead to distinct characteristics in its water. To the extent that the water experts judging the Taste Awards are able to identify similar differences among the waters they blind taste and, moreover, to the extent they share similar aesthetic standards, the inter-rater reliability of water judging should be better than random chance and could potentially be as high as that of wine judging.

We find that the inter-rater reliability of water judging at the Taste Awards is generally better than random chance, similar to wine judging at some competitions (including, in particular, the 1976 Judgment of Paris), and worse than wine judging at other competitions (including, in particular, a recent year of the California State Fair's commercial wine competition studied by Bodington, 2020).

The fact that inter-rater reliability at the Taste Awards is better than chance suggests that, to some extent, the fine waters that have competed have been different, the judges have been able to identify those differences, and they translated the differences into ratings in a way that was consistent within and between judges. Similar statements could be made about any wine competition with an inter-rater reliability better than chance.

Yet the fact that the Taste Awards' inter-rater reliability was roughly the same as some wine competitions and worse than other wine competitions suggests one or more of the following may be true. First, differences among fine waters at the Taste Awards might not have been as pronounced as differences among the wines at some wine competitions. Second, judges at the Taste Awards might not have been as skilled as judges at some wine competitions in terms of identifying any given differences in the beverages they were blind tasting. And finally, compared to judges at some wine competitions, judges at the Taste Awards might not have been as consistent with each other in terms of translating identified differences into ratings, perhaps because aesthetic standards are less established for fine water than wine. Such things could change over time if the bottled water industry continues to expand and if water expertise becomes as professionalized as wine expertise.

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# How do consumers relate to wine quality? A case of red wines from Apulia according to Vivino

*Mengting Yu (University of Tuscia), Luigi Palumbo (University of Tuscia), Enrico Mazzoli (University of Tuscia)*

## Introduction

Wine is an experiential good, meaning its true quality is unknown to the buyer until after the purchase (Gocekus & Nottebaum, 2011). Consumers adopt various coping strategies to reduce such asymmetry, including collecting information before the purchase through word-of-mouth (peers' judgements), consultation with experts' guides, and using online information portals.

Wine quality is affected by multiple inter-influencing elements such as climate, soil, and human interventions (Carbonneau and Casteran, 1987; Jackson and Lombard, 1993). Understanding how consumers perceive wine quality is fundamentally important for winemakers and wine marketers. Past studies have investigated the determinants of wine quality (Botonaki and Tsakiridou, 2004; Jover et al., 2004).

However, we haven't seen much research on open-access opinions shared directly by consumers online, which might be "a gold mine" to discover valuable information about how consumers think. We aim to investigate consumer opinions on wine quality based on the web-scraped data from the most popular wine app, Vivino.

## Literature review and research questions

As the old saying goes: "you get what you pay for". Generally, several people can resonate with the concept that a more expensive good is expected to be higher in quality than a cheaper one. However, the idea that price levels predict quality does not necessarily hold, especially for wine. According to Jover et al., wine quality is perceived from seven dimensions which are categorized into extrinsic cues and intrinsic cues (Jover et al., 2004). Extrinsic cues are related to origin, vintage, ageing ability, image, and presentation; intrinsic cues relate to personal experience.

From the wine producer's perspective, insights into consumer preferences would also be important. Selecting a well-known grape variety and introducing it to the consumers by showing the variety's name on the wine labels is a strategy with proven commercial success, especially in the New World, where labelling laws and regulations are more flexible than in the Old World (Anderson et Aryal, 2013).

Against this background, our research focuses on online wine ratings published on Vivino, a leading wine ratings and purchases platform. Vivino's ratings are user-generated, which are considered less reliable than traditional expert reviews (Kwak et al., 2021) but also a superior explanatory power for wine retail prices (Oczkowski and Pawsey, 2019), and there is a consistent path of research leveraging user-generated wine ratings (amongst others: Kotonya et al., 2018; Mazzoli and Palumbo, 2022).

## Data collection

Vivino does not provide automatic access to its data. Thus, we developed a custom web scraper in Python to retrieve the data used for this study. For this research, we collected data about 947 red wines from Apulia in Italy in June 2022 and processed our dataset to remove inconsistencies and corrected the flawed information.

Our dataset included 19 different vintages (from 2001 to 2021), 165 different wineries, and 19 grape varieties. We added “wine blend” (blend wine or single varietal wine) and “wine denomination” according to the modern Italian wine denomination hierarchy<sup>2</sup> to investigate the potential correlations with the ratings.

To normalise price variables, we also applied a logarithmic transformation for the price.

## Methodology

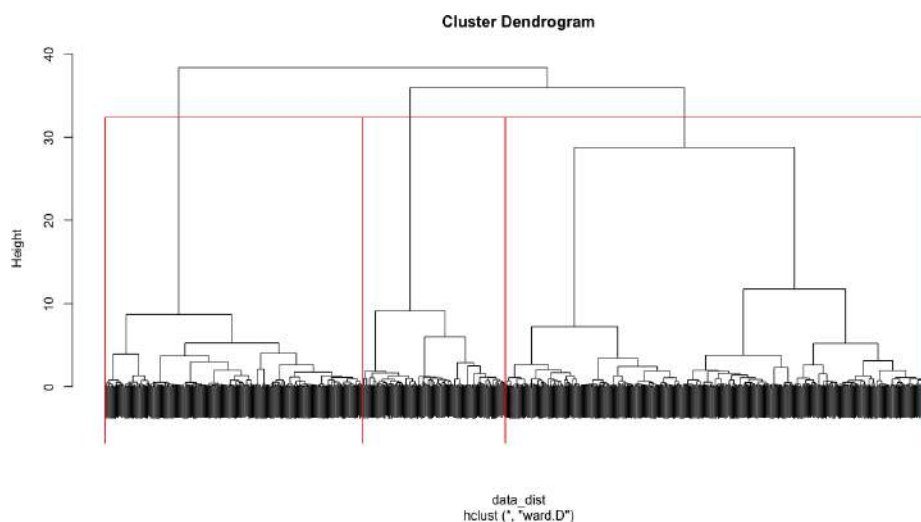
We implemented Forward Stepwise Regression (FSR) to analyse the potential influence of explanatory variables on consumers’ ratings for all red wines in Apulia. According to Desboulets, the forward stepwise approach is a well-known test-based approach to identifying statistically significant variables (Desboulets 2018). The model is built by starting with an intercept without the predictor variables, and then variables are introduced one by one at each forwarding step, meanwhile being testified with Akaike information criterion (AIC) until the model reaches the point that the best AIC is achieved.

Considering that the perceived quality may be critical to the economic return, we focused on one single wine region – Apulia – rather than a set of different regions. However, our dataset still left us with a fairly big number of levels under the nominal variables. In this case, we applied Agglomerative Nesting (AGNES) algorithm to do clustering (Figure 1) before running the FSR model (Chitra1 and Maheswari 2017). Meanwhile, we examined the performances of the model before and after the clustering practice with the standard error and mean absolute error.

Figure 1: Cluster Dendrogram

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<sup>1</sup>Information quality is often an issue for data obtained via webscraping, and this is especially exacerbated on platforms like Vivino where a large portion of data is published by users without expert supervision. While it would be desirable to have automatic data cleaning methods, quite often expert manual intervention is needed for the



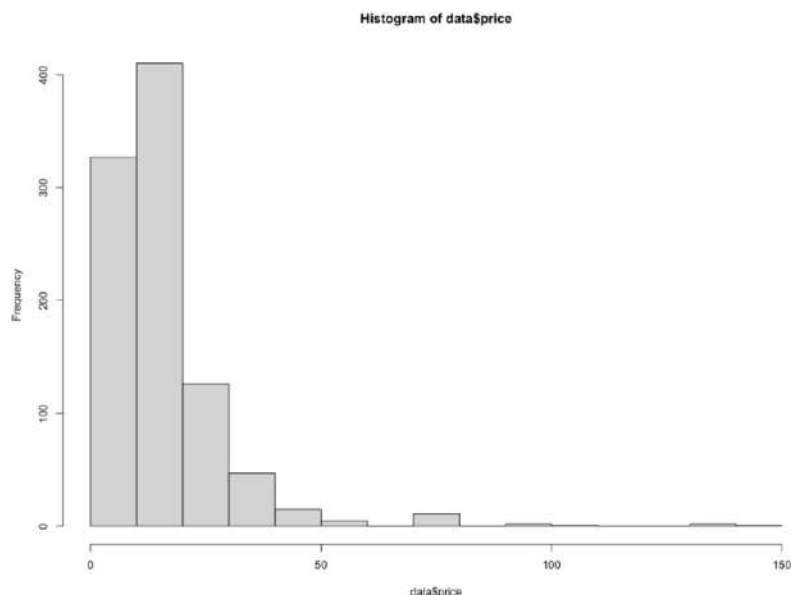
data preparation process.

<sup>2</sup>Italian wine denomination hierarchy: VDT (Vino da Tavola / table wine); IGT/IGP (Indicazione Geografica Tipica / Protected Geographical Indication); DOC & DOCG (Denominazione di Origine Controllata and Denomizzazione di Origine Controllata e Garantita / Protected Designation of Origin).

## Results and discussion

Our 947 observations were further described with 165 wineries, 19 vintages, 19 grape varieties (54 combinations of grape blends), 2 wine blending types, and 4 wine region denominations. More than 75% of the observed wines cost between 4.9 to 18.45 euros (Figure 2), while a few reached 149 euros. The average ratings were scored at approximately 4.0 out of 5.0. The average alcohol content was near 14% and the highest record reached 18%. 66% of wines were from 2017 to 2020. Interestingly, more than 83% of the wines were single varietals. Most wines were labelled as DOC or IGT/IGP.

Figure 2: Histogram of observed wine prices



Before clustering, the positive influence over the wine ratings from the vintages grew more significantly from the year 2010. The blending type was not relevant to the ratings, and only 3 grape combinations – Negroamaro & Syrah, Primitivo & Uva di Troia, Syrah (single varietal) - indicated a negative impact on the ratings. Table wine was related to a negative perception of quality (lower ratings). Higher prices and alcohol content were significantly related to higher ratings.

After clustering, we obtained two big clusters - C1 (489) and C3 (295) – and a smaller C2 cluster (163). C1 and C3 contained only single-varietal wines, but C1 had more recently released table wine and IGT/IGP wine meanwhile C3 was dominated by DOC wine. C2 was the only cluster dominated by blended wine, with various vintages and denominations except for DOCG. Differently from the other two clusters, C2 was in a much narrower price range (€4.9 - €33.8).

Alcohol content and price displayed a consistent positive influence on the ratings. In C1, Vivino users showed preference (higher ratings) for the recent vintages, but 2006 was an exception. Table wines were perceived with less quality. In C2, various blends correlated with the ratings positively or negatively. Four vintages were with negative coefficients. In C3, old vintages (2007, 2008) of single-

varietal wines were favoured by the Vivino users. It might indicate that a concentration of age-worthy high-quality wine existed in this cluster.

We examined the residual standard error, standard error, and mean absolute error of the model before and after clustering. Grouping the dataset improved the model performance slightly.

### Conclusions and future work

Our findings confirm the positive correlations between wine ratings and prices. However, we cannot assert whether a causal effect exists between the rating and the price, and in which direction it may run. In the case of Apulia red wines, consumers seem to reward higher alcohol grades with better ratings. Winery brands and grape varieties also seem to carry weight, positively or negatively, depending on the case. What we can estimate from this research is, when it is a single varietal red wine from Apulia, the consumers do not consider grape variety contributing to the wine quality. The younger vintages receive better feedback than the older ones, but a few old vintages stand out as well. Those are the areas requesting more study in the future.

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# The value of potency in cannabis, wine, and spirits: A hedonic price approach

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## Introduction

The U.S. legal cannabis market is expanding rapidly, but to date, no published research has examined the effects of cannabis potency and other product characteristics on prices, in part because of the unavailability of large-scale price data that include product characteristics.

To fill this gap in the literature, we collected a large data set of about 170 million U.S. cannabis retail prices and product characteristics over a nine-month period. In this paper, we use the hedonic price method on these data to estimate implicit prices of cannabis characteristics such as potency, concentration method, and plant species. We observe considerable differences between cannabis flower and cannabis concentrates in the effect of THC potency on price.

## Data

Over a 41-week time period from April 11, 2022, to January 16, 2023, we collected a data set of about 170 million cannabis retail prices at about 7,500 stores in 30 U.S. states that were listed on Weedmaps, the leading online retail listing and e-commerce website. A majority of legal cannabis retailers in many U.S. states maintain Weedmaps listings, and much of the existing literature on U.S. cannabis prices uses Weedmaps data (Goldstein et al., 2020).

We narrowed the 30 states from our initial data set to 23 states with at least 1,000 total price observations (including flower and concentrates) from at least 5 different stores in each state. The total data set for our hedonic price analysis was about 18.5 million price observations.

Retailers list prices for a variety of cannabis products, including standard flower packages, oil cartridges, and other products. Listings include a variety of product characteristics (including, for some, product and strain names, THC potency, and plant species), as well as retailer characteristics (including location and storefront vs. delivery-only).

## Method

The hedonic price method, pioneered by Rosen (1974), aims to estimate implicit prices for the individual “utility-bearing attributes or characteristics” of products. Typically, implicit prices are estimated from a regression of price on a vector of objective characteristics, using data that include a variety of different combinations of characteristics that correspond to different prices.

The hedonic method has been used to estimate the value of wine characteristics (e.g. Gustafson et al., 2016; Nerlove et al., 1995), but has never been applied to cannabis data. We use the hedonic price method by regressing price on cannabis product characteristics to estimate implicit price values of each characteristic in a variety of retail products and package types.

We construct separate hedonic price models for flower, concentrates, and several sub-categories of concentrates. Prices and log prices are the dependent variables, and a vector of product characteristics are used as the right-hand-side variables.

We test several model specifications, including store- or state-level fixed effects to control for spatial variation, and weekly fixed effects or time trends of varying degrees to control for temporal variation.



One of our primary variables of interest is THC content, roughly analogous to (but, as we find, also quite different from) alcohol content in wine, beer, and spirits. We include versions with THC and product characteristic interaction variables to examine heterogeneity in the THC-price relationship across distinct product segments. We run separate hedonic regressions on prices of cannabis flower and concentrates, and we compare the two.

## Results

We report summary statistics and results with regression tables showing statistically significant coefficients for a variety of product characteristics, including state, package size, THC content, store type (delivery or storefront), and species (sativa, indica, or hybrid). We control for falling prices (negative time-lag almost monotonically decreasing over time) across all product categories over the 41-week data collection period.

Flower and concentrate product characteristics differ in important ways. Cannabis flower is sold in raw smokable form, processed only by trimming, curing, and packaging. Strains and plant species differ between flower products, but those differences can only be perceived through information on the label. Concentrates vary more in their physical characteristics. Common concentrate products include liquid oil in cartridges or disposable vape pens, and sugar-like resin. Some are nearly pure THC distillates, while others are “live,” “whole-plant,” or “full-spectrum” extracts that contain more terpenes and other cannabinoids in addition to THC.

For flower, we find that THC potency has the biggest effect on price of any characteristic. We find that for a one-eighth-ounce package (the most common flower format), an increase of 1% THC (about a 3.9% increase in potency, for an average product) increases price by about 78 cents (about a 2.2% increase). In concentrates, however, we find that higher THC potency is *not* associated with higher prices. Instead, specialty methods of extraction (“live,” “rosin,” and “resin”), are the main drivers of retail value in concentrates; and higher THC potencies are actually associated with slightly *lower* prices for concentrate products.

## Discussion

The dissociation of the price-THC potency relationship between the two main forms of cannabis has not been observed in previous literature, and is unique in the context of other agricultural markets like wine and other alcoholic beverages, where farm products that are also marketed in raw forms (e.g. table grapes) are concentrated and distilled into products (wine, brandy, cha cha,, etc.) with a wide range of potency. In the high-potency alcohol market, unlike in the high-potency cannabis market, consumers do pay more for even higher potency. A 750 ml bottle of 190 proof (95%) neutral grain alcohol (e.g. Everclear) typically sells at a 10–15% retail price premium over the 151 proof (75.5%) version. A similar relationship holds for non-ingestible rubbing alcohol prices.

Why does the price-potency relationship disappear or even invert in the cannabis concentrate category? We conclude by discussing some unique aspects of cannabis that could explain these phenomena, including consumer information gaps, regulatory and tax structures, and unusual allocation of labor and capital resources in production.

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# **Sounds too Feminine? Brand Gender and the Impact on Professional Critics**

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This study examines how specifically masculine or feminine brand names classify experience goods and impacts tastings and professional evaluations. We obtained data on 18,609 wines and their ratings from the Wine Enthusiast Magazine between 1997 and 2016, yielding a sample of 31,058 observations to objectively evaluate the impact of brand gender on quality ratings measured by experts' critics. We suppose that the gender of the taster needs to be considered to understand what affects tastings and ratings, as women and men might be attracted differently to masculine or feminine names. This study shows that masculine brand names receive higher evaluations than feminine ones. In addition, we discover that women tend to rank products with higher gender name scores more highly than men. Finally, this study provides evidence that people's unconscious perceptions and quality assessments of products can be significantly impacted by (brand) gender bias.

# **Does the Tasting Note Matter? Language Categories and Their Impact on Professional Ratings and Prices**

*Clarissa Spiess Bru (Paderborn University)*

Particularly in the wine industry, information asymmetry between consumers and wine producers regarding product characteristics leads prospects to consider available information, such as market prices, professional reviews, and ratings, as reliable indicators for product quality and purchase decisions. Nevertheless, few studies reflect wine reviews' textual dimension and content. This study explores the impact of reviews and defined language inventory like articles, verbs, or adjectives and their effects on wine prices and ratings. Using 83,067 reviews from the professional wine critics magazine "The Wine Enthusiast," a seemingly unrelated regression (SUR) estimation, quantile regression, and review text analysis utilizing the content analysis tool LIWC-22 was conducted to examine the simultaneous impact of linguistic categories on wine prices and ratings. The results indicate the tasting note's increased word count and positive sentiment are significantly positively associated with a higher wine rating. The results indicate that the tasting note's increased word count and positive sentiment are significantly positively associated with a higher wine rating. Further, specific categories have a statistically significant positive impact on ratings but a negligible effect on wine prices. Consequently, a subsequent instrumental variables estimation is conducted to control for endogeneity and test for the effect of reviews on wine prices, revealing a positive significant influence. These findings could have practical strategic implications for wine market communication, marketing, and purchasing decisions, as linguistic indicators in reviews could be associated with wine quality by vintners and prospects.



# Parallel session III-

**Marketing**

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# Extending the Theory of Planned Behaviour to explore wine consumers intention and behaviour towards online wine experiences

*Giulia GASTALDELLO (Free University of Bozen-Bolzano), Luca Rossetto (University of Padova), Elisa GIAMPIETRI (University of Padova)*

While the Covid-19 pandemic and the related mobility restrictions brought the wine tourism sector to a standstill, they also pushed wine operators to find new strategies for improving sector's resilience. Online wine experiences (OWE) are one of the innovations fuelled by the pandemic, which are still exploited by several actors from single wineries (e.g., Pasqua winery in Verona) to Consorzi di Tutela (e.g., the Consorzio Tutela Conegliano Valdobbiadene Prosecco Superiore) as a promotional and marketing tool. At the same time, tourism operators implemented online wine tasting experiences in their offer. The phenomenon is gaining increasing attention on the supply and the demand side but, although some papers offer an exploratory view of the phenomenon (e.g., Gastaldello et al., 2022; Wen & Leung, 2021; Szolnoki et al., 2021), the current body of literature lacks of robust and representative studies that can help actors of the wine and tourism industry to have a better understanding of the target market and fully exploit OWEs potential.

The present research aims to tackle this need focusing on the demand side.

Specifically, the study applies Azjen (1991)'s Theory of Planned Behaviour (TPB) through Structural Equation Modelling to analyse the antecedents of intention and behaviour towards OWE relying on a large sample of Italian wine consumers having past wine tourism experience. The sample is representative in terms of age, gender, and geographical place of residence and data were collected through an online survey at the beginning of 2022.

An extended TPB model is further tested including wine involvement, risk attitude, and future wine tourism intentions in addition to the common TPB antecedents (i.e., attitude, subjective norms, perceived behavioural control). Notably, the key role of involvement is widely recognized among marketing and behavioural scholars (Michaelidou & Dibb, 2008) as it is acknowledged to affect consumer decision-making processes and behaviour (Broderick & Mueller, 1999; Prebensen et al, 2013). Coherently, wine involvement can significantly affect purchase behaviour (Bruwer & Buller, 2013; Koksai, 2021), wine tourism intentions (Sparks, 2007; Pratt, 2010), motivations (Afonso et al., 2018) and travel patterns (Brown et al., 2007). Regarding risk attitude, it is an innate characteristic of human beings which is critical to explore consumers behaviour towards OWEs as they are new products and, as such, their purchase might be seen as a risky transaction where little is known about the product. Specifically, risk attitude can affect how and how strong risk is perceived thus influencing the outcome of decisions involving risk (Wu & Chang, 2007; Tan, 1999). Lastly, wine tourism intentions are included as a precursor of behavioural intentions since a key role of OWEs for the sector is attracting potential customers to the winery and the wine region. If people having stronger wine tourism intentions in the next 12 months are also more enticed by OWEs, the latter can actually become effective marketing tools.

Preliminary results suggest that the extended model represents an improvement to the base TPB, with a remarkable explanatory power. Both future wine tourism intentions and wine involvement are significant positive predictors of intentions, whilst risk attitude negatively affects consumers behaviour. While perceived behavioural control strengthens intentions, it shows a negative and greater impact on the actual behaviour. Finally, subjective norm and attitude are positive predictors of intentions.

This study analyses the developing phenomenon of OWEs overcoming several limitations of the current literature: it incorporates consumers behaviour through a sound theoretical approach instead of stopping at intentions or interest; and it provides results generalizability to the Italian population due to the large and representative sample used for the analysis. Therefore, findings of this research provide

strategic information to operators of the wine and tourism industry as well as to policymakers to effectively develop OWEs offer. To the best of our knowledge, similar information is missing.

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# Eco-innovations in Hungarian wineries

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The future of the wine industry in a context of changing environmental conditions has received increasing attention from the different research disciplines. Growing concerns on the uncertain future and the widespread adoption of new regulations regarding the industry's environmental footprint have prompted wineries to develop and adopt new environmental practices and technologies especially in developed countries. The opportunities and challenges associated with these transformative forces have concomitantly become an important subject of inquiry. The range of questions and methods to address this emerging topic, as well as the geographical scope of the cases analyzed, have expanded in recent years. However, the knowledge of how wine firms adopt and develop new sustainable practices and eco-innovations is still limited. In addition, new insights about eco-innovation have yet to be extended across a wider variety of geographical and institutional contexts. Although there is increasing literature on eco-innovation in wine sector in developed countries, the research on Central European countries is still scarce. Our research tries to fill this gap focusing on Hungary with rich tradition in wine making. More specifically, we address three questions. 1) To what extent do wine firms adopt and develop eco-innovations? 2) Can we identify groups of wineries according to their eco-innovation practices? 3) What are the features of these clusters of wineries?

Hungary is a good example to investigate the innovation in wine sector. Since the fall of Communism winemakers are recovering traditional recipes and are experimenting with new techniques that existed before collectivization. The Hungarian Wine Society describes the sector as characterized by “a time of innovation, rivalries, and rediscovery – attempts to define the Hungarian version of “international” grape varieties, and to recreate and rehabilitate their indigenous grapes”. Vineyards are experimenting with new blends, new grape varieties in unfamiliar regions, and rediscovering lost varietals. A small number of large wine farms have received interest from Foreign Direct Investment, but the majority of the sector is still constituted by domestically owned, micro and small businesses. To illustrate, before transition about 30 large state societies and 50 cooperatives controlled the Hungarian wine production and now there are operating about 1200 small mostly family-owned and -operated businesses.

Recent literature addresses eco-innovation's distinctiveness in terms of underlying processes, drivers, and capabilities within the organization. A wide range of factors and determinants associated with conventional forms of innovation have been identified over the years. They range from internal capacities and resources to extra-organizational interactions and knowledge networks. It remains unclear whether the same determinants are associated with eco-innovation.

We focus on the three potential factors affecting the adoption of sustainable innovation. First factor relates to firm characteristics. Papers on innovation have long investigated the relationship between innovation and the general characteristics of the firm including firm size and age yielding inconclusive results.

Second factor relates to internal capabilities. Dynamic capability theories emphasize the integration, reconfiguration, and development process of resources enabling businesses to match or create changes of the market, as main driving-forces for innovation and competitiveness. Firm's ability to capitalize on changing external circumstances, to make use of external knowledge as well as their

ability to develop new products and services are essential for gaining sustained competitive advantage.

Final factor is the external knowledge sourcing. While the importance of internal capabilities is widely recognized, innovation is not solely the result of interactions and processes within the organization, but also of interactions between the firm and other economic agents. In general, having a wider array of knowledge sources and tighter relationships with external actors may have positive impacts on firms' innovative performance.

In this study, we conduct an original survey gathered from the population of Hungarian winemakers. The original firm-level survey was conducted from June 2022 until January 2023 to gather information on business and innovation strategies in the Hungarian wine industry. We investigate four types of sustainability innovation: product, process, marketing, and organizational innovation on a sample of 234 wineries covering the 22 historical wine regions of Hungary.

In the first step, we ran separate principal component analyses based on the four groups of innovation indicators. This analysis resulted in six factors. In the second step, we performed a cluster analysis of these six factors to sort firms into homogeneous groups two factors for marketing and process innovation and one factors for organizational and product innovation. The components derived from this factor analysis were used as inputs for the cluster analysis. We employed k means cluster analysis techniques to determine the number of clusters. Based on the results derived from the Calinski-Harabasz pseudo F index, two clusters were selected. The first cluster can be identified as the highly motivated eco-conscious farmers, while the second cluster is mainly composed of farmers using conventional technology.

Cross-validation analysis highlights that difference between clusters are based on mainly adaptive, absorptive, innovation and network capability. Social demographic factors are less important to explain the differences between factors.

**keywords:** Eco-innovations, dynamic capabilities, innovation capacity, networking capacity, absorptive capacity, knowledge transfer, wine industry, Hungary

# Developing a Blockchain-based Framework for Improving Customers' Loyalty to the Wine Brand: A Case Study

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**Keywords:** Blockchain Technology, Customers' loyalty, Wine loyalty, Digitalisation, Smart contract

## Introduction

The wine industry has become fiercely competitive worldwide and consumers are increasingly offered a broad range of wine brands. Consequently, wine marketing managers are required to develop strategies for building consumer brand loyalty for their own wines (Bianchi et al, 2015; Bianchi et al, 2014). The concept of customer loyalty is focused on market orientation and market demand. Its objective is to retain customers and increase sales (Wang, 2022). Brands can translate into loyalty behaviors particularly when the choice and risk process is more complex. Using market orientation to promote and increase loyalty to the brands can be important in efforts to differentiate firms from their competition (Serra et al, 2022). Results of a study carried out in the Chilean Wine Industry by Bianchi and colleagues (2015) on consumer loyalty to brands indicate that wine brand satisfaction has the strongest relationship with wine brand loyalty. In light of this, Angelini and Gilli (2022) investigated how customer experience can be used by wineries to enrich their value proposition and improve their competitive advantage. The results demonstrated the role of consumers' experience suggesting that using dimensions such as brand awareness to understand how wineries can further improve their value proposition.

Over recent years, an ever-increasing body of literature shows considerable interest in the blockchain technology in different business operations and procedures also related to the marketing unit. While commonly referenced for enabling cryptocurrency exchanges like Bitcoin, the secure, distributed ledger of blockchain may be applied for many other purposes (Sihi, 2020). Blockchain deployment in marketing, indeed, has a positive impact on marketing strategy effectiveness and ultimately on the firm performance through enhanced customer value propositions, increased sales revenue, reduced costs, and improved profitability (Wang et al, 2019; Petrović et al, 2021). Blockchain technology allows customer to be more aware of what they consuming, increase data security and traceability and food safety and quality, which leads to more conscious choices in their consumption behaviours (Tiscini et al, 2020). The overall values generated through blockchain deployment in marketing enable firms to enhance their operational efficiency and effectiveness, better serve their customers, enhancing customer satisfaction, trust, and ultimately customer loyalty (Madhani and Pankaj, 2022), and, in turn, create competitive advantages.

The wine sector undoubtedly represents an important context when discussing brand loyalty because the survival of companies in the sector depends on consumer loyalty (Rundle-Thiele (2005,

p. 333). In general, many use cases of blockchain technology are indeed emerging in the wine sector, but with unproven impacts on the sector. While some companies have initiated efforts to utilize blockchain-based distributed ledgers and smart contract capabilities to improve customers, academic assessment of blockchain applications in the loyalty context remains scarce. In addition, despite blockchain providing economic and operational benefits but companies operating in the wine sector claim to have little knowledge about blockchain and smart contracts due to its novelty and the lack of application studies.

In order to elucidate the blockchain and smart contracts mechanism and also to address the gaps outlined above, we formulated the following research question:

RQ. How a wine company could benefit from blockchain use cases for the loyalty of the brand as a marketing strategy?

The contribution of this paper is to provide a wider understanding of the blockchain as an emerging technology capable of enabling novel opportunities in the wine sector. This study will be based on the theoretical model of Pine and Gilmore (1998), thus, shifting from a goods-based economy to an experience-based economy through a service-based economy. In this model, the authors argue that successful businesses will increasingly focus on creating memorable experiences for customers, as opposed to simply selling goods or services. This will be the key to differentiating themselves and creating lasting relationships with customers (Pine & Gilmore, 1998). In addition, a more recent study by Kiseleva et al. (2016) highlights the importance to monitor behavioral loyalty by implementing a consumer 'retrospective transactional analysis' and by considering the emotional loyalty of customers.

Therefore, this paper focuses on the wine industry and explores how blockchain use cases, and blockchain-based applications including smart contracts, can improve the loyalty of customers to the wine brand. Starting from the strategies currently adopted in the wine industry to upgrade the customers' loyalty towards the wine brands, the study aims to propose potential applications of the BCT and smart contracts to make these strategies more effective and less expensive.

## **Methodology**

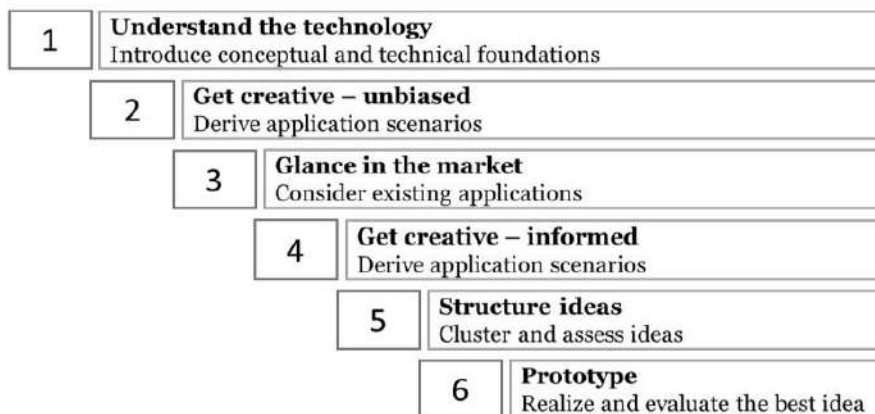
An experimental research study, as a case study, will be developed in an Italian wine company. In this work we will analyse the strategy adopted by a winery to upgrade costumers' loyalty toward a brand and based on the main obstacles occurred we propose how winery can implement the BCT in order to improve the effectiveness of the strategy adopted. In order to achieve this goal in a systematic way the Fridgen and colleagues (2018) approach will be adopted.

Fridgen and his colleagues (2018) proposed a systematic method for investigating how blockchain can act as a suitable and promising solution to address the problems according to the special needs of each company. The six steps include: 1. understand the technology, 2. get creative unbiased, 3. glance at the market, 4. get creative-informed, 5. structure ideas, 6. prototype, (Fig.1). Organizations should perform these steps within one-day or two-day workshops. By following these six steps it will be possible to identify the blockchain and smart contracts strategies that look promising to increase the customers' loyalty to a wine brand.

CEO and staff members from departments like business development, marketing, IT and innovative business units, in the wine company, will be interviewed in order to identify marketing-related problems in the companies and verify the potential of blockchain and smart contract in improving the current strategies that wine companies adopt for brand loyalty. In particular, we will host interactively online workshops to gather feedback from all relevant stakeholders. In fact, we will propose them the blockchain solutions that can be considered to improve brand loyalty within the wine company. Afterwards, the participants discuss on the selecting the most appropriate blockchain-based

strategies to solve the current challenges. The ideas will assess by using existing group creativity techniques (e.g., brainwriting). Finally, participants can cluster and prioritize all ideas concerning on the suitable blockchain-based strategy to improve consumer loyalty to a wine brand.

Figure 1. Blockchain Use Case Development Method (Fridgen et al, 2018)



## Expected Results

The expected results provide helpful insights into how to introduce and operate blockchain solutions in the private sector that look promising for the wine industry. To the best of our knowledge, there is no work on investigating the benefits of blockchain solutions and smart contracts in the wine industry as a marketing strategy to upgrade the loyalty of customers to the brand. Therefore, this framework creates a new value in this field of research.

In addition, the expected findings of this research work as a reference for wine companies to formulate appropriate blockchain-based marketing strategies to increase customer loyalty, competitiveness and the excellence of their business. The result also has value for wineries, wine retailers, and wine marketers towards identifying new trends and being proactive in these areas.

Moreover, there are enormous opportunities in blockchain-based smart contracts that will bring a revolutionary change in the upcoming years in the agro-food systems. The findings of the study can also benefit wine firms in investment decisions, brand management, and formulation of innovative strategies for the future. Finally, findings can support policymakers in developing strategies which can focus on of BCT promotion (also by means of dedicated funds) for enhancing the wine sector.

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# User-Generated Content and Relevance of Sustainability Attributes for Wine Consumers

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**Keywords:** Wine, consumer preferences, user-generated content (UGC), sustainability attributes.

Consumer environmental concerns in the wine industry have been growing in recent years. Consumers are increasingly demanding more eco-friendly practices from wineries and organic and biodynamic wines. Moreover, research has revealed that customers are willing to pay a premium for organic and biodynamic wines due to the perceived benefits of these products, which has contributed to the growth in their availability. Wineries that demonstrate their commitment to sustainability and environmental responsibility will be in the best position to meet consumer demand (Schauffele & Hamm, 2017). Using a discrete choice experiment, Tait et al. (2019) show how consumers are willing to pay for the presence of some wine-related sustainability attributes. Nevertheless, literature has recently assessed the discrepancy between attitudes and behavior regarding organic wine consumption (Jorge et al., 2020). Then, the attitude-behavior gap in organic wine consumption must be further explored to understand it better.

User-generated content (UGC) has grown exponentially across Internet platforms and applications in recent years. Social networks and other specific Internet platforms and applications have allowed users to have spaces to post content in different formats and for different purposes (Luca, 2016). Content also ranges from personal updates to reviews, opinions, and comments on social networks. Furthermore, content is materialized in text, ratings, photos, audio, and video. This digital content ecosystem can be an ideal context to explore and analyze the world, generate knowledge, and gain insights on different topics (Saura, Palacios-Marqués & Ribeiro-Soriano, 2023).

In this context, behaviors related to food and beverages are increasingly spreading on the main social networks and opinion spaces, so the amount of available information is increasing and of higher quality. In addition, dedicated social applications allow for more valuable information on specific sectors, such as the wine sector (Kotonya, De Cristofaro & De Cristofaro, 2018; Mazzoli & Palumbo, 2022).

On the one hand, general social media analytics consists of collecting large amounts of data from social profiles to discover patterns and knowledge related to a specific topic and sector (Saura et al., 2023). On the other hand, more specifically, spaces and particular applications associated with the world of wine (i.e., blogs, wine rating, and buying applications, wine communities, tourism recommendation websites, and applications) can be used to evaluate specific opinions and ratings associated with wine products. Kotonya et al. (2018), for example, carry out a detailed multi-market analysis of the data, opinions, and ratings of the Vivino application to detect trends, tastes, and preferences in different countries.

Therefore, the objective of this research will be based on the collection and analysis of user-generated content on social networks, such as Twitter or Instagram, related to sustainability dimensions and attributes that consumers naturally talk about in social media and opinion forums. This analysis will allow us to complete the conclusions obtained through other methodologies and offer a complementary tool to SMEs in the industry to decide which most relevant and activatable dimensions from the winemaker's marketing strategy perspective. In addition, analyzing social networks and other web spaces also offers an attractive area to study future trends. It allows us to identify the most active and influential users and profiles in configuring these trends.



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# The Relevance of Wine Branding: A Bibliometric Analysis of Wine and Brand

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## Introduction

Wines are complex products. They historically have been identified by country and/or region of origin as well as by the producer or, in recent decades, marketed using grape varietal descriptions that gained 'generic brand status' (Spawton, 1999). Spawton (1990) supports a multi-faceted view of a wine brand. This brand hierarchy includes country of origin, region or appellation, variety of grape from which the wine is made, domain, bodega, or estate, and producer label. It may also include family heritage, production facility and equipment, winemaker, specific vineyard, soil type, climate, and even regional tourism characteristics and cuisine (Lockshin et al., 2000).

Because of its agricultural nature, the wine industry has many brand-building sources to draw upon that go beyond primary product attributes. The proliferation of means of identifying wines leads to various product variants and types and a complex buying situation for consumers; this is a significant difference between wine and other consumer goods.

## Purpose

It is then essential to uncover relationships between these wine elements and its branding. Since these connections still need to be better understood, offering a bibliometric analysis of the academic work done so far toward understanding the topic seems relevant. It may provide insight into the effectiveness of a wine brand in a time where brands and marketing knowledge (that is, the capability of firms to manage brands and distribution networks) provide fundamental elements of the growth strategies of firms in foreign markets and their evolution (da Silva Lopes, 2007).

## Preliminary literature review

The interest in articles covering the topic has been growing since the late 1990s. For example, in 2016, 30 articles related to wine banding, wine brands, or wine branded were published. Since that year, the number of yearly published articles related to this knowledge area has remained stable. Studies concerning wine branding cover many topics. Generically, a brand is related to abstract elements such as loyalty (Bandyopadhyay & Martell, 2007), identity (Devigili et al., 2018), and authenticity (Beverland, 2006). However, the concept of the brand shows several nuances when drawn to wine; it deals with, i.e. product features such as packaging (Orth & Malkewitz, 2008), labels (Labroo et al., 2008), and regionality (Johnson & Bruwer, 2007). Concepts related to wine and brand are also closely linked to tourism and events (Altschwager et al., 2017), wine tourism as a regional brand (Gómez & Molina, 2012), wine brand equity (Gómez et al., 2015), a wine tourism destination (Bruwer et al., 2016; Gómez et al., 2015), and wine country-of-origin effects (Balestrini & Gamble, 2006). In terms of wine market analysis, wine branding is related to -better- marketing practices (Thach & Cogan-Marie, 2018), consumer-choice analysis (Agnoli et al., 2014; Goodman, 2009), hedonic price analysis (Schamel & Anderson, 2003), and wine tourism market segmentation (Nella & Christou, 2021).

## Research methodology

A Bibliometric Analysis is a valuable method to analyze a large number of scientific data used to get an in-depth study of their relationships, intersections, and topics of relevance (Donthu et al., 2021). For this research, 400 papers, 852 authors, and 170 Journals were the size of the dataset. This study has been performed on VOSviewer software using the SCOPUS database with "WINE" and "BRAND\*" as the keyword query.

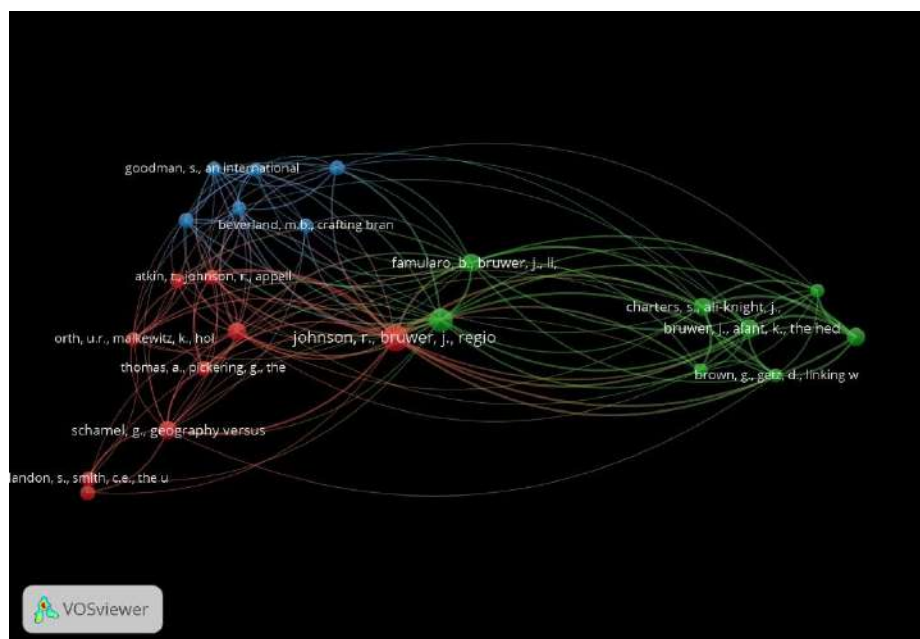
## Preliminary findings

A preliminary analysis of a sample of 1336 occurrences shows that excepting the words themselves

-wine and brand- the most repeated keywords were consumer behavior (44), marketing (35), and Australia (25). In terms of articles published per country related to wine branding, most of them are from the United States of America (88), followed by Australia (84), Italy (61), France (57), and the United Kingdom (32). The highest number of citations is held by articles from Australia (3761), followed by the US (2898), France, the UK, and Italy (around 1200 citations each). The most influential journal on the topic is the "International Journal of Wine Business Research," which has 90 documents and more than 2000 citations, then the Journal of Business Research and the British Food Journal, which both have more than 500 citations.

A bibliographic coupling analysis on documents with more than 100 shared references shows eight clusters; the articles sharing the most citations are Orth (2008) – Packaging cluster; Beverland (2006) - Luxury Wine cluster; Schamel (2003) - Pricing cluster; and Bandyopadhyay (2007) Regional Brand cluster. The co-citation analysis, represented in Figure 1 (see below), shows three significant clusters of interest in wine branding, Market (Blue), Tourism (Green), and Consumer Choices (Red).

**Figure 1 Co-citation analysis of the cited references, with a minimum of 8 cited references per document**



Source: own elaboration.

The analysis of interdependence, determined by the number of shared references, shows a demand-side-focused analysis on both the single consumer and the segmented consumers (i.e., millennials or inhabitants of a country) and a supply-side-focused analysis on quality and the impact of the territory, its image, and its identity.

## Conclusions

This initial step in understanding the relationships between wine attributes and its branding shows an increased interest in the topic by wine industries and academics of the New World. Australia and the United States lead in the interpretation, evaluation, and analysis of branding strategies that would seek to develop functional and symbolic associations in a consumer's mind to maintain awareness and salience. While geographical denominations have been historically crucial in the sale of wine, grape

varietals have taken more importance in recent decades. However, a whole branding experience seems to have nowadays taken a significant impact on marketing wine.

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# **A life's work – Brian Croser's influence on identifying terroir and geographical indications in Australia**

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Terroir is the term traditionally used by French winemakers to describe the space in which viticultural practices produce wine with distinctive characteristics. Encapsulating the combination of soil, topography, climate, landscape, biodiversity, and tradition that contribute to the typicity of a wine, terroir can be simply translated as the taste of place (Trubek, 2008). There are many more complex definitions of terroir (Parker, 2015; Matthews, 2016) including consideration of its economic implications (Meloni and Swinnen, 2018; Charters et al, 2017), which will be relevant in this study.

Geographical Indications (GIs) designate products that have a specific geographical origin and possess characteristics that are due to that origin. Unlike terroir, they are a legal entity, indicating “intellectual property rights in placenames that evoke the typical qualities of agricultural products and foodstuffs that originate in particular districts” (van Caenegem and Cleary, 2014: 90). They were introduced to Australia in 1993 during EU trade negotiations and have been evolving slowly in practice and gaining broader recognition (Zito, 2021).

This paper aims to analyse the influence of Brian Croser on identifying terroir and Geographical Indications in Australia. Croser was and still is a motivated leader in the Australian wine industry, beginning his career in the 1970s and has only recently resigned as Deputy Chair and Board Director of Wine Australia. His distinctive impact on viticulture and oenology as well as wine education and economy will be outlined following a brief overview of the historical context of the industry. The paper concludes with an evaluation of Croser's legacy in Australia and a comparison with other key international figures in the world of wine.

European traditions and techniques in winemaking laid the foundations for the wine industry in Australia, and none were more important than the French (Dutton, 2023a; Pierre, 2020; Sexton, 2011; Dunstan, 1994). From the 1770s throughout the 19<sup>th</sup> century, French knowledge and exchanges nourished Australian viticulture and winemaking, but there was little consideration of the importance of terroir. When the Appellation d'Origine Contrôlée (AOC) system was emerging in France during the first decades of the 20<sup>th</sup> century, Australia was still recovering from phylloxera and the world wars.

The wine industry only relaunched in earnest in the 1960s when sparkling and still wines started to compete with fortified wines and beer. Although certain regions became better known for their wines, geographical provenance and site specificity took second place to a winemaker's signature and the impact of a brand. The iconic example of Penfold's Grange Hermitage, made by Max Schubert from the 1950s until the mid-1970s, was a multi-sited blend of Shiraz and Cabernet Sauvignon. Grange is still Australia's most famous (and expensive) wine, confirming that terroir has not always been the first consideration among Australian winemakers.

Growing up in the Clare Valley, Brian Croser was surrounded by vineyards now renowned for their fine Riesling as well as Shiraz and Cabernet. He graduated with a Bachelor of Agricultural Science from the University of Adelaide in 1969, then went to work as a researcher and head winemaker with Thomas Hardy and Sons. After studying graduate courses in Oenology at the University of California Davis in the 1970s, he returned to South Australia and by 1976 had created Petaluma Winery, making its home in the Piccadilly Valley where he was the first to plant a commercial vineyard in 1978. The Adelaide Hills region is now covered in grapevines and winemakers who emphasise the specificity of their terroir on bottles and websites. The 1980s and 1990s were successful for Petaluma and Croser sparkling wines, but in 2001 both brands were bought by global beverage company Lion Nathan in a hostile takeover. Some of the original vineyards are now family-owned again, but Croser continued to innovate elsewhere, creating Tapanappa Wines on the Fleurieu Peninsula in 2002, with Jean-Michel Cazes,

renowned owner of 1855 classed growth Château Lynch-Bages in Bordeaux, and the Bollinger family from Champagne. He bought his French partners out in 2014 and continues to make Pinot noir from Tapanappa and Chardonnay from the original Tiers Vineyard in the Piccadilly Valley.

Croser has always insisted on the primacy of viticulture to wine quality, and is widely known as a “terroirist”, mentioning terroir in almost every interview or article he writes. His terroir-focused winemaking practices have been embraced by his daughter Lucy, also influenced by her Champenois husband Xavier Bizot – their company name is “Terroir Selections”, and they make their own wines from Terre à Terre Vineyards in Wrattenbully, near the Coonawarra region in South Australia.

As an early adopter of terroir-driven winemaking, Croser influenced new generations of winemakers through education. He established the course in Wine Science in 1976 at the Riverina College of Advanced Education, which is now Charles Sturt University, the largest provider of degree level wine education in Australia, if not the world. In 1980, he initiated and participated in creating the Australian Society for Viticulture and Oenology, providing continuing education in tasting seminars, wine assessment, and other short courses. These initiatives earned him two Honorary doctorates – from Charles Sturt University and the University of Adelaide – the latter at which he served as Deputy Chancellor from 1999-2007. During his tenure, Croser negotiated the University of Adelaide’s rental of the National Wine Centre – built by the South Australian government for AU\$50 million in 2001 – for a peppercorn lease from 2003-2017.

In addition to his influence through education, Croser was appointed to prominent industry positions, including two terms as President of the Winemakers’ Federation of Australia (1991-1995 and re-elected from 1997-1999). In this role, he oversaw the introduction of Geographical Indications to delineate agricultural and viticultural regions in Australia in 1993. Croser was also a founding board member of Wine Australia, which replaced the Australian Wine and Brandy Corporation in 2010, becoming Deputy Chairman and Board Director for many years until he stepped down from these roles in 2019 and 2021 respectively. Among his final initiatives was the “Shiraz Terroir” project with AU\$5.3 million investment from Wine Australia to investigate how Australia’s terroirs influence Shiraz wine styles and quality. Results show that Pivot© Profile, the new sensory method developed in this project, is effective in detecting terroir-based characteristics of Shiraz wine from across six distinct Australian Geographical Indications (Schmidtke, 2021: 8).

Through persistent terroir-driven practices, enthusiastic promotion, and intergenerational education, as well as institutional and economic leadership and research in the wine industry, Croser has succeeded in proving that terroir is a feature of winemaking in Australia. He has extended understanding of terroir in Australia and more widely via the “Shiraz Terroir” project and demonstrated the relevance of Geographical Indications as much more than simple markers for trade markets (Dutton, 2023b).

The impact of this individual is impressive. In many ways, Croser is like a modern-day mirror of Joseph Capus and his mission to implement the Appellation d’Origine Contrôlée (AOC) in France. Both men drew on their personal resources and practices, using educational outreach and institutional lobbying to create a framework for observing and safeguarding respect for terroir. The world has recognised Capus’ contribution to the AOC, which subsequently became the benchmark for the European Union’s Protected Designation of Origin (PDO) system. Croser’s passion and life’s work may appear less significant on a global scale, but he has been rewarded with scientific validation that Australian wine does have a sense of place.

**Keywords:** Terroir, Geographical Indications, Australian Wine Industry, Brian Croser.



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## Parallel session IV-

**Territories, Sustainability & Tourism**

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# Evaluating the contribution of landscape diversity to the beauty of German wine landscapes, using eye tracking

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Keywords: winegrowing, landscape diversity, landscape aesthetics, biodiversity

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## 1. Context and research problems

Wine landscapes are often prominent examples when it comes to attractive cultural landscapes (e.g. Daniel et al., 2012). However, as with other cultural landscapes in Europe, they are subject to significant change through the human hand. In Germany, wine landscapes were traditionally characterized by high degrees of heterogeneity, including small field plots as well as structural elements such as stone walls, hedge rows, etc. (Leyer & Mody, 2022). In the 1960s, these small plots were consolidated into larger, higher-yielding areas to help winegrowers run a more profitable business (Job and Murphy, 2006). And while it seemed that the investments were at first economically worthwhile, landscape changes had drastic consequences for biodiversity, as well as the human perception of these landscapes: the local population who identify with the landscape they come from (Daniel et al., 2012), and the tourist market for which the landscape is of paramount importance (Brown, 2006). The question is, to what degree that influences the wine landscapes' aesthetic value.

Aesthetic quality has for centuries been a subject of puzzlement in art, philosophy, and environmental management (Daniel, 2001). And while it could be assumed that aesthetic preferences in the landscape context differ largely between people, "perceptual assessments of predominantly natural landscapes have consistently shown consensus to be far greater than disagreement" (Daniel et al., 2012, p.8813). It could thus be assumed that the more natural, the more beautiful a landscape appears. At the same time, cultural landscapes are by definition characterized, at least in part, by the presence of human-made fields. Research from other forms of agriculture shows that higher landscape diversity contributes to a higher aesthetic and recreational value (e.g. van Zanten et al., 2016), but is that also true for wine landscapes? The aim of this study is to find out, if landscape diversity and the occurrence of natural structures contribute to the beauty and recreational value of wine landscapes.

## 2. Methods

To find out how the presence of natural structures in vineyard landscapes influences the perception of wine landscapes, an eye tracking study was combined with an online survey. For the study, three photographs from three different wine regions in Germany (Rheingau, Rheinhessen and Nahe) served as visual material for the study. To have the same level of potential vegetation, they were taken in one single week. The three taken images were then converted into three versions each: one with 25% natural elements, then 50%, and finally 75%. In the end, a total of nine images (see Figure 1) was presented to the study participants.

Targets for the study were German wine consumers. They had to speak fluent German, not be professionally involved in wine, spirits, or market research and drink and buy wine at least twice a month. Importance was also given to an even gender distribution and three different age categories (under 40 years / 40-59 years / 60 years and older). In February 2023, the study was conducted with 31 people under laboratory conditions at the Department of Landscape Planning and Conservation at Geisenheim University.










Share of natural structures Image No. (region name)	25%	50%	75%
<b>1</b> (Rheinhessen)			
<b>2</b> (Nahe)			
<b>3</b> (Rheingau)			

Figure 1: landscapes images studied

During data collection, participants were given a brief introduction to the eye tracking device and further information about the data collection procedure. Participants were shown the prepared nine images for 14 seconds each in a random order. After any image was shown, participants were instructed to rate the perceived beauty of the image as well as its recreational value. To ensure that respondents actually saw the various degrees of diversity, they were also instructed to rate landscape diversity.

### 3. Preliminary results

Since the data collection was only completed a few days ago, a comprehensive evaluation of the results is still to be carried out. In order to give a first insight into the results, however, we present which landscape images were rated the most beautiful and then go into more detail about why this particular image scored so well based on the eye tracking results.

#### 3.1 The most beautiful and recreational wine landscapes

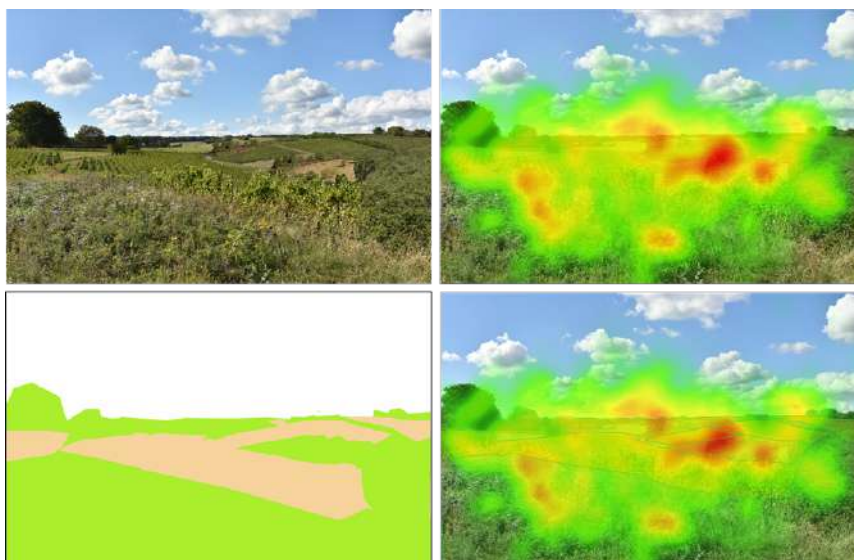
The results show that the study participants were able to rate landscape diversity according to the degree of variability that should be given to each image, i.e., the images were manipulated as they were intended to be perceived. In terms of perceived beauty, the highest rated image was “2.75”, followed by “3.50” and “2.25”. Thus, even when the most beautiful image was one with a high percentage of landscape diversity, the second and third most beautiful images contained only 50% and 25% of natural elements. This means that even if survey participants rated the images as more diverse, this did not translate into them finding them more beautiful. If anything, initial results suggest that a 50/50 ratio of vineyards to natural structures might be more beautiful. In terms of recreational value, “3\_50” scored highest, followed by “3\_75” and “1\_50”, again showing that in the case of vineyard landscapes, more nature does not necessarily mean more recreational.

Table 1: Survey results

Image	Diversity	Beauty	Recreational value
1.25	3.6	3.8	3.8
1.50	3.9	4.0	4.5
1.75	4.2	4.1	4.2
2.25	3.9	4.5	4.0
2.50	4.0	4.4	4.5
2.75	4.7	4.9	4.4
3.25	3.6	4.2	4.2
3.50	4.1	4.5	4.8
3.75	4.3	4.3	4.7

### 3.2 Eye tracking results: vineyards vs. natural structures

For the eye tracking evaluation, the first preliminary results were produced for image "2.75", the landscape perceived as the most beautiful. The results (see Figure XX) show that the time to first fixation (TTIF) was lower for the vineyards than for the natural structures, which means that participants engaged with nature faster than with the vineyards. With a fixation score of 26.20, they also fixated more frequently on the natural elements than on the vineyards (14.00). Finally, the dwell time of the eyes in nature was more than twice as high as in the vineyards. This suggests that, at least for the image that was rated most attractive, the natural structures were more appealing than the vineyards.



	Nature	Vineyard
TTFF AOI (ms)	823.60	994.10
Fixation count	26.20	14.00
Dwell time (ms)	3412.20	1673.90

Abbildung 2: Heatmap and eye tracking metrics of image "2\_75"

## 4. First conclusions

The aim of this study was to find out whether landscape diversity contributes to the beauty of wine landscapes, using eye tracking combined with an accompanying survey. The preliminary results presented show that a 50/50 ratio could be the optimum. In this work, we only provide some initial

insights. It is likely that, even when our results will be better elaborated, there will be a need for further interdisciplinary research.

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# **Impact of regional location on specialized degree programs' performance: the case of the French wine-producing regions**

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Regions and territories put forward and highlight specific features and expertise to distinguish themselves and build up a positive and attractive image (Houllier-Guibert, 2019). These features are key elements of their reputation and notoriety. They gather historic, economic, cultural and social characteristics that play an essential role on territories' attractiveness and on the way they are perceived and considered (Lardon et al., 2009). Along this reputational dimension, the concept of ecosystem has become central to regions' weight and importance. The concept of ecosystem is originally an ecological notion (Malecki, 2018). It started to be used under the expression of business ecosystem in management sciences after the work of Moore (1993), which introduced the concept as the firm's external environment. Ecosystems bring together economic and institutional actors of a given field or industry that have linked and interrelated activities. Its definition and the nature and extent of its features fluctuate and remain debated by researchers as other expressions like clusters, value networks, industrial districts or innovation systems can also be considered (Daidj, 2011).

Higher Education entities like universities, schools or programs are important regional actors. The measure of their performance varies as the concept of performance itself can have different definition and extent and is subject to debate and interpretations (Bessire, 1999). Nevertheless, performance in Higher Education is commonly linked and based on factors and variables used by accreditations (Kumar et al., 2020) and rankings (Aithal & Kumar, 2020). The choice and the weight of these variables depend on each ranking and accreditation entity and is regularly criticised and questioned. Many stakeholders feel that they do not highlight and reflect current issues and today's concerns and challenges. Nevertheless, there is today a global consensus around some performance measurement variables that have to be included to evaluate universities, schools or programs' performance. Students recruitment selectivity (Pascarella et al., 2006), graduates employability (Smith et al., 2000) or internationalization (Paige, 2005) are some of them.

To date there is no work that has studied the links that can affect the relations between territory reputation and ecosystem and specialized degree programs performance. Our research aims at filling this gap. To do so, this paper will focus on French wine growing regions and its specialized degree programs in wine. The image of a territory is often associated with an economic sector (Fujita, Krugman & Venables, 2001). Wine is a perfect case study as the reputation of wine-producing regions (especially in France) is well known by consumers. But the case of wine has a general character. New technologies in the "Silicon Valley" region, finance in the cities of NYC or London, are other examples of territories attached to a sector. We will therefore try to understand and analyse if and how a wine producing region's notoriety and ecosystem impact degree programs in wine's performance.

Our research methodology is based on a method design mixing qualitative and quantitative approaches. A mixed method can be used considering the complexity of the phenomena studied (Östlund et al., 2011) and can be useful and relevant to study topics that have not been explored yet (Morse, 2016). This approach enables triangulation that consists of implementing several approaches to collect data and then analyze issues by looking at them from more than one point of view (Venkatesh et al., 2023). In our case, we based our work on two main sources of information.

On one hand, we implemented an econometric treatment of French degree programs specialized in wine and wine producing regions quantitative data. We have listed, in an exhaustive way at the scale of France, data for 75 training programmes in the field of wine economics and business emanating from universities (public sector, non-profit), business schools (private sector, for profit) and professional



institutes (managed by the wine industry itself). For each of these programs we calculated multivariate performance indicators. These indicators constitute our dependent variable. They are regressed on two main variables of interest: the wine reputation of the region (as a multivariate indicator) and the importance of the regional ecosystem (approximated by regional production). The regression incorporates all the characteristics of the programs as control variables for their performance. Initial results (very preliminary at this stage) suggest a link between territory and programs performance.

On the other hand, we performed a qualitative work based on 21 interviews with wine degree programs' directors, students and alumni and wine industry professionals. We managed to gather a panel that represents the training programs and the different French wine regions included in our econometric work. Interviews were all conducted in 2022. Our interviews were semi-structured and the respondents were given the opportunity to elaborate on their answers. Our analysis employed an abductive approach (Alvesson and Skoldberg, 2017). First, we identified repeating patterns and focused on describing what was being displayed. Next, we organised these codes into more distinct themes as relationships emerged. Eventually, these (sub)themes were condensed into major themes (Gatrell, 2019) in a way that represented how they were related to one another. Following this approach enabled us to feed into the data analysis, data gathering and literature review (Reichert, 2019). As a result, the analysis steps were not linear and formed an iterative process that enabled to have a clear picture of the emerging themes and a clear idea of the relationships between themes. The final step consisted of seeking relationships between our different second-order themes to finally construct our model.

One of the key methodological questions was to determine how we will build up the order of the sequence in which the components occur and the emphasis given to each of them, e.g. parallel, sequential or concurrent (Östlund et al., 2011). Eventually, we decided to design our study on a sequential study approach (quantitative then qualitative study approach). This way, the qualitative approach enabled us to test and confirm the quantitative results. Besides, it complemented the gaps and the limitations that the number and the nature of the quantitative data available could have shown.

The aim of our work is to try to show the importance and the impact of regions' reputation and ecosystems on the performance of wine degree programs. Above all, it will help schools and universities that would like to set up new specialized degree programs with relevant information and elements of decision-making on their choice of location. This study will also be a useful guidance for regions and territories to better integrate Higher Education entities and programs in their strategy of development and take advantage of their activities.

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## Better together: classic method sustainable wines

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**Purpose:** The basic paradox and research question in the beginning was the combination of luxury wine marketing of sparkling wines and sustainability. The main research objective is to define and evaluate the benefits of establishing and developing wine cluster for sustainable sparkling wine producers. Very important research objective is how to increase motivation to start new businesses providing sustainable development in the region.

**Design/methodology/approach:** The most of all the research and scientific resources were obtained with cooperation of Austrian Wine Producers Associations and specialised academic experts at the University in Austria (IMC University Krems) and in South Africa (Stellenbosch University). The wine industry in both countries has experienced dynamic development and intensive cooperation in wine clusters has led to worldwide fame and significant export successes. Examples, principles and models of successful cooperation within associations and clusters can lead to a generalization of the theoretical approach and inspiration for other clusters in neighbouring countries. The special emphasis is to innovative approaches and principles leading to sustainable development in cluster research. The source of research are interviews with cluster managers, and research among winemakers and winegrowers. Further research of trends in target markets.

**Findings:** Wine production before the Velvet revolution (before 90's) in the Czechoslovakia was focused on quantity and not to allow the development of specialized categories with high value added such as classic method sparkling wine. The whole wine sector subsequently recorded a very slow development of only quantitatively orientation towards production quality and focusing on originality associated with the uniqueness. There are new projects to promote wine with high value added after the beginning of the new millennium. The research project follows the development of the regional associations of small and medium-sized wineries cooperating in system for appellations Vína Originální Certifikace (VOC). There are successful forms of sparkling wine /traditional method producers/ cooperation in wine clusters

-in the world, which can serve as a source of inspiration for the growing cluster initiatives in the Czech Republic.

The values relating to the environment and society are of particular importance in the eyes of the consumer, who acts as a responsible citizen. Moderate regular drinking of classic sparkling wines creates space for education in the areas of sustainability and circular economy of their producers. Sustainability, Organic wine certified, Biodynamic wine certified, Natural wine or raw wine have become part of complex modern business management and marketing of wine clusters specializing in the production of classic sparkling wines. Findings of the research is devoted in detail to the organization the CIVC (Comité Interprofessionnel du Vin de Champagne), the Comité Champagne is trade organisation representing interests of independent producers (vignerons) and Champagne Houses. Champagne to be a fully sustainable region by 2030. The point of view of the organization of a new appellation system for sparkling wines in the Czech Republic is examined in detail with the introduction of the highest Austrian sparkling wine category Sekt G.U. (PDO). Seven years ago (2015) local producers set the course for Austrian Sekt with a protected designation of origin and certified quality has been instantly recognizable for consumers via the three quality classes – The Austrian Sekt G.U. Quality Pyramid - of Klassik, Reserve and Grosse Reserve. The inspiration for the intensive cooperation of individual producers is the Method Cape Classic association in South Africa,

whose model of operation is excellent in wine tourism and especially in the areas of cooperation on innovation and new sustainable processes.

This paper analyses the potential for wine tourism development and creating a plan for newly formed strategic alliance coordinating services offer all wineries in the region. This study describes the potential to offer services and products of wine growing areas in South Moravia region in the southeast part of the Czech Republic, suitable for promotion offers wine tourism destinations and services. To achieve the objective of the paper was conducted marketing research data collection and mapping current events and activities taking place in the wine- growing region of Moravia, where are offering specific local products and services associated with gastronomy and wine. Based on the results it can be concluded that the interprofessional association VOC Czech Republic meets the conditions for a cluster. The plan to create a sparkling wine production cluster was proposed to establish cooperation between the newly emerging associations of VOC appellation at three sub-regions of South Moravia to achieve competitive advantage.

**Research limitations:** The suggestions for future research is possible in new emerging Moravia Classic Method association created in year 2021. The identified limitations in the research processes were influenced by pandemic crisis COVID19 and related declines in producer turnover and wine sales throughout the wine world. After all limitations with pandemic COVID19 was coming new situation in the beginning new year 2022: there are a lot of economical influences for producers and also trends in the related markets regarding to energetic and war crisis in Ukraine.

**Practical implications:** The implications for organisation in cluster practice, applications and consequences are identified by three examples of clusters (France – CIVC, South Africa – MCC, Austria – Sekt G.U.). All examples of cluster organisation is going to responsible sustainable outcomes.

**Keywords:** wine cluster, paradox luxury and sustainability, CIVC, MCC, Quality Pyramide

# Assessing true cost of wine and its impact on customers willingness-to-pay

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**Keywords:** fine wine, true cost, customers' perception, willingness-to-pay

*"The responsibility of the winemaker is to take that fruit and get it into the bottle as the most natural and purest expression of that vineyard, of the grape varietal, and of the vintage."* (R. Parker)

## Abstract

The human being is strange. He has many facets, and often he is only able to reveal his best facet in the face of adversity. Today, the economic situation, but even more so the social and environmental situation, are difficult. Uncertainty, shocks of various natures, seem to have brought about an awareness that environmental and social issues should be given more importance, perhaps to the detriment of the economy. This raises questions about (1) how environmental and social dimensions can be better integrated into an economically focused model, and (2) if and how this awareness can affect consumer behavior.

This article has two objectives: (1) to model the True Cost of Wine (TCW), and (2) to examine the extent to which TCW can affect consumer decisions. The notion of True Cost is interesting for several reasons. The most important one probably relies on the fact that it does not require a change in the economic paradigm on which our societies are based. It simply requires an adaptation of this paradigm to take into account dimensions that go beyond simple economic considerations. In concrete terms, it means calculating a cost that takes into account direct economic costs as well as social and environmental costs. In the past, these were called externalities. The purpose of True Cost is to internalize these externalities so that, at the very least, economic agents have access to a complete set of information about the impact of their decisions, and thereby can potentially adapt their decisions in order to reduce the externalities they induce.

Examining TCW is relevant because of the very specificities of wine, and the way customers perceive this good. Among agricultural products, wine is one of those with the highest environmental footprint. Moreover, it has significant direct and indirect impacts, both in social terms (through working conditions and contribution to the local community) and health terms (harmful addictive behaviors, burden on the health system). It is also a product that is very much affected by the current trend of consumers to favor short circuits and products respectful of nature. Thus, organic, biodynamic and natural wines have gained a lot of popularity in the last few years. However, even if the trends are clear and strong, these wines are still in the minority compared to conventionally produced wines. This observation reflects both the popular and sometimes political

will to move towards a more sustainable agriculture, and the fact that consumer behavior remains difficult to change.

On some issues, the academia anticipates developments, whereas on others it tends to merely follow and analyze them. On the issue of True Cost, the academic world seems to have clearly fallen behind. There are many initiatives from private and non-governmental organizations. The academic world has recently "woken up" with special issues from high impact journals. But, in full generality, and in the context of agricultural products and in particular wine, many questions remain open: (1) how to measure the True

Cost of wine; (2) what are the key dimensions that need to be taken into account; (3) are consumers sensitive to this type of information, and (4) how to best communicate the True Cost to consumers in order to influence their consumption decisions. This paper aims to contribute to advancing these issues.

## Emerging wine tourism in island destinations: Empirical insights from Crete

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Over the past decades, wine tourism has gained increasing recognition among scholars, practitioners and policy makers worldwide, for its potential to generate value across various sectors as well as to enhance sustainable regional development. Wine tourism destinations are “*regions which base some or all of their appeal on wineries and wine-related benefits*” (Getz & Brown, 2006, p. 79). The latter components are embedded in a wider set of both tangible and intangible regional resources. This context-specific, unique combination of physical, cultural and natural features - defined as ‘the wine tourism terroir’ - provides each destination with a distinctive attractiveness (Hall & Mitchell, 2002).

The development process of a wine tourism destination is inextricably associated with the elements that comprise its ‘wine tourism terroir’ (or regional winescape), i.e., the grape wine product, vineyards, wineries, events and festivals, supplementary services and other relevant assets (Tomljenović & Getz, 2009). Recognizing the evolutionary character of these components, previous literature has demonstrated the utility of Butler’s (1980) Tourism Area Life Cycle (LC) Theory in explaining the development patterns of a certain wine tourism destination. Earlier attempts to examine wine tourism from a LC perspective have resulted the identification of distinct development stages (see Alebaki & Koutsouris, 2019 for a review). Besides, a stream of research addresses wine business networks, strategic planning and the adoption of a holistic (systems) perspective as critical factors for the sustainable development of wine tourism based on LC theory (Alebaki, Lontakis & Koutsouris, 2020; Deery, O’ Mahony & Moors, 2012; Poitras & Getz, 2006).

Quite recently, Tahar, Haller & Massa (2021) have underlined the significance of co-creating individual and collective strategies in forming and preserving the attractiveness of wine tourism destinations. Employing benchmarking metrics at both a micro- (winery) and a macro- (destination) level to allow comparisons between regions, particularly at their earlier stages of development, is also considered of utmost importance for the long-term performance of wine tourism (Getz & Brown, 2006). Emerging wine tourism destinations, i.e., less dependent on tourism wine regions, are characterized by complexity in their nature and require special attention with respect to both their product offer and market particularities (Alonso & Liu, 2010; Sigala & Robinson, 2019; Terziyska, 2017; Williams & Dossa, 2003). Yet, research so far has largely concentrated on more mature wine regions (Rauhut Kompaniets & Nilson, 2023) of the so-called New World. Even less attention has been directed to island destinations, where wine tourism is evolving within the predominant mass tourism paradigm (Serra- Cantallops, Ramón-Cardona & Vachiano, 2021; Torres, 2002).

Considering this gap, this paper focuses on the Mediterranean region and seeks to provide a thorough mapping of the history and current state of wine tourism in the island of Crete (Greece), a typical ‘4S’ destination in the global map (Andriotis, 2006); yet with a rising wine tourism sector. Based upon data from multiple sources, including, *inter alia*, field work and participant observation; quantitative surveys and in-depth interviews; a World café dialogue; and content analysis of websites and social media, this work performs an updated meta-analysis of previous empirical findings (Alebaki, Lontakis & Koutsouris, 2019; 2020; 2022; Alebaki, Psimouli & Kladou, 2022; Alebaki, Psimouli, Kladou, Anastasiadis, 2022; Kladou, Psimouli, Alebaki & Terzides, 2022; Papadopoulou & Alebaki, 2023) in order to explore the following research questions:

What is the evolutionary trajectory and the future prospects/challenges of wine tourism in the Cretan case, from a LC perspective?

What are the main components of the wine tourism industry, viewed as a complex socio-ecological system<sup>1</sup>?

What is the degree of interaction and co-creation between individual and collective marketing activities and how do actual and potential wine tourists evaluate such marketing efforts?

Crete was chosen because of its profile as a well-known Mediterranean destination to particularly evaluate LC theory for an alternative tourism type (i.e., wine tourism) which becomes increasingly more important for the local economy. Although wineries are dispersed throughout the island, the majority of them is located in the Prefecture of Heraklion, where different factors (e.g., geography, combination of entrepreneurial/ agricultural heritage, existence of PDO wines) are more favorable. From a systems perspective, the Cretan wine tourism industry is composed by the linkages between vine growers, winemakers and various associated actors, including wine tour operators, the gastronomy and hospitality sector, administrative, management bodies, as well as the scientific and the host community. This kind of multistakeholder cooperation is a result of the systematic efforts of the regional wine producers' network, namely, "Wines of Crete", which, at the time of the study, included 36 wineries-members, accumulating for 95% of the island's total bottled wine production. In essence, Wines of Crete is an umbrella network, embracing two wine producers' Associations: Heraklion-Lasithi (i.e., Eastern Crete, founded in 2006), and Rethymno-Chania (i.e., Western Crete, founded in 2009).

From a LC perspective, Crete falls into the second stage of wine tourism development, namely the 'developing wine tourism' stage (see Macionis, 1996; Tomljenović & Getz, 2009). Primarily through the support of the "Wines of Crete" network, the island has managed to gain market share and a place on the map of wine tourism destinations in Europe. The overwhelming majority of wineries have invested in tourism facilities and are open to visitors all year round. Interestingly, Crete is among the regions with the youngest population of wine producers at a national level, thereby suggesting greater familiarity and intention to engage in social media and other marketing tools. In terms of the wine tourism experience offered, TripAdvisor reviews of visitors to Cretan wineries are largely positive, while particular references are made to the educational component (Pine & Gilmore, 1999; Papadopoulou & Alebaki, 2023). Findings also reveal the importance of synergies among different tourism types.

In terms of its academic and managerial implications, the present paper aims to enrich Alebaki, Lontakis & Koutsouris' (2020) benchmarking framework and serve as an analytical tool for the strategic planning of wine tourism development, especially in the case of developing destinations. Future research could extend this work by examining the role of different stakeholders in co-creation processes and the possible tensions amongst them.

**Keywords:** wine tourism, life cycle theory, benchmarking, Crete, Greece

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# Total factor productivity in the presence of spatial dependence and transient and persistent inefficiency

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In recent decades, globalization in the wine industry has been providing conditions for increased competition, with new entrants in the market and the rise of substitute alcoholic beverages. In such a scenario, the firms most competitive are the ones with business models that drive to be most efficient in the use of production factors as well as in the absorbing of technology progress. Supported by microeconomic production theory, these decisions are translated into the quantification of the evolution of Total Factor Productivity (TFP) and its components measured by changes in technical efficiency and technological progress. Therefore, the analysis of TFP growth and its components is a key element in the decision-making process for managers and policymakers as a tool for the assessment of entrepreneurial and industry strategic decisions.

In agrifood industries, firm location plays an important role to determine its ability to higher productive performance. Thus, the quest for improvements in efficiency, technical progress, and TFP at the microeconomic level should deserve detailed attention concerning the relationships of interdependence and interconnection that arise from the relevance of regional clustering in these industries.

Recent research developments in the modeling and computation of productivity, namely in the stochastic frontier approach made it possible to account for spatial dependence and at the same time, to disentangle between short and long-term efficiency. These features are of particular importance in industries where location is a crucial determinant of firms' capabilities, as is the case of the Portuguese wine industry.

Despite these advances and the noticeable relevance of accounting for spatial dependence in efficiency and TFP measurements, there is a lack of studies computing and comparing spatially-weighted models and non-spatial models, a gap that this paper tries to fill by computing and establishing therefore a link between spatial dependence and TFP.

Therefore, departing from a spatial stochastic frontier model that simultaneously accounts for the separation between short and long-term inefficiency and allows for the inclusion of the determinants of inefficiencies, this paper computes and analyzes the TFP of a representative

sample of Portuguese wineries, covering a period from 2014-2021. The advantages of using a spatial stochastic frontier model are discussed and the results are compared with those of non-spatial models.

The results show that the TFP indices are sensitive to model specification. Spatial spillovers are identified and found to impact the level of TFP. Specifically, the computed indices show large differences in both the mean and distribution of inefficiency estimates, despite both approaches producing comparable trends in TFP. Those are driven by similarities in technical change and scale efficiency changes across the model specifications.

Moreover, the presence of spatial dependence patterns in the stochastic frontier modeling tends to generate higher TFP values. Thus, one important conclusion is that the overall impact of spatial spillovers on TFP is positive. This generally means that for the Portuguese wine industry, strategies that foster firm cooperation based on wine regions are likely to improve the firm's productivity. Similarly, the industry might benefit from region-specific public policies, as the influence of spatial closeness between players is a positive driver of productivity, hence competitiveness.

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# Parallel session V-

Consumers

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# Gender and participation in the AECS. The case of Hungarian wine grape farms

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**Keywords:** gender, AECS, wine grape farms, propensity score matching

One of the key challenges facing modern agriculture is a resilience, and trade-offs in sustainability with stronger involvement of this sector in efforts for green economy and sustainable development to reduce climate change and the negative impact of agricultural production on the natural environment, with a simultaneously growing demand for food (FAO 2019, European Communities 2008, Ait Sidhoum et al. 2022).

The negative impact of agriculture on the environment is revealed in many papers, including the impact on climate change through greenhouse gas emissions, water pollution, air pollution, soil degradation as well as reducing biodiversity (Pingali 2017, OECD 2004). Limiting these processes requires strengthening farmers' motivation to implement environmental and sustainability practices. Agricultural policy plays a key role in shaping the pro-environmental behaviour of farmers, which includes such basic mechanisms as regulations (e.g., limits on pesticide use), and economic instruments which pay farmers directly for adopting environmentally friendly practices.

The basic group of instruments (in addition to the obligation to comply with specific environmental regulations) which is used in the European Union (EU) under the Common Agricultural Policy (CAP) are economic incentive measures in the form of voluntary commitments of farmers referred to as Agri-environmental Schemes or its current successor Agri-Environment Climate Scheme (AECS) which emphasizes their role in activities for sustainable development and climate protection.

The AECSs are designed to deliver numerous environmental benefits, such as environmentally sustainable agriculture and forestry, protection and enhancement of wildlife habitats, protection, and enhancement of water quality, and thus have a great potential for meeting both society's multiple environmental and farm income objectives. However, a key question related to public support in general – especially for the environmental programmes – is the extent to which public support promotes the achievement of the policy objectives.

Whilst there is growing literature on the effect of environmental payments, including the support of AECSs (e.g., Kleijn and Sutherland 2003, OECD 2004, Pufahl and Weiss 2009, Burton and Schwarz 2013, Udagawa et al. 2014, Desjeux et al. 2015, Arata and Sckokai 2016, de Krom 2017, Kuhfuss and Subervie 2018, Garrone et al. 2019), the results of these studies have been rather inconclusive. Some authors, e.g., Batáry et al. (2015) and Arata and Sckokai (2016), find that AECSs have generally been beneficial for farmland biodiversity and that, mostly, participation in the AECSs is effective in promoting more sustainable agricultural practices. Others, e.g., Udagawa et al. (2014) argue that entering the AECS could negatively affect farm incomes and given the diminishing negative impact over time, the level of AECS payments needs to be reviewed in the longer term. Moreover, Burton and Schwarz (2013) note that the environmental effectiveness of action-oriented AECSs (in contrast to result-oriented ones) is "rather poor".

Recognition of the motives and factors encouraging farmers to participate in AECS, which is particularly important in the context of voluntary adoption of conservation practices in most of these programmes (Batáry et al. 2015, Dessart et al. 2019). The willingness of farmers to participate in such programmes is a necessary condition, although of course, it does not guarantee success in achieving the assumed resilience and sustainability goals, particularly environmental ones. During the recent decade there is a vast literature on the determinants of participation in AECS in different countries (e.g., Uthes and

Matzdorf 2013, Raggi et al. 2015, Lastra-Bravo et al. 2015, Zimmermann and Britz 2016, Mozzato et al. 2018, Defrancesco et al. 2018, Uehleke et al. 2019). However, research results from various countries remain ambiguous, which indicates that many conditions are not only country but local specific that require more detailed recognition in different geographical or space contexts (de Krom 2017, Mozzato et al. 2018, Dessart et al. 2019), particularly, if context-specific measures are considered (Brown et al. 2021). More recently, Kreft et al. (2021) emphasize the role of non-cognitive skills, namely self-efficacy, and locus of control, in farmers' uptake of mitigation measures.

Within the wider topic of willingness to uptake AECS and effectiveness of AECS, in this research we focus on the gender driven participation in the AECS and farm sustainability.

The focus of our empirical analysis are wine grape growing Hungarian farms. We use Farm Accountancy Data Network for our empirical analysis. As expected, there is a strong gender bias with respect to farm ownership/management. For the 20 years period (2001 -2020) of the total 1182 wine grape growing farms included in the FADN, only 99 have female ownership/management. This work has just started, yet we expect interesting results rather soon.

Unay-Gailhard and Bojnec (2021) found the gender-based driven entrepreneurship in the AECS adoption among young farmers in greening farming in Slovenia. Young women-managed farms were found more likely to adopt AECSs. This is also our main research question. Our expected novelties and contributions of this research are three folds: first, we compare gender-based differences in the adoption of AECS and sustainability effects within and between the countries. Second, we use advanced econometric approaches. Finally, possible gender-based differences in AECS adoption behavior and trade-offs in sustainability can be important for science, policy, and practice in relation to CAP subsidies.

## Is there a corruption-effect on champagne consumption?

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Key Words: champagne, conspicuous-consumption, luxury-goods, corruption

*Consumers are motivated to drink sparkling wine more for symbolic and less for hedonic reasons than is the case with wine in general (Charters, 2005).*

The idea that consumers purchase a good not just for its intrinsic value but also for its signaling value—to impress others about their wealth abilities—is not new. Since Thorstein Veblen (1899) coined the term “conspicuous consumption” more than 100 years ago, economists, social psychologists, and philosophers alike have conducted various analyses on this topic. For instance, Bagwell & Bernheim (1996) examine under what circumstances “Veblen effects” arise from the desire to achieve social status by signaling wealth through conspicuous consumption; Leibenstein (1950) and Corneo & Jeanne (1997) show how signaling value depends on whether consumer behavior is characterized by snobism or conformism. Other studies provide empirical evidence on how different factors affect conspicuous consumption such as status (Chao & Schor, 1998); globalization (Dholakia & Talukdar, 2004); mating motivation and sexual signaling (Griskevicius et al., 2007 and Sundie et al., 2011); geographical proximity (Grinblatt et al., 2008); race (Charles et al., 2009); self-esteem (Truong & McCol, 2011); social class (Khamis et al., 2012); and spirituality (Stillman et al., 2012).

This study explores corruption’s potential effect on conspicuous consumption.

We claim that in a country where corruption is rampant, (1) smuggling and under-reporting means a smaller number of recorded transactions; and (2) it is important to send signals via conspicuous consumption to other corrupt individuals in order to expand and better engage in networking activities, and consequently become more successful (Lambsdorff, 2002, p. 224).

To empirically examine the existence and magnitude of any potential corruption-effect, we examine champagne consumption, perhaps the most quintessential conspicuous consumption good; and we put forward the following claim: The higher the corruption in a country the lower the volume (officially recorded) and higher the average price of champagne imported. In doing so, we impose a log-log relationship between champagne imports and income based upon the shape of the estimated Engel curves in Heffetz (2011, p. 1109); and the relationship between luxury car imports and income in Gokcekus and Suzuki (2014, p. 218). To consider a general hypothesis regarding the implications of corruption levels as well as income levels on champagne imports volume and average prices, we model champagne imports a la Heffetz as in the following equations:

$$\ln(\text{champagne volume}_i) = \beta_0 + \beta_1 \ln(\text{CPI}_i) + \beta_2 \ln(\text{income}_i) + \beta_3 \ln(\text{wine}_i) + e_i$$

$$\ln(\text{avg. champagne price}_i) = \alpha_0 + \alpha_1 \ln(\text{CPI}_i) + \alpha_2 \ln(\text{income}_i) + \alpha_3 \ln(\text{wine}_i) + \alpha_4 \ln(\text{pop}_i) + v_i$$

where champagne volume is champagne imports per 1,000 people; CPI stands for the level of perceived corruption; income is per capita income and  $e$  and  $v$  are well behaving

disturbance terms. Subscript  $i$  refer to country ( $i = 1, 2, \dots, 131$ ). Note that wine, average

wine consumption to capture wine culture in a country; and population ( $\text{pop}$ ) are included to capture the visibility of conspicuous consumption and its signaling strength.

We compiled statistics for champagne imports and wine consumption from the databases of the OVA for 2017. For champagne, our data set includes both volume in 75 cl bottles and value in Euros for 131 countries, which are expressed as per 1,000 people. Wine consumption is in liters per 1,000 people. We use Transparency International's Corruption Perceptions Index (CPI), which measures levels of perceived corruption from 0 to 10 (10 being least corrupt), as the corruption indicator (see Lambsdorff,



2008, p.302). For income, we use GNI per capita, Atlas method (in constant 2021 US\$) from the World Bank's World Development Indicators database. Population is from the UN data bases.

Three findings emerge from our preliminary analyses: 1) champagne is luxury and income elastic ( $\beta_2 = 1.14$  and  $z=4.76$ ); and there is a corruption-effect on champagne consumption: an increase in perceived corruption level (lower CPI score) results in 2a) a lower level of (officially recorded) champagne imports ( $\beta_1 = 2.36$  and  $z= 4.88$ ) and 2b) higher average champagne price in a country ( $\alpha_1 = -0.21$  and  $z = -2.92$ ).

# Quality perception of Hungarian wines in foreign markets: The case of Tokaj region

*Jeremias Mate Balogh (University of Budapest), Mengting Yu (University of Tuscia), Luigi Palumbo (University of Tuscia)*

## Introduction

More than one hundred years ago, Hungary was one of the most important European wine producers. At that time, royal courts touched glasses filled with sweet Tokaj noble rot wines. In 2021, Hungary registered 64,470 hectares of vineyards, located in six wine regions, including 22 wine districts. In Hungary, 70% of vineyards are covered with white grape varieties, while 30 % are red. Hungary produces approximately 1 % of global wine, 2.5-3 million hectolitres of wine annually, ranked 25<sup>th</sup> in the world (OIV 2022). Historical evidence from the 13<sup>th</sup> century testifies to the tradition of winemaking in the Hungarian Tokaj wine region, the birthplace of Tokaj noble rot wines. The mellifluous Tokaj noble rot wines are the product of the *botrytis cinerea* fungus, which concentrates the natural sugar levels in the grapes. In the 17<sup>th</sup> century, Louis XIV, King of France, described 'Tokaji Aszú' noble rot wines as '*the king of wines, the wine of kings*' (Wine Folly 2022a). In the 18<sup>th</sup> century, winemakers in Alsace, France, and Friuli, Italy, put the words "Tokay" or "Tokai" on their labels to attract buyers. This confusion resulted in the Tokaj classification of the vineyards in 1730, which led to a royal decree issued in 1737 to establish the closed production district of the Tokaj region (Wine Folly 2022a). Later, the Hungarian wine industry and Tokaj wines accounted for a notable drop, due to the aggressive assault of grape phylloxera in the 1880s, two world wars, and several years of collectivization<sup>1</sup> of the agricultural sector in the 19<sup>th</sup> century (Wine Folly 2022b). Today, Tokaj is still considered Hungary's most famous wine region. Furthermore, the reputation of Hungarian high-quality wines is built on the respected dessert wines of the Tokaj region, located in northeast Hungary.

Identifying wine quality based on other characteristics is a challenge for research. In the scientific literature, the price-quality debate is addressed by many researchers. Various wine quality ratings applied in the literature explaining wine quality based on different technologies such as expert ratings (Lecocq and Visser 2006, Dubois and Nauges 2010, Bicknell and MacDonald 2012, Snipes and Taylor 2014, Zelený 2017), machine learning predictions (Fuentes et al. 2020, Nascimento 2022), or community ratings (Kotonya et al. 2018, Oczkowski and Pawsey 2019, Mazzoli and Palumbo 2022, Bazen et al. 2022). According to Kwak et al. (2021), Vivino's platform is a community rating based on user-generated ratings, which are less reliable than traditional expert reviews.

In turn, other authors argue (Kotonya et al. 2018, Oczkowski and Pawsey 2019, Mazzoli and Palumbo 2022) that community ratings have a higher power in explaining wine prices. The purpose of the research is to investigate the quality perception of Hungarian wines in European markets, focusing on the distinguished role of Tokaj wines. The wine reviews utilized and variables obtained from the Vivino database, including Hungarian wines sold in the Italian, the UK, German and French markets.

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<sup>1</sup>Policy adopted under the control of the Soviet Union occurred between 1959 and 1961 in Hungary, to transfer the ownership of private farmland to the state to reduce the economic power of the prosperous farmers. At the end of this period, more than 95% of agricultural land in Hungary had become the property of collective farms.

## Data and Methodology

A cross-sectional database was created for Hungarian wines, including 492 observations in total, of which 243 observations (reviews) were derived from the Tokaj wine region, and of which 129 ratings evaluated Tokaji noble rot wines (called Aszú in Hungarian). The data were accessed by web scraping performed on 25 July 2022 on the Vivino online platform. The data cover wine quality (reviews), average wine prices, and characteristics of Hungarian wines sold in the Italian (116), the UK (145), German (189) and French markets (42). Ordered logistic regression is applied to discover the relationship between the perception of wine quality, wine prices, as well as the characteristics of Hungarian wines, focusing on the Tokaj wine region and noble rot wines. We applied Vivino (2022) data on Hungarian wines available in Italian, UK, German, and French markets. We attempt to test the role and characteristics of the wines from the Tokaj wine region played in Vivino wine quality ratings. The estimated ordered logistic regression model for Hungarian wines in four selected European markets is as follows:

$$\ln(\text{rating})_i = \alpha + \beta_1 \ln(\text{price})_i + \beta_2 (\text{alcohol})_i + \beta_3 \text{Hungarian\_variety}_i + \beta_4 \text{Tokaj\_region}_i + \beta_5 \text{noble\_rot}_i + \varepsilon_i$$

where

$\ln(\text{rating})_i$  represents the average Vivino rating for Hungarian wine  $i$  (scale 1-5) \*

$\ln(\text{price})_i$  represents the price of wine per bottle (0.75 litres) in Euro for wine  $i$  \*\*

$\text{alcohol}_i$  represents the alcohol grade for wine  $i$

$\text{Tokaj\_region}_i$  represents dummies for wine  $i$ , = 1 if the wines are from the Tokaj region, 0 otherwise

$\text{noble\_rot}_i$  represents dummies for wine  $i$ , = 1 if the wine is made from Tokaj noble rot grape, 0 otherwise

$\text{Hungarian\_variety}_i$  represents dummies for Hungarian wine  $i$ , = 1 if the grape variety is native Hungarian, 0 otherwise

$\beta_i$  are the estimated coefficients  $i$

$\varepsilon_i$  captures the error term

Note:

\* The Vivino rating is an average for the individual Hungarian wine composed of all the ratings that Vivino users have given from all over the world.

\*\* Since Tokaj noble rot wines are bottled in 0.5-litre packaging, their price is converted to the price per standard wine bottle (0.75 litre), (price for 0.5-litre multiplied by 1.5).

## Results

Based on the sample, the average rating for Hungarian wines was 3.98 in the selected markets, ranging between 3.1 and 4.8 (on a scale of 1-5). In total, 242 wines were rated between 3 and 4, while 250 are rated on a scale of 4-5 in the sample. In addition, the ratings for Tokaji noble rot wines varied between 3.7 and 4.8,

with an average of 4.31. Regarding the foreign markets where the Hungarian Vivino wine data were derived, the highest average score of Hungarian wines was obtained from the French market (4.1), followed by German (3.97), Italian and the UK (3.96) on the date of selection. Considering Tokaj noble rot wines as a specific category, globally the highest-rated wines (4.37) were tasted on the French market, followed by the UK (4.3), German (4.29) and Italian (4.28). This indicates that European foreign buyers scored the highest (quality perception) for Tokaj noble rot wines compared to regular Hungarian wines. Taking into account the different Hungarian wine regions available in the sample, Tokaj wines received the highest average score (4.11) and average price (38.51 EUR) in Vivino compared to other Hungarian wine regions. The ordered logistic estimation of Hungarian wines shows that average wine prices are positively correlated with average quality ratings; therefore, more expensive Hungarian wines tend to be valued more favourably. Consequently, highly appreciated Tokaj noble rot wines are positively associated with the global quality perception of Hungary's wines (wine ratings). In turn, the role of the Hungarian grape variety and the Tokaj wine region alone were not significant in explaining the higher wine ratings (wine quality) in the estimated models. When wine is made from the Hungarian grape variety, it had insignificant negative impacts on ratings in most of the markets analysed (except Italy). These results indicate that the well-known proverb of Louis XIV for Tokaj noble rot wines as 'the king of wines, the wine of kings' is still true, but only for Tokaj noble rot wines. The reputation of the Tokaj region or its regular Hungarian wines does not contribute to the higher perceived quality or ratings globally, sold and reviewed in the selected foreign markets. Finally, higher alcohol levels in Hungarian wines do not significantly influence perceived wine quality. The results suggest that high-quality Hungarian Tokaj noble rot wines are still appreciated around the world and are sold at higher prices on European markets, but these wines are not sufficient to preserve the reputation of the entire Tokaj wine region or Hungarian wines. Finally, the marketing of other Hungarian flagship wines (Dry Furmint, Muscat Blanc à Petits Grains, Juhfark, Egri Bikavér, Kékfrankos) and regions (Eger, Villány, Szekszárd, Badacsony, or Somló) should be encouraged in highly competitive international markets to maintain the reputation and brand at the same level.

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# Impact of Education and Group on Performance in Blind Tastings, an Experimental Approach

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## Preliminary literature review

Carpenter and Humphreys (2019), in their article *What the Wine Industry Understands About Connecting with Consumers*, state “In the battle to gain an edge over competitors, companies spend millions of dollars to understand consumers through focus groups, surveys, and sophisticated analytics. But too often, because most people don’t really know what they want, these methods waste time and resources. There is a better way: educating consumers, rather than listening to them.”

Despite the fierce competition in the wine evaluation market, wine experts share *lexis* (James, 2018). Since the end of the 1970s, and especially since the creation of the aroma wine wheel by Ann Noble in 1984, most aromas in wine are described through analogy with fruits, berries, flowers, herbs, and spices (James, 2018; Langstaff, 2010). They also share a common goal to shape and impose taste norms while educating wine consumers (Olivesi, 2016) and reducing information asymmetry (Thode et al., 2002). Wine experts possess practical cultural (Beckert et al., 2014) and aesthetic (Charters, 2006) competencies in wine tasting, as well as accumulated comparative experience (Burnham & Skilleas, 2012). They can analyze, identify, describe (using wine vocabulary), compare and synthesize wine information, and assess and signal quality (D’Alessandro & Pecotich, 2013). They thus have both conceptual (of terroirs, grape varieties, vintages) and perceptual (sensory) knowledge of wine (Frøst & Noble, 2002; Honoré-Chedozeau et al., 2020).

According to the existing literature, the perceptual abilities of wine experts and novices differ (D’Alessandro & Pecotich, 2013). Their accuracy in guessing grape variety, country of origin, and region of origin of wines under blind tasting conditions is influenced by their wine- tasting education, which leads to an improvement in analytical abilities (Arvisenet et al., 2016). Langstaff (2010) proposes that the absence of apprenticeships in the wine industry (conversely to coffee or tea tasters) to educate the quality evaluators in terms of the qualities found in the product category could explain the low inter and intra reliability of wine experts ratings (Ashton, 2012; Berg et al., 2022; Bodington, 2017, 2020; Gawel & Godden, 2008; Khalafyan et al., 2021). Schiefer and Fischer (2008) also question the usefulness of wine experts’ ratings as a predictor of wine consumer liking, concluding that most expert ratings do not reflect consumer taste.

Wine knowledge and perceptual abilities are important factors in determining wine enjoyment and consumption: individuals with more wine knowledge are more likely to enjoy and consume wine regularly (Ares & Varela, 2017; Charters & Pettigrew, 2008). Perceptual education has a positive impact on the sensory sensibility and accuracy of wine tasters (Wang et al., 2021), including wine experts (Tempere et al., 2012). Wine education is therefore a key leverage for an industry confronted with a global decrease in consumption (Ticau, 2022). Unsurprisingly, wine education has a positive impact on individual perceptual ability (Cliff et al.,

2016; Taylor et al., 2008). Wine is mostly consumed in a social context (Terrien & Steichen, 2008; Thompson & Vourvachis, 1995), but to our knowledge, there is no study tackling the impact of wine education on group perceptual ability. There is limited research on the influence of individual personality traits (such as extraversion), group dynamics, or wine education on tasters' performance in group tastings. In this experiment, we will question the role of objective and subjective wine knowledge in group dynamics, including leadership perception.

## Experimental design

We carry out two blind tastings on a large sample of international students in wine-related tracks (n=106). Their training includes wine-tasting education. To conduct this longitudinal study, the first tasting took place during the intake day (September 2022) and the second will be held at the end of the academic year (April 2023) (Figure 1).

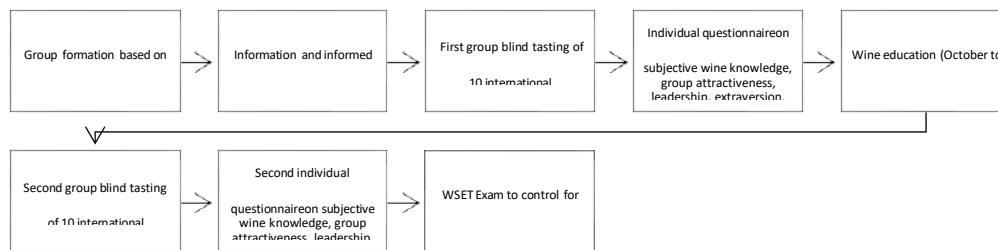


Figure 1. Experiment phases and organization

## Participants

The inclusion criteria for participating in the experiment are the following: participants have to be students enrolled in a wine track at the Burgundy School of Business (Dijon, France) and be available and willing to complete the experiment. The groups are homogenized according to the participants' objective wine knowledge, validated by WSET certifications or equivalents.

The participants do not receive any compensation for participating in the experiment but are incentivized on performance: the best-performing team overall, the best team for grape variety, and the best team for regions win a prize.

## Samples

Ten international wines have been selected for this experiment. The criteria for selection were the following: the wines had to be (1) monovarietal wines (2) from different countries and (3) different wine regions. Students blind taste those ten different international wines.



## Experimental procedure

After being informed that each grape variety appears twice in the experiment, participants are invited, for each wine, to guess (1) the grape variety (2) the country, and (3) the region of origin of each wine.

The blind tasting is followed by a questionnaire collecting both individual and group information. Individual information includes (1) socio-demographic characteristics, (2) objective wine knowledge (highest certification obtained), (3) subjective wine knowledge (adopting a 3-item scale adapted from Flynn and Goldsmith, 1999), and (4) personality, and in particular respondents' extraversion, through 20 items drawn from the IPIP (International Personality Item Pool) Big-Five personality factor markers of extraversion, developed by Goldberg (2001). Group information included perceptions of who the group leader is (gender, age, and wine knowledge) and the attractiveness of the group, measured through the 16-item scale developed by Hunger and Wheelen (1975). The experiment protocol was validated by the ethical committee of the educational institution where the experiments took place (validation number CERBSB2022-34).

## Results and implications

Education and group dynamics may be key determinants of wine blind-tasting performance, perception, and interpretation. Therefore, investing in education in this area could be beneficial for individuals or groups who wish to objectively improve their wine-tasting skills. The experiment will provide new insights that have implications for wine education and training programs, especially concerning the effectiveness of different approaches to wine education and training.

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# Communication styles on Italian wineries websites

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**Keywords:** *Web-communication; content analysis; wine; marketing*

## Introduction

Website visibility is a critical factor of a company's performance and allows assessing the success of the company's marketing strategy (Melo et al., 2017). Although the Italian wine industry has lagged foreign competitors, it has begun to adopt an internet-oriented approach to its communication strategies (Fleishmanhillard and Osservatorio E-Commerce Politecnico Di Milano, 2015). Management has a strong influence on corporate communication in the wine sectors (Vrontis et al., 2016); therefore, analysing wineries' web communication allows to understand important aspects of the company's strategy.

Studies have explored agri-food companies' communication strategies based on product quality (Qalati et al. 2021), health and nutrition (Martinovski et al., 2019) or sensory attributes (Souza et al., 2019). Previous studies on wine web marketing aimed to identify web marketing strategies and wine producers' perceptions of internet marketing (Begalli et al., 2009), the website structure (Iaia et al., 2019), and influential wine blogs' content (Beninger et al., 2014).

The present study seeks to address the following research questions:

Q1) What are the recurrent word combinations utilized by Italian wineries in the representation of their identities on websites?

Q2) How do wineries convey the relationship between their wines and the geographical regions in which they are produced?

Q3) What are the pivotal elements or arguments used by wineries to describe the organoleptic attributes of their wines?

Q4) Is there evidence of a distinctive mode of communication used by Italian wineries on their website?

A Web Content Analysis will carry out on the websites of Italian cellars, examining all textual material for the identification of marketing elements, company philosophy, connection to the territory, and descriptions of the wine's sensory characteristics.

## Methodology

The most common methods for evaluating websites are surveys, experimental evaluations, and content analysis (Chiou, Lin and Perng, 2011; Cristobal-Fransi et al., 2020; Sparacino et al., 2023). This study focuses solely on the content, ignoring design, technical, and commercial aspects.

A review of the literature on wineries' web communication and on the content analysis methodology will be conducted to determine the elements to be investigated.

The research process will be based on three phases:

- 1) Sample design and data collection. We focused on an Italian wine consortium, identifying all the companies' websites and using the web scraping method to harvest all the textual material.
- 2) Data cleaning and coding. Each winery's website content was transcribed into structured Word documents covering Cellars, History, Territory, and Wines. We created a codebook with codes and subcodes to classify text and create an analysis-suitable dataset. The codebook was built in two phases: deductively using the scheme of Mayring et al. (2015) to find main categories, and inductively through a thorough text screening to create additional codes (Chen et al., 2021; Sparacino et al., 2023).
- 3) Data analysis, Visualization and interpretation of the results. Content analysis was performed with Nvivo (Chen et al., 2021; Sparacino et al., 2023). Therefore, the codebook was built in two phases: the first was based on a deductive approach and follows the scheme of Mayring et al. (2015), building on previous theoretical knowledge to find the main categories, the "thematic codes" of Wineries and wine communication. Additional codes were created with an inductive approach during a more thorough screening of the texts.

To respond to our RQs, we will perform a multi-level analysis:

- 1) An analysis of website's most frequent words and combinations.
- 2) A relationship map (RM) to show connections and influences between codes and subcodes, and to visualize frequency.
- 3) A Cross-relationship analysis using matrix representation to identify similar topics.

## **Expected Results and Conclusion**

The expected results concern the significant role of the communication of viticulture techniques, with reference to the techniques used both in the field and in the cellar. In this perspective, producers should better convey to the consumer the techniques used in order to improve consumer awareness and understanding of wine attributes and characteristics.

Future research may focus on wineries selected in different geographic areas with a comparison between regions or countries. Moreover, future research based on the same approach could also consider communication styles on social media, and a comparison between the communication style of small and large Italian wineries.

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# Parallel session VI-

**Industrial Organization & Management**

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# Collective Reputation Effects: Empirical Evidence from the Austrian Wine Market

*Dieter Pennerstorf (Johannes Kepler University Linz), Daniela Rroshi (Vienna University of Economics and Business), Christoph Weiss (Vienna University of Economics and Business)*

We evaluate the introduction of a collective brand in form of a denomination of origin label DAC (Districtus Austriae Controllatus) in the Austrian wine market using a comprehensive panel dataset of 32,143 wines for the period 1999-2020. We exploit the temporal and regional variation in the implementation of the DAC regulation to estimate the effect of the collective label on prices. A weighted differences-in-difference approach is used to estimate the price effect, which accounts for heterogeneous and dynamic treatment effects. We find a negative average treatment effect on prices, which ranges from 10% to 29% depending on the estimation model used. However, there are heterogeneous effects across regions and time and depending on the reputation of the wines and on the individual winery reputation. The results show that less reputable wines are the ones benefiting a price premium from the DAC label.

**JEL Classifications:** D82 , L12, L66, Q13

**Key Words:** Asymmetric Information, Product Quality, Collective Reputation, Food Labeling

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# Successes and Failures by PDOs as Collective Brands for Italian Wine

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**Key Words:** Collective reputation, wine appellation, geographic indications, government failure

**JEL Codes:** Q13 Q18 L51 L52 L66 N54

## Extended Abstract

Wine is a highly differentiated good, with prices ranging from a few Euros to hundreds and even thousands of Euros per bottle. Much of this differentiation is associated with place of production. Premium prices may reflect natural scarcity of the particular productive resources (i.e., land with its soil, terrain, climate and so on) that comprise “terroir” or artificial, contrived scarcity associated with regulations on production and barriers to entry by government. Often it is a combination of the two. Europe’s system of PDOs (protected designations of origin) is a prime example

Much has been written about Europe’s PDOs for wine, their origins, and their economic implications since they were first introduced in France about 100 years ago (see, e.g., Meloni and Swinnen, 2013, 2016, 2018; Livat et al. 2018, Alston and Gaeta 2021, Mérel et al. 2021). Information problems arise in the market for wine because wines are both vertically and horizontally differentiated, and wine is an experience good. These information problems can be partially addressed by private brands, but the proliferation of brands can be overwhelming for consumers. PDOs and the like can contribute by providing a signal of collective quality—referring to both product attributes and production process attributes—creating a collective brand that can serve the interests of both producers and consumers.

While they might have accomplished this purpose, at least at the outset (see, e.g., Mérel et al. 2021), the number of European PDOs for wine has grown considerably and may have become too great to effectively accomplish the primary purpose (see, e.g., Livat et al. 2018) and questions have been raised about some aspects of the implementation of PDO rules, which vary from place to place (e.g., Meloni and Swinnen 2013, Alston and Gaeta 2021). In the United States, analogous entities called American Viticultural Areas (AVAs) have been created that serve to create collective brands for wine but entail minimal regulations over products and process of production. Across Europe, however, PDOs entail quite onerous rules and technological regulations that are difficult to justify and appear in many instances to be acting as de facto supply controls more than quality assurance.

As argued by Alston and Gaeta (2021), the introduction of these rules and regulations was probably beneficial initially both for their didactic effect on wine producers and consumers, and as a way of overcoming a significant “lemons” problem in the market. However, those same rules and regulations are much less valuable today, given (1) the potential for alternative sources of information to solve the lemons problem, (2) evidence that the appellation system per se might not be effectively serving that purpose as well as it once did, and (3) evidence that some of the regulations impose significant social costs. Yield restrictions, in

particular, are economically inefficient as a way of enhancing and signaling quality (their ostensible purpose) and as a way of restricting total supply to support market prices and thus producer incomes (apparently a significant motivation). The inherent weaknesses of the policy design are compounded by failures of governance. As Alston and Gaeta (2021) conclude, a less heavy-handed approach to policy would allow more scope for the market mechanism to match supply and demand for this signature product from European agriculture.

Questions can also be raised about the economics PDOs as product monopolies. The managing bodies of individual PDOs often act as though they imagine they have some market power, such that they can generate additional revenue and even profit for their producers by restricting collective supply or by taking other strategic marketing actions to manage the collective brand. The potential for profitable collective brand management in these ways can be expected to vary among PDOs, depending on the elasticity of demand they face for their wines and, more fundamentally, the market characteristics that determine that elasticity (market shares and elasticities of substitution).

Consider, for example, Champagne and its unique status within the category of sparkling wines compared with Cava or Prosecco; and Burgundy, within the category of still wines, compared with, say,

Bordeaux and its 57 sub-appellations or Chianti Classico. The results may depend on whether, as appears to happen quite often, the actions of the individual PDOs are not independent—if, for example, they all restrict supply in concert or if they all undertake beggar-thy-neighbor promotion programs. Also, any favorable effects may evolve—most likely be eroded over time as the market progressively adjusts and competitors respond to incentives created by the PDO's action.

In this paper we look into the economics of the collective brand management of PDOs, using selected examples from Italy, each of which has its own angles and offers its own insights. We treat each of the selected PDOs as a case study. We review and analyze the time path of key performance indicators over the past few decades in the context of strategic actions taken to promote the brand of the PDO, to restrict production from the PDO, or otherwise to manage the collective brand. Then we synthesize findings across the cases to see what more-general inferences can be drawn.

One fairly general finding is that the technological regulations imposed by the PDOs have become increasingly burdensome, such that some producers are finding it profitable to opt out, and pressures to relax or revise some regulations is growing: PDOs are changing. Another general finding is that *de facto* supply control via yield restrictions within PDOs is an ill-conceived idea: it does not really work and it is expensive. More complicated stories arise in instances where ideas for market innovations were well conceived and the execution was good. But another general observation is that—in the market for wine as in other competitive industries—success attracts competitive entry and the gains from marketing innovations are likely to be short-lived unless the collective brand is truly distinct and cannot be undermined by competitors. For these types of reasons, the European Commission is developing plans for a comprehensive reform of the PDO system (Šajn 2023). In this paper we will take a first look at the potential implications of the anticipated new PDO rules.

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## Are cooperatives doomed to produce only low quality wine? Not quite...

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### Background

Historically, many cooperatives were formed 'out-of-necessity', e.g., to gain bargaining power, to solve market failures, etc. in difficult times (many in the interwar period, few others decades earlier). Over time, the success of Cooperative organizations (co-ops) has been mixed. While their resilience in difficult times is reassuring (see, e.g., the last report on the UK at <https://www.uk.coop/resources/co-op-economy-report-2021>), in other dimensions co-ops are not doing so well. For instance, co-ops in the wine sector tend to be less internationalized and with a weaker reputation for product quality than their private counterparts (see, e.g., Frick, 2004; Schamel, 2015; Veseth, 2021). Indeed, the 379 Italian wine co-ops cover 58% of wine production but only 40% of value (turnover), implying that the unit value of the wine they produce is well below that of IOF. These lackluster performances are confirmed also by the fact that co-ops cover only 52% of PDO but 65% of PGI production. Moreover, the total wine exported by co-ops is only a third of total wine export (<https://vivite.it/argomenti/vinitaly/cs-vinitaly22/>).

However, while the aggregate performance may appear below average, there are few instances in which co-ops have shown great performances and success in terms of quality, export orientation, and economic satisfaction for members. In other words, while on the aggregate co-ops may under-perform compared to IOF, there is sizable heterogeneity among co-ops themselves and successful cases are well known (see, e.g., Russo, 2019, and <https://vivite.it/argomenti/vinitaly/cs-vinitaly22/>). In some cases, wine co-ops seem to perform even better than IOF and reach extremely high levels of product quality (see, e.g., Mullen, T., *The Luxury Wine Cooperatives of Northern Italy*, Forbes, 2022).

Starting from these overall performances and heterogeneity, in this study we investigate whether the co-operative form and its principles (beginning with the Rochdale's and up to ICA's (2022) principles) can still serve its purpose and create value for members. Value creation can be translated into efficiency in seizing market opportunities, likely to be a crucial opportunity to create value for members given the evolution of food markets (e.g., by increasing the co-op market share and increasing member's financial gains in terms of grapes payment; see, e.g., Aiassa et al., 2018), and/or providing useful services at cost to members<sup>1</sup>. Market opportunities, can be represented by reaching new markets (e.g., foreign markets), implementing new distributions channels (e.g., e-commerce), increasing product value by finding new uses or selling formats (e.g., bottling vs bulk), and so on. Instead, services to members include, for instance, technical support, innovation diffusion, and so on.

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<sup>5</sup> This study is part of WP1 of the PRIMA project "Agricompnet. Governing the agri-food supply chain: how to improve smallholders' competitiveness."\*

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1 One of the best descriptions of how a co-op can provide value to members is probably that offered in Aiassa et al. (2018), where the management at Domane Wachau states: "A cooperative can succeed as long as it over performs and it pays higher grape prices compared to the rest of the market. Only that way a cooperative can expect solidarity from its member growers and the management to implement higher-quality criteria in the vineyard" (p. 248).

## **Aims**

How can co-ops create value for their members? Our interest is in investigating when and how well cooperatives can seize value creation opportunities for members, tackling the challenges that co-ops are facing and individuating possible feasible solutions and best practices.

The objective of this study in particular is to understand whether and to what extent the different payment methods used to remunerate members' grapes are related to the co-ops performances, taking into account quality schemes as well. Structural information on the co-op, like number of members and hectares, balance sheets data, etc. are also taken into account.

## **Methods**

Our methodology is qualitative and based on semi-structured in-depth interviews with 15 wine cooperatives located in the Alto-Adige, Trentino and Veneto Italian regions. These interviews were recorded and transcribed. The co-ops in the sample have different production orientation, size and strategies. We take the grapes payment systems as a reference, since it is a widely recognized indicator in the wine co-ops literature (see, e.g., Aiassa et al., 2018; Hanf and Schweickert, 2014; Fares and Orozco, 2014). The present analysis is a first exploratory step, for a subsequent study on a larger Italian sample. Indeed, results of the preliminary qualitative analysis will guide a national survey extended to management and governance practices of Italian wine cooperatives.

The scale development relies on an economic approach. Indeed, data collection, measurement and score assignment are all based on relevant (economic and/or organizational) theory. For instance, if quality in procurement from members is deemed important (this may be so if a co-op pursues a quality-driven business model) and to the extent that remunerating quality commodities (e.g., grapes, milk, etc.) is considered efficient and effective, a co-op using quality-based remuneration schemes for members should obtain a higher score than a co-op not using them.

## **Preliminary results and discussion**

We observe that more powerful quality incentives are associated with better performing cooperatives in terms of quality obtained (proxied by prizes and scores obtained by wine experts, i.e., wine guides) and average selling prices for bottled wines. Moreover, these same cooperatives are in healthier financial conditions and make significantly more investments than other comparable wine co-ops. The results of this exploratory study will allow to apply and adapt the developed scale to measure other different managerial and governance dimensions in order to identify organizational areas prone to possible improvements, and provide interested cooperatives and/or their associations with policy advice.

## **Contribution and implications**

This exploratory study captures heterogeneity in wine co-ops grapes payment schemes, in particular regarding their quality. This exploratory benchmarking exercise will serve to develop an initial merit scale for classifying wine co-ops along different performance dimensions. Results of this preliminary analysis will guide a national survey extended to management and governance practices of Italian (wine) cooperatives in order to identify organizational areas prone to possible improvements and provide policy advice to interested cooperatives, their associations and/or policy-makers.



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# Terroir, terroir, are thou in Bordeaux ? A spatial hedonic regression analysis for Bordeaux wines

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Alcoholic beverages, as many other consumer goods, are very differentiated products, and consumers care about their different characteristics. Wines are no exception, chosen as they are based on their many dimensions, such as the grapes variety, the vintage, the “terroir” it refers to, the weather occurred during a particular vintage, and so on. Some of this information is signaled to consumers via different means, typical example being the collective label very common in the case of EU wines. Collective labels, e.g., denominations of origin, are used to assure specific production practices, together with specific natural endowments (the “terroir”) that are perceived to have effects on wine quality. The consumer can also use other sources of information, including ratings published by experts and quality awards gained in specialized outlets or events.

There is a relatively recent literature that estimates the impact of private brands and collective labels. Landon and Smith (South. Ec. J., 1998) were among the first to estimate the impact of product quality and reputation on prices and decompose the reputation impact into individual and collective reputation effects. Using a hedonic model for Bordeaux wines, they find that the impact of reputation on prices is much bigger than the impact of current quality, suggesting a major role for reputation in price formation. Moreover, collective reputation indicators play a significant role in price formation via their impact on expected quality, and thus affect prices as predictors of quality. Overall, they show that empirical models that include proxies for individual and collective reputations are more predictive than either individual-only or collective-only models, thus justifying the analysis of the dual impact of reputations.

Costanigro et al. (AJAE, 2010) suggest an empirical hedonic model to jointly analyze product, firm and collective reputations. Using data from California wines, they disaggregate reputation premia into different quality performances, considering not only average quality but also consistency of quality and name longevity, in a model that nests specific and aggregate names. They show that reputation premia decrease as names become more specific, i.e., as one goes from collective to individual to product reputations. Last, their data show that the use of collective reputation is important for inexpensive wines, while in premium wines specific names become more important.

In this paper, we use a hedonic approach to estimate the impact of different wine characteristics on prices. In the literature on hedonic pricing, prices are usually regressed on quality (often proxied by ratings or awards) and other characteristics. The peculiar contribution of this paper is the introduction of the so-called spatial autotogressive models to explicitly account for spatial effects on wine prices. In its most popular formulation, a spatial autoregression explicitly allows that the response variable of each unit is potentially related, not only to a set of exogenous characteristics, as in standard regression models, but also to a weighted average of the response variables of neighboring units.

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The weights are postulated to be known and exogenous such that the autoregressive component of the model is fully known up to a single parameter that needs to be estimated. In addition, the weights are generally determined ex ante and they are often based on the inverse of some geographic and/or economic distance across units. A sensible weighting matrix will thus assign larger weights to the “closer” neighbors, while smaller weights will be given to those further away from it. In this context, we construct the weights  $w_{ij}$  between winery  $i$  and winery  $j$  as the inverse of the geographical distance between wineries  $i$  and  $j$  when the distance between such pair of wineries does not exceed an exogenously chosen cutoff, and zero otherwise. The weight corresponding to  $w_{ii}$  is conventionally set to zero. The distances have been calculated by means of GIS techniques, after locating where each winery is located based on the address of the chateaux. Using data on about 400 Bordeaux fine wines traded in the UK, we estimate a standard spatial autoregression as our baseline model, such as

$$\log(\text{price})_i = \alpha_0 + \beta'x_i + \rho \sum_{j=1}^n w_{ij} \log(\text{price})_j + \epsilon_i, \quad (1)$$

where  $i = 1, \dots, n$  denotes winery,  $n$  is the total number of observations and  $x_i$  contains, among other controls, measures of quality rating, a binary variable that controls for region where the winery  $i$  is located and the appellation. The scalar parameter  $\rho$  captures the spatial correlation and appears to be strongly significant. However, a standard Moran I test on the residuals obtained from model (1) reveals that spatial correlation due to unknown factors is still present in the model, and thus that term driven by the spatial lag of price (which might capture a mechanism of price competition), is not sufficient to account for the spatial structure in full. Hence, we extend the model in (1) to also allow for spatial correlation in the error term, which in turn accounts for geographical spatial correlation driven by unknown factors (such as features of the “terroir”)

$$\log(\text{price})_i = \alpha_0 + \beta'x_i + \rho \sum_{j=1}^n w_{ij} \log(\text{price})_j + u_i, \quad u_i = \lambda \sum_{j=1}^n w_{ij} u_j + \epsilon_i. \quad (2)$$

Estimation of the latter reveals that the parameter  $\lambda$  is strongly significant, but  $\rho$  is not. Such result supports the conjecture that spatial correlation in this setting is mostly driven by unobservable factors, such as the “terroir” features, and not by a mere price competition across wineries.

# Whose bubbles are these? Winery brand versus Territorial brand

*Chiara Mazzocchi (University of Milan), Stefano Corsi (University of Milan), Riccardo Saracino (University of Milan)*

## Introduction

In the wine sector the concepts of brand and territory are closely intertwined. In the last decades the dichotomy between brand and terroir has become even more relevant because of the changes in the wine industry and consumption's habits.

A brand is a name, term, sign, symbol, or design, or a combination of them, with the aim to identify the goods and services of one seller or group of sellers differentiating them from those of the competitors (Vlachvei et al., 2012). The brand is an integral part of any wine business and can be used to communicate the quality and the values of a winery. The strongest brands become synonymous with fulfilling a defined set of expectations, are valued for their identity and people have built emotional relationships with them. Although the consumers can recognize the company's brand, the purchasing choice is driven by different other attributes, included variety, country, vintage, alcohol content, etc. The denomination of origin (DO) can be considered one of the attributes of the wine. In this sense wine brands can demonstrate their commitment to a specific region in order to build a strong connection with their consumers.

But at the same time, DO is also a regional or territorial brand, especially in EU traditional producing countries, like France, Italy and Spain, which states the quality of the wine and the collective reputation. The specific product and process standards confer wines belonging to a given DOC/DOCG-specific quality characteristics, substantially differentiate each DOC/DOCG from the others and build the DOC/DOCG collective reputation that gives access to a potential premium price on the final market based on consumer willingness to pay for terroir wines (Hertzberg and Malorgio, 2008). In fact, the link between wine and its origin is one of the most important aspects of wine production (Crescenzi et al., 2022). Every wine has a distinct character and flavor that is derived from the unique terroir of the region in which it is produced, with the physical environment, climate, and soil that can have a great impact on the characteristics of the wines produced.

At the opposite many large-scale firms competing on international markets and more oriented to the New World, like US, Australia, Argentina, Chile and South Africa, adopt the concept of quality hinges more directly on consumer preferences and is conveyed through industrial brands.

The alternative 'brand-based strategy' for quality differentiation relies on the individual reputation of industrial firms.

The aim of the present work is to analyze the performance of a winery in the Franciacorta DOCG region compared to that of the other wineries belonging to the local DO consortium.

## Methodology

Time series analysis is a powerful tool used to analyze data over a period of time. It is used to identify trends, patterns, and correlations that may exist between the variables of interest.

A time series model approach has been adopted in order to analyze the difference between the economic performances of the biggest Franciacorta DOCG winery (from here: the winery) and the performance of the other Franciacorta DOCG wineries associated to the Consorzio (from here: the Consorzio).

An exploratory study on national and international sales data has been done, comparing different products typologies (i.e. Brut, Satèn, Rosé, etc..), different distribution channels and different country's sales destination (Italy, Germany, USA, etc...) over time (2011-2022).

The dataset includes about 700.000 observations from January 2011 to September 2022, representing the daily invoices issued by wine companies for the sales of the different wine products both addressed to Italian market and to export countries. The work employs a log-linear regression

approach which uses as dependent variable the revenues of the individual invoices issued during the 2011-2022 period. The explanatory variables considered are: i) the sales channels, as the large retailers, the Ho.Re.Ca., the direct sale and the importers' channel; ii) the Franciacorta DOCG wines produced both by the winery and by the Consorzio; iii) the countries in which the Franciacorta DOCG wines are sold.

## **Results and conclusions**

The results show the different performances by brand and terroir wines in diverse markets and for specific typology products. As an example, main results on the products typology, regards the Satèn typology by Consorzio, which performs better than that of the winery, while, at the contrary, the Brut typology of the winery has a higher coefficient than that of Consorzio. This can be linked to the different power of the winery brand related to the wine typology, for which Franciacorta Satèn DOCG is a highly recognizable territory brand, strongly rooted in the territory. At the opposite, the base wine of Franciacorta zone, the Franciacorta DOCG Brut, is less powerful and known than the winery brand, confirming the strong brand identity of the winery. Other evidences are related to the distribution channels, with the large retailer's channel that is characterized by a significative power of the winery brand, while the Ho.Re.Ca. channel is strongly represented by the territory brand.

Future step of the research will be address to explore the difference between the products exported and the export country's market of destination. Moreover, will be possible focusing the research on the differences between countries about this topic, specifically between the European and the no-European export countries.

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# Parallel session VII -

Sustainability, Environment & Organic

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# Price impacts of ecofriendly attributes on cheap standard wines and quality wines: a comparison between hedonic model investigations

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**Keywords:** Ecofriendly attributes of wines; wine eco-certifications; hedonic price analysis of wines; ewine business strategies

## Background and objectives

An increasing trend drives wine producers to display logos on their bottle labels that certify compliance with procedures and methods that respect principles of environmental, ethical, and social sustainability. The European Regulation No 203/2012 sets rules for organic wine production, labelling, and sale in the European Union (EU). But there are also producers' associations and other private organizations that, based on their respective standards, claim the certification of products and production practices with low impacts on the environment and health or respectful of ecosystems, ethical principles, social equity, or consumer safety. From the point of view of marketing communication, it is logical to assume that, with these strategies, wine businesses intend to convey to consumers a message of attention to their health and the values they believe, to build brand awareness, create customer loyalty, and increase product prices and sales. Higher prices of food and beverages certified as organic or with other attributes related to sustainability are considered a consequence of both, technical factors (higher production costs, lower yields due to reduced use of inputs, smaller economies of scale) and better appreciation from consumers. However, if the higher price that consumers are willing to pay for attributes related to sustainability is evident in the scientific literature for most foods and beverages, it is not the same for wines: especially when the willingness to pay (WTP) has been analyzed by revealed preference studies focusing on quality wines. On this basis, our presentation shows the results of investigations on consumers' WTP for wines claiming eco-friendly attributes and how this behavior influences the marketing strategies of wine businesses.

## Methodology and data

Our analyses are based on Rosen's hedonic price models that consider the market price and the greatest possible quantity of qualitative attributes observable in each wine bottle or packaging. Assuming conditions of perfect market equilibrium, a wine price results from the sum of the implicit prices that consumers want to pay for each of its attributes. These implicit prices can be estimated through a multivariate regression, describing a wine price as a function of its observable attributes.

We developed two hedonic models. The first one was based on data on wines sold online by a wine shopping Italian website in October 2020. The selected sample included 746 Italian red wines, in 0.75 lt bottles, obtained from the 2017 and 2018 vintages: observed prices were medium-high (mean = 22.16 €/bottle; median = 14.06 €/bottle; min. 5.14 €/bottle, max. 732.00 €/bottle). The final dataset had 51 variables corresponding to the market attributes that consumers could observe for each wine on the website. The variables were classified in 8 categories: vintage year, geographical denomination (DOCG, DOC, IGT), label mentions (classico, riserva, etc.), alcohol volume, region of production, wine critics judgements, production systems (including labels related to organic and other eco-friendly practices, ethical aspects of production, specific production practices, etc.), and the type of wine aging.

The second model focused on data on cheap wines sold in supermarkets of two Italian middle towns (Forlì in Northern Italy and Caltanissetta in Sicily) in April 2022. The analyzed sample was made up by 297



observations: observed prices were low (mean = 5,24 €/lt; median = 5.32 €/lt; min. 1.19 €/lt; max. 10,25 €/lt). The final dataset had 38 variables including attributes like town, supermarket chain, producer brand, year of production, type of packaging, wine color, geographical denomination, alcohol volume, production region, ecofriendly claims (organic and sustainable certifications), and other production characteristics. In both models, all variables were dummy and the data processing applied a backward elimination procedure with the software IBM SPSS.

## Results

In the first model (quality wines), the final regression had 25 independent variables capturing about two third of the price variability ( $R^2_{adj.} = 0.657$ ). The region of production and the ratings from the wine critics resulted the variables more positively correlated to price, the variable related to ecofriendly claims (including organic, biodynamic, and sustainability claims) resulted negatively correlated (coeff. = -0.089;  $p = 0.38$ ) (see Table 1). We calculated other regressions by dividing the sample based on prices above and below the median and quartile values. In the higher prices clusters, ecofriendly wines increased the negative magnitude of their coefficient and its significance, i.e. ecolabels showed negative correlations with prices. In the lower prices clusters the coefficient of this variable still resulted slightly negative, but non-significant.

**Table 1 - First model (quality wines) regression results (N = 746;  $R^2_{adj.} = 0.657$ ; Variables = 25)**

Variables	Coefficients	P value
(Constant)	2.023	.000
Vintage 2017	.146	.000
DOCG	-.143	.000
Superior	-.095	.069
≥ 14.5% ABV	.156	.000
Prod. Tuscany	.325	.000
Prod. Piedmont. Aosta V. & Liguria	.362	.000
Prod. Lombardy & Trentino-S.Tyrol	.365	.000
Prod. Veneto. Friuli-V.G. & Emilia-R.	.130	.021
Prod. Sicily & Sardinia	.198	.000
Overall rating 90-93	.163	.000
Overall rating ≥ 93	.488	.000
Rating “Collection”	.621	.000
Rating Bibenda	.123	.000

Rating Slowine	.177	.024
Rating Veronelli 3 gold stars	.248	.000
Rating Verinelli 2 red stars	-.093	.007
Rating Vitae AIS 4 Vines	.275	.000
Rating Vitae AIS 3 Vines	.069	.048
Rating Decanter 90+	.139	.060
Rating Robert Parker 90+	.277	.000
Eco-friendly wines (organic, biodynamic, sustainable)	-.089	.038
Special wine process. practices	.216	.000
Matured in wood	.096	.015
Matured in barrique	.162	.000
Matured in large casks	.147	.016

In the second model (cheap wines), the final regression had 15 independent variables covering nearly two third of the price variability ( $R^2_{adj.} = 0.639$ ). The strongest correlations with prices were found for the supermarket chain brand, the package size, the wine packed in bottles, and the geographical designations. Ecofriendly claims, which in this sample concerned only wine certified as organic, resulted positively correlated with prices (coeff. = -0.156;  $p < 0.001$ ) (see Table 2). Two more regressions were calculated by dividing the sample according to prices above and below the median values. For the wines with prices above the median value, the “organic wines” variable decreased its coefficient value (coeff. = 0.106;  $p < 0.001$ ). For the wines with prices below the median value, the coefficient of this variable resulted the same of the regression with the whole sample (coeff. = -0.156;  $p = 0.016$ ).

**Table 2 – Second model (cheap wines) regression results (N = 294;  $R^2_{adj.} = 0.639$ ; Variables = 15)**

Variables	Coefficients	P value
(Constant)	.797	<.001
Supermarket FAMILA	-.307	<.001
Supermarket LIDL	-.520	<.001
Supermarket DPIù	-.431	<.001

Vintage 2020	-.194	<.001
Vintage 2021	-.245	<.001
Size 0.75 lt	.400	.006
In glass bottles	.355	.029
Red wine	-.075	.034
DOC	.314	.004
DOCG	.414	<.001
IGT	.293	.006
Reserve	.242	.055
12.5% ABV	.089	.040
13 - 14.5% ABV	.173	<.001
Organic wines	.156	<.001

## Conclusions

Considering the impact of ecofriendly attributes on wine consumers' WTP, the results of the two models show that, in the case of cheap standard wines, the presence of ecofriendly attributes have a substantial positive impact on prices as it generally happens for most food products. In the case of more expensive quality wine, it seems that consumers do not perceive ecofriendly attributes as attractive as other specific attributes of these goods, such as the prominent features of established brands supported by ratings of wine critics, hence a negative correlation with price.

From the viewpoint of wine businesses, the models indicate that, in the market of cheap standard wines the implementation of an ecofriendly label may be strategic for product differentiation as it happens for other types of ordinary food products (milk and fresh dairies, fresh meat, eggs, and fruit and vegetables, bakeries, etc.). In the quality wine market, environmentally friendly labels can be a product differentiation strategy for brands that are not yet established, but they are not relevant for those wines that already benefit from renowned oenological virtues.

# Developing a hierarchical integrated framework to evaluate sustainability performance in the wine industry

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**Keywords:** Design process; hierarchical framework; sustainability assessment; sustainable wine production.

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## Extended abstract

Modern intensive agriculture is marked by mechanisation, the massive use of chemical inputs and increased yields. This production model has contributed for agro-environmental problems associated to climate change and natural resources depletion (Olde, Oudshoorn, Sørensen, Bokkers, & Boer, 2016; Zhang, Xiao, Duan, Zhang, & Yu, 2015). Furthermore, as human wellbeing and agricultural productivity are also being affected with the worsening of public health, animal welfare, and food security, questions about the need for a global transition towards a more sustainable agriculture are increasingly being asked (Hayati, 2017).

Regarding the wine industry, the tighten link to terroir impels viticulture to rely deeply on weather conditions, becoming extremely vulnerable to climate change impacts (Cichelli, Pattara, & Petrella, 2016; Dibari et al., 2019). However, issues related to the wine sector are not only embedded in the debate over its climate resilience, or even its impact on the surrounding environment. Recent public policy reforms and rising consumer's demands have continuously enhanced wine growers' awareness on the importance of changing their farming practices to meet new sustainability requirements (Baiano, 2021; Tait et al., 2019; Troiano et al., 2020).

Sustainability assessment tools as powerful performance evaluation and monitoring instruments for supporting decision-making, have brought attention to the wine sector. Stakeholders are currently requesting for proper and better tools to upkeep the industry's transition and improve their competitiveness (Keichinger & Thiollot-Scholtus, 2017; Qiang, Qile, & Yanqing, 2013; Ramos, 2019). Nevertheless, very few assessments consider holistic indicators or provide a robust basis level for data comparison (Gafsi & Favreau, 2013; Iyer & Reczek, 2017; Martins, Araújo, Graça, Caetano, & Mata, 2018; Santiago-Brown, Metcalfe, Jerram, & Collins, 2014). According to literature, the majority of available sustainability assessment tools are often environmentally focused, based mostly on impact assessment, non- context-comprehensive or unfit to evaluate permanent crops such as viticulture (Flores, 2018; Merli, Preziosi, & Acampora, 2018; Trigo, Marta-Costa, & Fragoso, 2022).

Thereupon, the purpose of this work is to introduce the conception of a proper and holistic sustainability assessment framework, capable to help the so much needed transition towards a more sustainable wine production.

It is proposed a three-tier hierarchical framework specifically designed for assessing sustainability performance in winegrowing context. Hierarchical as it is composed of principles, criteria, attributes, indicators and reference values in a structured way. The triple-tear structure allows to measure each of the attributes under analysis through different evaluation factors that most closely relate with the end-user's purpose and its available resources of information. The objective is to identify and organise strategic sustainability indicators to either assess the state of the system (Core Sustainability Indicators); impact trends of sustainability significance (Key Sustainability Indexes); and interactions with the surrounding environment based on cause-effect relationships (Management Practices Indicators).

If minimum required information is provided, a broader sustainability score can be achieved based on the company's environmental, social and governance (ESG) performance results. This ESG score may

assist wine companies to comply with the new ESG regulations for corporate reporting. In short, new ESG disclosure rules have been approved as part of a global standard to which the wine industry will too need to conform. Mandatory concepts and principles, in accordance with European Sustainability Reporting Standards (ESRS), must be soon applied by companies when reporting sustainability information (EFRAG, 2022).

The framework design starts with the determination of quality assessment criteria to properly design assessment tools and evaluate their success and practicability to the wine industry. Considering that sustainability assessments should provide technical strength to the system being evaluated (winegrowing system), benefits to the end-user (direct benefits) and benefits to both the surroundings and wider stakeholder community (indirect benefits), six fundamentals were identified as critical to account: (i) multidimensionality of sustainability; (ii) multifunctionality of agriculture; (iii) multilevel hierarchy of agribusinesses; (iv) time and generational succession; (v) terroir/geographical context; and (vi) learning foundation. This step does not intend to prescribe a specific recipe of conduct, but rather refine fundamental properties to consider when developing integrated and holistic assessment frameworks for complex production systems.

The following step is centered on the scrutiny of already used and validated sustainability assessment tools. Knowing the different types of available assessments helped us to comprehend how to better use these tools to our advantage. Different families and typologies of sustainability tools were revised based on their scope, content or structure, and also according to the six quality fundamentals, to better understand their advantages, limitations and design approaches. This step strongly supported further developments of the theoretical sustainability framework here proposed for the wine industry.

Not trying to reinvent the wheel, the framework is therefore based and inspired on various existing assessment models and approaches developed and already used by the academia, farmers and policy-makers. The tools analysed and considered were: EIOVI, INDIGO, SOECO, MESMIS, IDEA, INSPIA, ISAP, MASC, SAFE, FESLM, RISE; OECD core environmental indicators (OECD-CEI); the Commission on Sustainable Development indicators (UN-CSD), and the Sustainable Development Goals indicator-set (EU-SDG).

When designing the theoretical sustainability framework, we followed the design process of the model of Saifi & Drake (2008) for agricultural sustainability based on the relations between sustainability principles, practices and indicators. Thus, not only reported principles for sustainable agriculture and winegrowing were taken into account, but we also looked to core characteristics and practices of the whole wine production process to identify major sustainability issues inherent to the industry. Specialised literature, wine sustainability programs and results from previous interviews with main actors of the industry were also contemplated for this stage.

For the indicators' selection, the Pressure-State-Response model (PSR) was applied. The PSR model was initially proposed by Tony Friend and David Rapport and later adapted by the OECD to structure its work on environmental policies and reporting (OECD, 1993). The strategy to use the PSR model to assists in the identification of relevant indicators was also found in SAFE, RISE and the FESLM frameworks, in which a matrix process and hierarchical structure were likewise adopted (Häni et al., 2003; Smyth & Dumanski, 1993; Van Cauwenbergh et al., 2007). Finally, further research is set to see if the framework here introduced is valid and suitable for its intended use. The validation process will follow the methodological framework for assessing the validation of sustainability indicators developed by Bockstaller & Girardin (2003), which evaluates the design quality, the results reliability and the utility to end-users.

This work is seen as relevant as most sustainability assessment tools found in literature take little account of the specificity of winegrowing systems and wine production process (Baiano, 2021; Ferrara & Feo, 2018; Flores, 2018; Keichinger & Thiollot-Scholtus, 2017; Merli et al., 2018; Trigo, Marta-costa,

& Fragoso, 2023). The developed framework has also value for promoting debate and supporting stakeholders' decision-making, while aiding wine businesses to cope with market pressures and new sustainability policies. As for the design approach, it is shown how a structured hierarchical approach may answer to the need for more and better integrated methodologies when holistically evaluating the sustainability performance level of complex production systems.

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# Clusters and sustainability: an approach from the Spanish wine sector and its designations of origin

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**Keywords:** wine, designations of origin, clusters, sustainability

The agri-food sector, with agri-food industry (AFI) at its forefront, is a dynamic branch of Spanish economy, being relevant at micro-territorial level, as an engine of socio-economic progress. Its contribution goes from landscape conservation to creation of local wealth and employment and, therefore, it has become an instrument to foster rural population fixation. All these aspects make agri-food sector a factor of sustainable local development. Within this sector, designation of origin (DO), which cover in Spain a wide range of agri-food products from many geographical areas, play an important role.

Within the Spanish AFI in general, and the Protected Designations of Origin (PDOs), often identifiable as Local Production Systems (LPSs) in particular, the wine sector occupies a privileged position, both in terms of extension and production and in terms of foreign trade. But, from the perspective of sustainability, what is the role played by the wine sector and its main PDOs, as exponents of territorial clusters?

The main purpose of this research is to reflect this role in the most appropriate way possible, considering the limited detailed quantitative information available.

To get this objective, the paper has been structured in four sections. Firstly, Spanish agri-food sector and its PODs are introduced to highlight their importance in the Spanish manufacturing fabric, emphasising the relevance of wine activities within it. Secondly, the main wine PDOs are presented, which can be classified as LPSs or territorial clusters. Thirdly, activities and actions with a favourable impact on sustainability are identified throughout the whole wine sector value chain. Fourthly, the main contributions of Spanish wine PDOs to sustainable development are examined. The paper ends with the main conclusions drawn from these four sections and some final considerations on future perspectives of local/rural sustainable development based on wine PDOs activities, in a globalised world marked by the uncertainty of climate change, are deployed.

From the methodological perspective, data has been collected from different sources: Annual reports of Ministry of Agriculture, Fisheries and Food of Spain (MAPA) on PDOs and wine PDOs; Information provided by the Spanish Wine Federation (FEV) on sustainability of wine sector activities; Publications on the Spanish Wine Interprofessional Association (OIVE) on socio-economic information of Spanish winegrowing and winemaking. Besides, qualitative information from direct and telephone interviews with highly qualified manager and executives of wine sector are used to better understand the interrelations between the world of wine and the notion of sustainability.

With regard to the Spanish agri-food sector, some ideas should be highlighted:

The greater relative importance of Spanish agri-food sector in comparison with the EU average in its three areas: agriculture, manufacturing and commercialisation.

The strong presence of the AFI in the so-called “Empty Spain”, with 8,000 companies generate just over 305,000 jobs and 16.2% of the GDP produced in the area, with a social impact of around 9,000 million euros.

The importance of the wine sector within the Spanish AFI. Thus, a group made up of just over 4,000 wine companies (with a small average size: around 7 employees) generates 29,000 jobs and a turnover of close to 8,000 million euros.

The relevance of agri-food Quality Denominations (QDs), as an instrument at the service of local/rural development. These QDs are present in all regions and agri-food branches, with wines and vinegars standing out.

The second section consists of two subsections. In the first, some general features of the wine sector in Spain are highlighted:

Spain is the world leader in vineyard surface area, with approximately one million hectares. It is the second country in terms of production, after Italy and France, and it is, together with Italy, the largest exporter of wine by volume.

The strong geographical concentration of surface area and production, with Castilla-La Mancha at the top of the ranking.

Manufacturing atomisation and low domestic consumption, offset by strong export dynamism (with considerable importance of bulk wine).

Commitment to innovation and quality, with growing importance of PDO and PGI wines.

In the second subsection, the aim is to identify, in an approximate way, which of the 95 wine PDO territories are likely to form LPSs or clusters. In order to assess the concentration/specialisation of production typical of clusters, the number of wineries present in each territory has been taken as a basis, in absolute and relative terms. Furthermore, as a complement, the membership or not of each PDO in the Spanish Wine Routes (RVE) product club has been taken into account, insofar as the enotourism network implies the existence of collaboration and synergies on a local scale between wineries and companies from other sectors and institutions, which nourishes a greater productive diversification and a greater potential with a view to an integral local development.

The third section focuses on determining the links between the wine sector and the idea of sustainability. To this end, firstly, and taking the information published by the FEV as a reference, the set of Sustainable Development Goals in which the sector's commitment is most evident is highlighted. Secondly, the main aspects that, throughout the value chain, reflect the promotion of sustainability, both environmental, economic and social, by the wine sector are included: from the shaping of the landscape to the creation of employment and population fixation, including crucial issues such as rational water consumption, the reduction of the carbon footprint or elements associated with packaging.

The fourth and final section addresses a series of issues related to the importance of wine PDOs in terms of sustainability. In this regard, it is worth to underline:

The great economic capacity of many PDOs, embodied by an important contingent of wineries and winegrowers and a large volume of business, with important repercussions in terms of employment and income generation at local level. Such is the case of Rioja, Cava, Ribera del Duero, La Mancha or Penedés, among others.

The expansion of enotourism, as an additional singular manifestation of this economic capacity, with powerful knock-on effects throughout the local economic fabric, in a context of inter-business and institutional cooperation and commitment to historical heritage and the natural environment. The

impact associated with wine tourism activity can be seen most clearly in those PDOs integrated in the RVE, promoted by the Spanish Association of Wine Cities.

The rise of organic wine and the search by a growing number of wineries for certificates accrediting their environmental responsibility. Spain is the country with the largest area of organic vineyards in the world (131,200 hectares), accounting for approximately 27% of the world total surface area. The number of wineries exceeds 1,200 production units, present in almost all regions.

As far as accreditations are concerned, it is worth mentioning the *Wineries for Climate Protection* certification, created by the FEV in 2015, currently held by more than 40 wineries of various types, generally of great prestige, and registered in some PDOs, especially in Rioja and Ribera del Duero.

The existence of other mechanisms to promote sustainability, such as: public aid to companies within the framework of the Support Programme for the Spanish Wine Sector (PASVE); the FEV's Strategic Plan around digitalisation and sustainability as basic pillars, in order to attract resources within the framework of the Plan for the Recovery, Transformation and Resilience of the Spanish Economy (financed with *Next Generation EU* funds); the guidelines set out by the Wine Technology Platform in its Strategic Innovation Agenda for the Wine Sector 2021-2024, under which sustainability and climate change appear as R&D+i priorities; the role of the Regulatory Councils in explaining and making visible the importance of PDOs in terms of environmental, economic and social sustainability; and the cooperation agreements between institutions, where the FEV stands out.

# What is natural wine?

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**Keywords:** wine, natural wine, marketing, segmentation

## What is Natural Wine?

Natural wine appears to be a growing segment within the wine industry. Natural wines are increasingly discussed in wine magazines, shown at wine fairs, and seen on wine lists of expensive restaurants. But to study the segment from the point of view of economics requires a definition that can reliably differentiate natural wine from ordinary (non-natural) wine. How is the natural wine segment best defined? What is natural wine?

To approach this question, we conduct a survey of natural wine producers around the world. Here we report the results of an exploratory survey of 55 producers, who showed very little agreement over what constitutes “natural wine” from a sensory or production perspective. We use these results to propose a working economic definition of natural wine and prepare a larger future survey to validate and refine our definition.

## **Data and methods**

In January and February 2022, the investigators interviewed 55 international natural wine producers. They are objectively categorized as natural wine producers as they either selected this category during their inscription to the major organic wine fair in France - “Millésime Bio” – were present at one of the “off” events exclusively reserved for natural wine producers (“Les Affranchis” and “Roots 66”) or at “La Dive Bouteille”, the biggest natural wine fair in France.

Most of the respondents were natural wine producers from different regions of France (Alsace, Rhône, Bordeaux, Gaillac, Bourgogne, Provence, Loire, Tarn, Savoie, Beaujolais), Spain (Penedés, Valencia, Galicia, Andalucía), Italy (Salento, Romagna), Portugal (Douro), Austria (Wagram). Respondents were aged 21 to 68, and were either newcomers in the industry or issued from winemaking families. They answered a series of questions about their definitions of natural wine, production and marketing methods, and business characteristics.

## **Preliminary findings**

The main result of this exploratory study was a confirmation of our initial hypothesis of a total lack of agreement over what “natural wine” is. Respondents’ definitions of natural wines were extremely diverse in terms of both sensory and production characteristics.

Definitions varied from very technical to very abstract. For example: “it has to be made from organic, even better biodynamic grapes, hand-harvested, from spontaneous fermentation, using only natural yeasts, without fining or filtering, that is for the winemaking part”, “fermented grape juice”, “minimal intervention”, “it’s essentially the vineyards, do as much as possible there to do as little as possible in the cellar”, “work well to have nothing to correct” “take out as little as possible and add as little as possible”, “a wine for which you are not working, nature is”- to “authenticity”, “coherence”, “contact to the land”, “the respect of life” “living earth”, “peasant method”, “no poison,” or “a link between future and past.”

There was also a total lack of agreement over what, if any, certifications were relevant to a wine's being "natural." Some producers exited or never entered the French GI systems, and criticized them: "The AOP style is an end result style. It only works if you yeast. Without a correction in the cellar, it doesn't hold up." Others were AOP compliant. Most producers do not belong to any natural wine associations, but some display the label "vin méthode nature."

Given the disagreement among natural wine producers over how to define their own segment, what are the possible ways that a natural wine segment could be defined in a way such that useful data on the segment could be studied? We consider the characteristics of natural wines and respondents' answers in our survey, we reject two possible conventional ways of defining natural wine, and we find more promise in a third alternative.

1. Define natural wine by its sensory characteristics? Ordinary wine segments such as red and white wine are easily differentiated by objective characteristics such as their color. Sparkling wine is differentiated by its CO<sub>2</sub> content, and sweet wine by its residual sugar. Although there are some borderline cases (is Vinho Verde sparkling?), these are generally objective and clearly defined measures for inclusion in a segment.

Could natural wine be defined by its sensory characteristics? We say no: we observe even more sensory variation among natural wines than there is within any segment of ordinary wine. Some natural wines have attributes that might be considered flaws in ordinary winemaking, such as oxidation or secondary fermentation, but are sometimes intentional in natural wine; others have none of these attributes, and would meet high quality standards within some segment of ordinary wine.

2. Define natural wine by its production characteristics? Some ordinary wine segments, such as biodynamic and organic, are defined by certifications from governments or industry associations in different countries. Although some of the criteria for these certifications have been criticized as arbitrary, they are specific, and their stamps of approval visually define a product on the retail shelf. So these segments can be defined, not in sensory terms but in terms of objectively measurable aspects of the production process.

There is no broad agreement over what certifications or production characteristics would qualify a wine as "natural." Natural wine producers do not all belong to the same associations nor share beliefs about the validity of certifications. They generally share a commitment to "minimal intervention," but this means different things to different producers, from dry farming to wild yeasts to traditional methods of fermentation in clay vats. Some natural winemakers follow biodynamic or organic standards or some portion of them, while others do not. So a definition of natural wine based on production characteristics is not possible.

3. By business characteristics? Third, we consider definitions on the basis of non-wine and non-winemaking characteristics of natural wine: that is, the characteristics of the business activities and marketing practices of its producers. It is here that we find the most objectively measurable and systematic differences between natural wine and ordinary wine.

The main differences we observe do not, however, relate to the location, size, or ownership of firms. Natural wine producers come from all over the world, and have relatively small production (2,000 to 270,000 bottles per year from 2 to 30 hectares of vineyards). They tend to sell almost all of their small production, often through allocations. They are often family-owned farms with the natural wine business run by the younger generation. Natural wine producers pursue small markets in many

countries, as many as 30 or more, with very small export quantities (a container or less) to some countries. These characteristics are all out of the ordinary but not unique: they are also seen in the ordinary wine segment.

Where natural wine differs most consistently is in the business practices and sales and marketing behavior of producers, which is highly unusual in the context of the industry. Natural wine producers do not often show their products through tastings. Most come to wine fairs with nothing to sell, and those that do often come with unlabeled bottles. The natural-wine-focused fairs do, however, reinforce social bonds that are crucial to selling. The natural wine business is built around a network of friends with a big overlap between natural wine producers, natural wine distributors, and natural wine consumers.

Natural wine producers mostly work with one specific, well-defined group of distributors, and these distributors work exclusively with wines they deem “natural.” So the distributor’s stamp of approval—a wine sold by them *must* be natural—may play the role that the AOC or certification systems play in other segments. This makes entry into the natural wine segment unusual, in that signing up with a particular distributor is not a production challenge but rather a social marketing and networking challenge. To this end, many natural wine producers are engaged in other socially conscious business activities such as agro-forestry and eco-B&Bs, which may bolster their reputation in the small global network of natural wine influencers.

We thus propose a definition of natural wine that centers around social marketing networks, and we discuss future research to validate and refine this definition.



# Parallel session VIII-

International Trade & Macro

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# EU wine exporters competing in a changing international market

*Anna Carbone (University of Tuscia), Roberto Henke (Research Center for Policies and Bioeconomy, ROME)*

## Introduction

Wine production, trade and consumption changed deeply in the last decades. On the consumption side, wine has become a hedonic good. On the supply side, new producing areas have reshaped the geography of production and trade. More recently the international economic crisis started in 2008; the rise of China; the liberalization of the planting rights system in the EU; and finally, the COVID-19 disruption, deeply affected exporting countries' competition patterns (Màtè Balogh and Jàmbor, 2017; Canavati et al., 2020).

This paper contributes to assess the competitive position of a group of major European producers and exporters (France, Germany, Italy, Hungary, Spain, and Portugal). The analysis looks at bottled wines, both still and sparkling ones, and is based on an innovative indicator called C\_Consty aimed at measuring the sophistication levels of the destination markets. This indicator is used to assess the kind of competition exporters engage in their different clients' markets (Carbone et al., 2020; Carbone et al., 2021); here the C\_Consty is combined with more traditional trade indicators such as the penetration rates on the main world importing countries, and the average unit values (AUV) of exported wines.

## Indicators and data

The analysis is based on three different indicators that well complement each other.

The first is a sophistication index based on the per capita GDP of client countries:

$$Consy_i = \sum_j GDP_{pcj} * cij$$

where  $GDP_{pcj}$  is the per capita income of importing country  $j$ ;  $cij$  is the share of total world imports of item  $i$  imported by country  $j$ . Each  $Consy_i$  is the average of the  $GDP_{pc}$  of all countries importing product  $i$ , each weighted for the share of world imports for that item, imported by each country. The  $Consy$  vector provides the ranking of product sophistication on the import side.

The term sophistication encompasses aspects such as technology, branding, style, packaging, sensory attributes and so on and so forth. The idea behind this family of indicators is that there is a direct relationship between income levels and product sophistication. The sophistication measure was initially associated to the level of wealth of exporting countries as determined by their level of per capita GDP (Lall et al., 2006; Hausmann et al., 2007).

Elaborating on this, it has been observed that the demand for imports is increasingly associated with the sophistication of goods and that this relation also rises with income (Hallak 2006; Fajgelbaum et al. 2011).

The average income level of the destination markets for a specific product indicates the kind of competition engaged and potential profitability. Competition on richer markets rely more on quality, while price competition is more intense in less rich markets. Moreover, more complex competitive strategies are required in destination markets with higher sophistication levels.

We also built a country-specific C\_Consty indicator regarding the clients of each specific exporter. In this case, the interest is focused on the different destination markets and, thus, different exporters are



compared for a given traded item based on their different clients. This version of the index allows to compare the positions of the exporters on the international markets and, thus, to assess their potential competition.

The analysis of the sophistication is complemented with two other more traditional indicators:

the penetration rate, this is the share of exports from one given exporter over the total imports of a selected importer for a given product. In our case this is calculated on trade flows measured in values. This indicator measures the share of a destination market detained by an exporting country.

The AUV, which is obtained by dividing the export flow measured in value by the same export flow measured in quantity. The AUV is a weighted average of the prices of the goods forming the export flow; as such, it is commonly used in trade analysis as an indicator of product quality.

Data come from the United Nations ComTrade databank. We referred to the six EU Member States wine exports, while on the import side 130 countries are included, accounting for almost 100% of wine import flows for the biennium 2019/20. We refer to HS 1996 at 6-digit level where code 220421 is associated to all bottled still wines, while code 220410 represents sparkling wine. Data are in current US dollars and in Tons. The GDPpc is released by the World Bank (World Development Indicators) measured in Dollars at 2017 Purchasing Power Parity (PPP) values.

### **Evidence on EU wine exports and competition**

Countries selected for our analysis represent almost two thirds of world exports of still bottled wine and a bit less of 90% of world exports of bottled sparkling wine. The group leaders are France and Italy, with France especially dominating the sparkling wine world market.

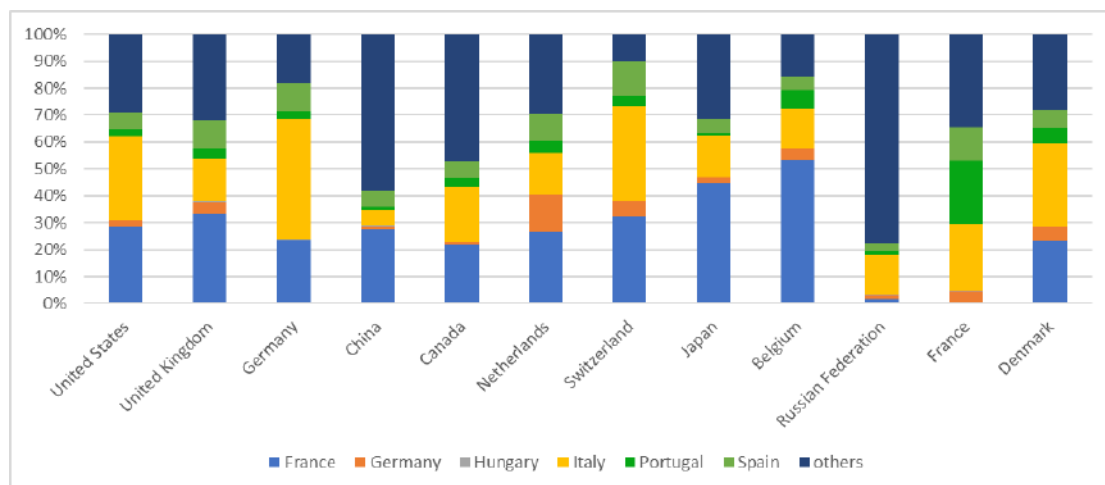
Previous studies have analyzed the sophistication levels of the whole range of agri-food exported goods, showing that wine scores rather high in the sophistication, especially sparkling wines. (Carbone et al. 2020; Carbone et al., 2021).

The high values of the Consy associated to bottled wines (table 1) is not surprising when considering that the three major world importers for bottled still wine are United States, United Kingdom and Germany, while for sparkling wine Germany is replaced by Japan.

For bottled wines, the highest score is presented by Italy (\$51,716) while the lowest is that of Hungary (\$40,070). Italy, France and Germany position themselves above the average world value. As for sparkling wine, the range of values is wider: from \$52,542 (France), to \$36,580 (Portugal). In this case, it is only France that is above the world value. European exporters seem to confirm the findings of previous works, that is: rich wine exporters trade especially with more sophisticated import markets, with France and Italy in the leading position.

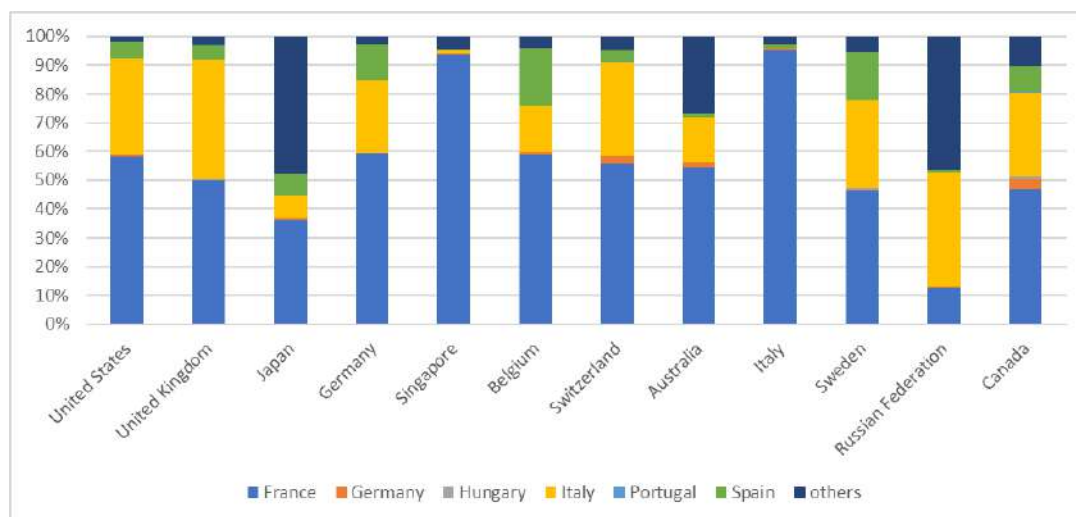
The penetration rates shed light on the positioning of the six European exporters (Figure 1 and 2). Looking at the imports of still wines, the EU exporters hold the largest shares of these markets, with France prevailing in some destinations (UK, Netherlands, Japan and Belgium) and Italy in others (USA, Germany, Switzerland, Denmark). It is also worth to pinpoint that non-EU exporters are more capable to enter the newer markets of China and Russia.

Figure 1. Market shares of EU exporters in the first twelve world importers (still wine, 2019-20)



Source: our elaborations on ComTrade data base.

Figure 2. Market shares of EU exporters in the first twelve world importers (sparkling wines, 2019-20)

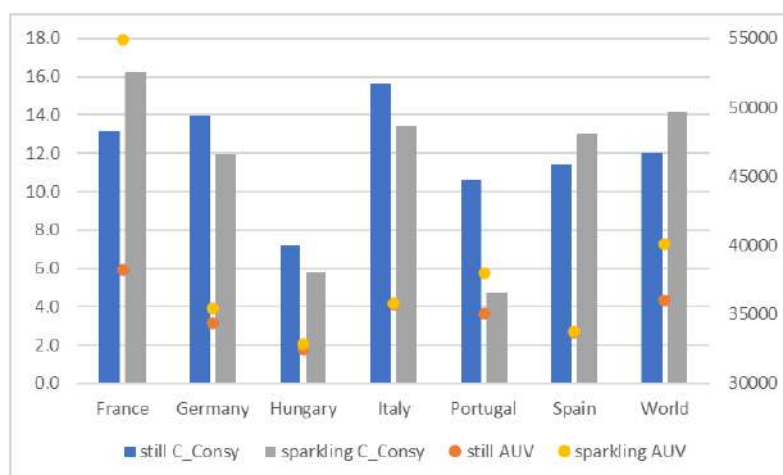


Source: our elaborations on ComTrade data base.

The analysis of the AUV reveals a strong differentiation among exporters. France leads the ranking of AUV being the only EU seller with AUVs above the world average. However, the gap with the other countries of the group is much larger for sparkling wines than for still ones. With the only exceptions of Italy and Spain, the AUV of sparkling wines are always higher than that of the still ones.

France and Italy enter highly sophisticated markets (Figure 3); however, France occupies higher market segments than Italy. This is especially true for sparkling wines but also holds for the still ones. Spain, the third world exporter, reaches slightly less sophisticated markets where it sells slightly lower quality wines compared to Italy. Portugal is the only exporter of the group selling to countries at very different sophistication levels the two wine typologies: much higher for the still wines than for the sparkling ones.

Figure 3. Comparing C\_Consy with AUV



Source: our elaborations on ComTrade data base.

## Concluding Remarks

By combining different trade indicators, we can assess the kind of competition engaged by major EU wine exporters. All of them are targeted at well sophisticated markets both for still and especially for sparkling bottled wine. However, France, Italy, and Germany manage to reach more rewarding clients compared to Spain, Portugal and Hungary.

Coherently, France and Italy show higher penetration rates in the main importing high-income countries. Besides, all exporters analyzed have low penetration abilities in distant markets, with the only exception of Japan.

The combined analysis of C-Consy and AUV shows that France occupies higher market segments than Italy especially for sparkling wines. Spain and Germany reach slightly less sophisticated markets where they sell lower quality wines. France and, to some extent, Portugal differentiate more AUV for still and sparkling compared to the other exporters. Portugal is the only exporter of the group selling to countries at very different sophistication levels the two wine typologies: much higher for the still wines than for the sparkling ones, for which, however the AUV is quite high. Differently, Hungarian wines get lower prices in less sophisticated markets.

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# Heterogeneity and diversification strategies in exports: The case of the protected Spanish wine industry

*Jacobo Nunez (University of Madrid), David Martin Barroso (University of Madrid),, Juan A. Nunez Serrano (University of Madrid), Francisco Velazquez (University of Madrid)*

This paper analyses the determinants of firm's export propensity in the Spanish protected wine industry. In order to do so, we propose an empirical model that introduces business heterogeneity, the location of firms through their corresponding appellations of origin, and some indicators to identify the strategies followed by the firms, specifically, the horizontal and vertical differentiation as well as innovation in the production processes. We build a three level database that contains information on the wines produced, the wineries and the firms that own the wineries, allowing the identification of the production and geographical differentiation strategies. Results show a statistically significant positive effect on exports of size, financial strength, differentiated production processes, the existence of a network, vertical differentiation of production, geographic diversification and price competitiveness. On the other hand, the age of the wineries, the horizontal diversification of products and the presence in high price segments, they all have a statistically significant negative effect on export propensity.

**Keywords:** Wine industry, exports, diversification strategies, business heterogeneity

# The impact of markups on export behaviour: Firm level evidence from Hungarian wine industry

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**keywords:** export behavior, firm-level markups, wine industry, Hungary

## The impact of markups on export behaviour: Firm level evidence from Hungarian wine industry

Theory predicts that firms with relatively low marginal costs and/or higher product quality, that is, larger markups, enter the export market and adjust their product prices depending on the level of competition they expect to encounter at the export destination. Furthermore, markups can change through learning by exporting for firms remaining in the export market for a number of years. However, the empirical evidence on the relationship between exporting and markups is limited especially for food industry. The aim of the paper is to investigate the impact of markups on export behaviour in Hungarian wine industry

The influence of markups, that is, the ratio of output price over marginal cost and its components, on firms' export participation and intensity has received considerable attention in the literature. A firm's physical productivity—which determines its marginal cost—has been identified as one of the key determinants of export participation and intensity. Although these models predict that productivity will have a positive impact on export intensity, defined as the ratio of export sales over total sales, a reverse effect is also possible. Given that firms with a given level of productivity can reach a certain fraction of consumers in both domestic and export markets, improved productivity enables them to increase the fraction of consumers they reach in both markets. If the positive impact of productivity improvements on domestic sales exceeds the positive impact on export sales, productivity, and export intensity will be inversely related.

We focus on the following hypotheses:

H1: Higher markups increase the likelihood of export

H2: Higher markups lead to higher export intensity, conditional on export participation

H3: Rising markups after controlling for productivity differences increase the likelihood of export

H4: Rising markups lead to incremental increases in export intensity.

The database employed in the analysis contains 1,158 observations. It represents an unbalanced panel of 196 firms from the Hungarian beer industry about which data was gathered during the period 2004-2019. Firm-level data is collected by the Research Institute of Agricultural Economics based on bookkeeping data in the National Tax Authority.

Labor is defined as the number of employees used to estimate the production function. We use deflated material costs for materials and the value of fixed assets for capital. The production function is estimated by deflating material costs and capital using the respective industrial producer price indices with base year 2004. Revenue is deflated to obtain a measure of physical output. Although the domestic price index is the harmonized index of consumer prices, we construct an industry-specific price index for exports using data on country-level export quantities and prices from. The overall sample shows considerable variations in firm revenues,

input variables, export intensity (only applicable to exporters), and firm characteristics, such as age and ownership. These variables also tend to differ between exporters and non-exporters, with exporters having higher average revenues and input use. Moreover, exporters tend to be older firms compared to non-exporters.

We employ two-stages approach. First, we adopt the De Loecker and Warzynski (2012) approach and augment it to account for input market power to recover markups of price over marginal cost. Production function estimated by Akerberg et al. (2015) using Translog and Cobb-Douglas functions. Second, because only a small percentage of firms engage in exporting, the dataset contains a large number of zero trade values. Nevertheless, these zeros must be treated as meaningful observations as they represent the optimal choice for these firms. Therefore, we employ the Cragg hurdle regression.

Our results suggest that on average, firms in the Hungarian wine industry charge prices that exceed marginal costs. Average markups differ significantly and within wine industry. We also find that the distribution of markup values exhibit a positive skew.

With respect to the impact of markups on export participation and intensity, our analysis reveals

that higher markups increase the likelihood that a firm will engage in exporting and will also exhibit a higher export intensity. Our investigation of the effect of export market entry shows an immediate markup increase upon entry. Moreover, we detect that the markup increases further if export activities continue for at least two consecutive years. Finally, our findings indicate that exporters and non-exporters differ in terms of their ability to exercise market power, as firms with higher markups self-select into export markets. This enables them to charge even higher markups.

We also control for productivity differences to study the relationship between firm markups

and export behavior. Theoretically, higher markups could be associated with differences in both

marginal cost (i.e., productivity) and price. When we control for cost differences across firms we obtain similar results, albeit of lower magnitude. This suggests that factors other than productivity, such as product quality and demand-side conditions, are also important in explaining markup differences across firms and also affect the markup– export relationship. The observed relationship—even after controlling for productivity differences—highlights the importance of product quality and/or differentiation to a firm’s choice of export destination markets when designing an export strategy.

# Measuring the impact of natural disasters on wine exports: Investigations at the level of French 'départements'

Alex Bao (University of Bordeaux)

**Keywords:** Natural disasters, French wine, Difference-in-differences, Quality.

## Extended abstract

International trade theories have been initially related to foreign demand and price competitiveness (Armington, 1969; Warner and Kreinin, 1983). Then, as non-price competitiveness has been introduced as another relevant feature on explaining trade flows (Hallak, 2006), climate change issues recently started to be considered as potential determinants. Osberghaus (2019) summarizes the empirical literature on effects on trade resulting from weather variations or natural disasters occurring. Changing weather may affect yields feature and the composition of exports of agricultural products and light manufactures (Jones and Olken, 2010). Besides, exports tend to be negatively affected by the occurrence and severity of disasters in the exporting country, after suffering from production losses (Gassebner et al., 2010; Mohan, 2017).

Moreover, latest findings on weather issues capture heterogeneous impacts between regional aggregate outputs owing to different weather conditions perceived across production areas (Ma and Maystadt, 2017). The existing literature dealing with natural disasters expresses that production losses may occur if disasters destroy productive capital or durable consumption goods, such as housing, which are replaced using funds and hence preventing productive investments (Hsiang and Jina, 2014). Some authors also stress destroyed transport infrastructure as a possible impact channel (Gassebner et al., 2010; Oh, 2017). The emphasis on export channel may provide new evidence of heterogeneity between traded products, such as quality sorting or price discrimination (Crozet et al., 2012; Martin, 2012; Emlinger and Lamani, 2020). Thus, throughout my analysis I attempt to derive the repercussions of natural disasters occurring on a single differentiated product for its global trade, which has never been run before with respect to my knowledge. I therefore aim extending this new path by assessing the potential heterogeneity related to natural disasters occurring on export flows composition according to a difference-in-differences approach (Rubin, 1990).

French wine as traded goods may treat prior issues related to international trade and whose overall production tend to be affected by environmental factors. Storchmann (2012) underlines that estimating the aftermath of climate change is one of the main issue in wine economics field, whose production substantially depends on weather conditions and the occurrence of natural disasters (Spellman, 1999). This commodity gathers several characteristics which should help us in quantifying the effects of natural disasters on international trade, regarding the other specific aspects already emphasized. First, wine is an experience good owing to sensory properties focusing on horizontal differentiation partially affecting its consumption (Combris et al., 1997). Secondly, vertical differentiation is associated with reputational effects present between and within French wine producing areas (Costanigro et al., 2010). Thereby, French wine production is highly diversified and geographically differentiated within regions, hence estimating potential heterogeneities due to the

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occurrence of a disaster amid producing areas and without any other standard determinant is relevant.

In this context, quantifying the aftermath of natural disasters on French wine exports is of particular interest. France is highly renowned about producing wine within several geographically diversified producing areas, whose the component of their exports might show a certain amount of heterogeneity. For the sake of the study, my paper will investigate possible repercussions resulting from the occurrence of natural disasters to French wine exports. Exports data are provided by the French Federation of Wine and Spirit Exporters (Fédération des Exportateurs de Vins et Spiritueux de France, FEVS), in both volume and value terms. This dataset deals with information on wine shipments for 134 French PDOs (Protected Denomination of Origin) to 52 importing countries over the period 1998-2020, representing more than 95% of total French wine export value.

We combine this database with information on natural disasters, whose annual data are collected by the French Institut National de la Statistique et des Études Économiques (INSEE). Indeed, this national institute provides a public database gathering a multitude of environmental indicators implemented within French territories, with observations available between 1982 and 2021. The observations may be accessible at the level of 'département', but also at the smaller level of 'communes'. This availability of data allows us to further disaggregate the estimates carried out, while distinguishing more precisely the effects resulting from a shock similar to the occurrence of a natural disaster on the exported wine flows. We must therefore associate the appellations with the production's 'départements' and communes to which they are attached before establishing the proposed empirical analysis.

Moreover, we run several estimations combining natural disasters whatever their categories in order to determine the impact of disasters occurring on French wine exports. We therefore apply Difference-in-differences method for different scopes and related to export volumes and unit values. As the empirical framework is twofold, we decide to start the analytical approach by focusing on 'départements' before reducing the sample scale by assessing discrepancies within denominations of a same 'département'. Thus, I attempt to capture significant relationships between diverse categories of natural disasters and wine exports for both trade margins and prices.

The preliminary results and principal expected effects suggest that a type of natural disaster occurring in a French 'département' tends to negatively affect its volume and prices of wine exported. The aftermath observed resulting from an external shock as a natural disaster is consistent with the existing literature dealing with linkages between international trade and environmental issues. I also infer relevant outcomes within individual 'départements' which confirms the results priorly obtained for the experimental analysis on the full sample. Finally, as I have not achieved all the empirical analysis further investigations should help us to get more accurate outcomes.

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# International Trade in Sparkling Wines. Is Prosecco Different?

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**Keywords:** Google Trends; international trade; gravity equations; sparkling wines; Prosecco.

## Abstract

In this project we investigate the use of Google Trends (GT) as a tool to empirically investigate and forecast international trade. We use data on international trade in major EU sparkling wines to estimate different gravity equations ‘augmented’ with GT data to check its predictive power. We also test whether the Spritz phenomenon has any role in explaining the Prosecco’s success.

## Literature

GT is a Google tool, free to use, that reports the most popular terms searched in the recent past (data collection for GT started in 2004). Indeed, “it provides access to a sample of actual search requests made to Google, allowing one to look into the interest in a particular topic from around the globe or down to city-level geography” (Medeiros and Pires, 2021: 2).

After the early seminal papers on “forecasting the present or ‘nowcasting’” (see, e.g., Choi and Varian, 2012, which reports probably the most elaborate and cited discussion of GT predictive qualities), several studies from different research areas have used GT to improve forecast accuracy. Thompson Reuters Web of Science and PubMed jointly recorded about 900 papers that used Google Trends or discussed its use in science since 2010 (Puhr and Mullner, 2021). The diversity of disciplines using GT is remarkable as well. The majority of papers and the earliest applications are in the field of public health, in particularly epidemiology, where GT has been used to study patient behavior/symptoms and to track the spread of viral pandemics, such as Covid-19, Ebola, and Flu (see, e.g., Nuti, Wayda, Ranasinghe, Wang, Dreyer, Chen, & Murugiah, 2014).

Later, economists joined as well and started to use search volume data to predict macro-economic variables, such as private consumption (Vosen & Schmidt, 2011), trade (Ma & Fang, 2021), unemployment, inflation, exchange rates, macroeconomic uncertainty (Castenuovo and Tran, 2017). Economists use GT to analyze also micro-economic phenomena, such as stock prices and their volatilities (see, e.g., 2020, Petropoulos, Siakoulis, Stavroulakis, Lazaris, & Vlachogiannakis, 2021) and trading behavior (Preis, Moat, & Stanley, 2013). Recently, Cziraki, Mondria, and Wu (2021) have used data from Google Trends as a measure of stock market investor attention. In these settings GT has proven valuable as a forward-looking market side measure of expectations with high predictive quality.

Other research applies GT to traditional social science topics like environmental awareness, gender attitudes (Corbi & Picchetti, 2020), religiosity, sexual behavior, suicide, or crime. In tourism, GT is used to predict travel activity (see, e.g., Law, Li, Fong, & Han, 2019). In political science, scholars use GT for polling (Mavragani & Tsagarakis, 2016) and to measure issue salience (Mellon, 2013) and public opinion (Gruszczynski, 2019). Moreover, GT is used to create indices of socio-economic uncertainty (Bontempi, Frigeri, Golinelli, & Squadrani, 2021). In sports research (and practice) GT is used to measure player/team performance/value (see, e.g., Gift, 2020) and in meteorology to study extreme weather phenomena (see, e.g., Kam, Stowers, & Kim, 2019).

While business scholars have employed GT to study technology adoption (Jun, Yeom, & Son, 2014) or advertising (Du, Hu, & Damangir, 2015, Hu, Du, & Damangir, 2014), few social scientists have used it to study firms’ internationalization or the like. To the best of our knowledge, the first application of GT data in the fields of strategy or international business is a recent working paper (Puhr and Mullner, 2021), which

uses GT data to study the moderating effect of internationalization on the sensitivity of stock prices during the Covid-19 pandemic. According to the authors, “the results of the study highlight that Google Trends measures of firm internationalization yield similar results as traditional internationalization measures used in International Business” (Puhr and Mullner, 2021: p. 4)

In international trade, to the best of our knowledge only two studies have used GT. Böhme, Gröger and Stöhr (J. Dev. Econ., 2020) show how geo-referenced online search data can be used to measure migration intentions in origin countries and to predict bilateral migration flows. Their approach provides strong additional predictive power for international migration flows when compared to reference models from the migration and trade literature. Moreover, their measures outperform any of the established predictors of migration flows in terms of predictive power.

Ma and Fang (Appl. Econ., 2021) analyze how online search, proxied by GT data, affects international trade in an otherwise classic gravity model. Their results show that online search intensity between two countries can significantly promote international trade. The analysis of possible mechanisms shows that online search is likely to increase trade by overcoming unfamiliarity and reducing trade risks. Since the role of online search is similar to that of traditional networks, they conduct extended analysis and find that online search is likely to substitute, rather than complement, migration networks in international trade.

## **Methods and wine application**

As explained in Castelnuevo and Tran (2017), Puhr and Mullner (2021), and Berger et al. (2021), GT provides the frequency in which a particular term is searched for in several languages from various regions of the world. Google normalizes the search data to make comparisons between terms easier. This means that search results are normalized to the time and location of a query by the following process. First, each data point is divided by the total searches of the location and time range chosen by the user. Then, the resulting numbers are scaled from 0 to 100 based on the topic's proportion to all searches on all topics. By doing so, Google Trends data represent the relative popularity. This feature avoids the situation where places with the most search volume would always be ranked the highest. All these Google Trends features described above are widely known by most of its users.

The idea we investigate in this paper is whether a certain set of words associated to a specific wine can be used to show consumption intentions by consumers in different countries. If searches are indeed correlated to consumption, then those same terms may be used to forecast trade of those wines in the countries investigated. We thus propose and investigate several measures for wines searches in different countries. Therefore, we estimate a 'standard' gravity equation where - among other explanatory variables such as distance, GDP, population, measures of trade costs, etc. - we have a proxy for the degree of consumers' interest in specific wines in the destination markets. We thus show to what extent these Google Trends measures can be used as a supplement to corroborate results from traditional gravity estimations. To conclude, and as a significant application, we use our methodology to explain the Prosecco success in international markets compared to other EU sparkling wines.



# Parallel session IX-

**Sustainability & Risk Management**

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# Sustainability-oriented innovations and productivity in the Italian wine industry: Does dynamic capabilities matter

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**Keywords** – wine sector, organizational routines, innovation, sustainability, total factor productivity

## Introduction

Innovation in the wine sector ranges from interventions in specific production chain processes to more integrated solutions aimed at organizational changes throughout the entire value chain. This study takes a slightly different track, but one that is coherent with this approach, focusing on how dynamic capabilities could enable innovations that accelerate the transition to sustainable systems (EC, 2020) ensuring business productivity at the same time.

Inspired by the Farm to Fork Strategy approach, wine value chain actors, including operators and stakeholders, are identified as the main implementers of sustainability-oriented innovation. Wine operators are directly engaged in ensuring sustainable manufacturing, processing, retailing, packaging and logistics, but their innovation capacity is greatly affected by the involvement of consumers, policy makers and researchers, who are stakeholders, and whose contribution is to guide choices and investments within the wine value chain in the pursuit of Farm to Fork Strategy goals for a Green Deal (EC, 2019).

The aim of the present study is to shed light on how dynamic capabilities and organizational routines related to sustainability-oriented innovations influence the Italian wine companies' performance.

## Conceptual foundations

Innovation in sustainability often involves the development of improved processes and products that reduce negative externalities (Leach et al., 2012). Sustainability has been debated in the wine industry as a potential source of competitive advantage (Jones and Webb, 2010). Small and medium-sized wineries have been found to be responsive to pressures exerted by stakeholders to become more sustainable and showed better performance in implementing voluntary sustainable management practices, demonstrating their willingness to accept the sustainability attitudes and norms expressed by others (Cordano et al., 2010).

There are several obstacles to the propagation of innovation. Without a positive attitude toward the adoption of sustainability practices, regulations may be even counterproductive. The lack of information sharing among relevant organizations is the most challenging barrier to sustainability (Szolnoki, 2013).

Recently, innovation in the wine industry has moved from being focused predominantly on products and technologies to include processes and services (Signori et al., 2017). However, converting operations from conventional processes to ones that are sustainable in the long term for the environment can be expensive and requires the development and/or adoption of innovations in various supply chain phases. All these changes require resources, time and skills, which can be made available only if the company's leadership commits to addressing sustainability innovation pressures.

## Empirical model

The dynamic capability approach assesses how companies construct and adjust their resources to maximize their organizational fit with the environment, which can be based on organizational routines (Mousavi et al., 2018). In many conceptualizations observed in the scientific literature, three types of dynamic capabilities are commonly identified: those needed to take in external knowledge, those needed to link the innovativeness to products and markets, and those needed to align the firm's resources and capabilities (Ellonen et al., 2011). According to Teece's (2007) categorization, the present study distinguishes between sensing, seizing and reconfiguring capabilities.

For sensing, an existing scale to evaluate wine companies' capabilities to gather information regarding innovation for sustainability was used, measuring, in particular, the wine companies' perceived importance of this information from internal, market, institutional and/or public sources.

For seizing, the measure was built as a combination of organizational activities through which innovations (new products or processes) have been developed (e.g., internal capabilities or sectorial best practice adoption) and commercialized (e.g., market penetration activities, cooperation with market and/or knowledge partners).

For reconfiguring, the present study relied on an existing scale (Jantunen et al., 2005; Wilden et al., 2013), based on the renewal activities towards sustainability. It assesses activities which have not been used before and derive from strategic management decisions, such as marketing methods or strategies, management practices and business processes, manufacturing-related processes.

With the concept of sustainability concretely established, productivity is gradually becoming a research hotspot (Wannakraij and Velu, 2021; Chou et al., 2014). The total factor productivity, which refers to the efficiency of production activities in a certain time frame, is used to disclose some contributions of output that cannot be explained by capital and labor accumulation (Pan et al., 2022).

Since innovation is usually related to companies' survival and TFP improvement, this study bridges the gap to some extent by investigating the impacts of dynamic capabilities related to sustainability -oriented innovations on TFP within the Italian wine industry, verifying the following hypotheses:

**Hypothesis 1.** There is a positive relationship between wine companies' sensing capabilities and their productivity.

**Hypothesis 2.** There is a positive relationship between wine companies' seizing capabilities and their productivity.

**Hypothesis 3.** There is a positive relationship between wine companies' reconfiguring capabilities and their productivity.

**Hypothesis 4.** The positive effect of wine companies' reconfiguring capabilities on productivity is mediated by the companies' sensing capabilities.

**Hypothesis 5.** The positive effect of wine companies' reconfiguring capabilities on productivity is mediated by the companies' seizing capabilities.

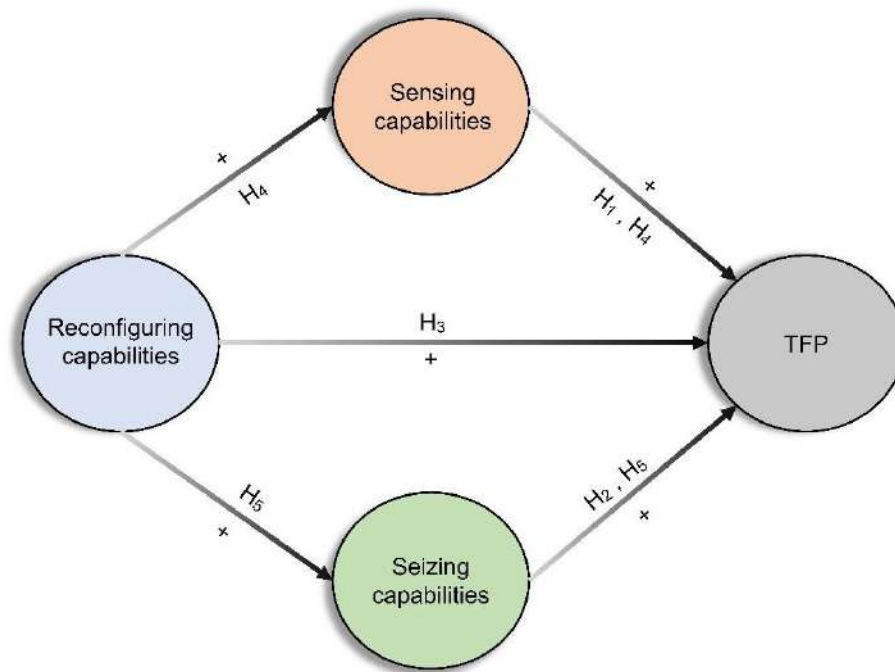


Figure 1 shows the structure of the empirical model for testing the existence of positive (+) relationships (H1-H3) between wine companies' dynamic capabilities and productivity performances. The arrows represent the direct effect of dynamic capabilities, measured based on the abovementioned scale, on the total factor productivity and also their mediating effect (H4 and H5).

The abovementioned model and related hypotheses (H1-H5) should be tested. For this purpose, a questionnaire was developed consisting of two main parts. The first part of the questionnaire aims at framing the context and detecting the wine companies' orientation to sustainability and their perception regarding the effects that innovations have on the sustainability achievement. The second part of the questionnaire aims at investigating the three groups of dynamic capabilities and organizational routines which steer a company towards sustainability: (i) sensing capability, aimed at gathering information regarding innovation from the environment;

(ii) seizing capability, aimed at developing innovative processes and/or commercializing innovation; (iii) reconfiguring capability, aimed at renovating activities, based on new strategic management decisions.

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# A Dynamic Model of Sustainable Development in the Wine Sector

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Sustainability is a significant challenge for today's wine industry. It is of growing relevance even in the short run as the effects of climate change become apparent (Santillán et al. 2019) and as consumers are increasingly aware and concerned about sustainability (McKinsey, 2023). Consumers also have favorable perceptions of sustainable certification programs (Forbes, 2019) as retailers push for these certification programs to show their environmental, social, and hence corporate responsibility.

Moreover, regulators restrict the use of agrochemicals due to growing health and safety concerns. Producer organizations including wine cooperatives and their governing bodies are also trying to engage their members into more sustainable production methods (Alto Adige Wine, 2020), but it remains a challenge to put sustainability principles into practice with many small and medium sized wine producers typically forming such cooperations. To meet this challenge, wine producers need to consider all three dimensions of sustainability, i.e., to grow environmentally friendly, socially responsible, and economically viable wine.

The idea of this theoretic paper is to analyze a dynamic model of conventional vs. more sustainably produced wine which incorporates two important external effects, related to the environment and reputation building. Our simplified model looks at wine regions with their residents and wineries selling wine on the world market. To keep the model simple, wine consumers enter through their willingness to pay (price) in the winery's revenue function.

The key concept in this paper is winery reputation which matures over time. Improving a winery's own reputation is a slow and time-consuming process. Raising it depends on reputation building activities through wine critics, marketing campaigns, social media wine influencers, wine fairs, competitions, resulting in reputation building expenditures. The higher these expenditures are, the faster a winery's own reputation builds up. The average winery reputation within a growing region denotes regional reputation (Schamel, 2009). In addition, a winery's own reputation also depends on its behavior with respect to sustainability. We propose that over time wine consumers will regard more sustainably produced wine also more reputable and will be paying more for it, which in turn makes conventional wine less desirable and less profitable for individual wineries. Simply said, conventional wine loses as consumer concerns related to sustainability increases and trust in the quality of more sustainably produced wine grows over time. Consumer intelligence support this hypothesis, particularly as younger generations of wine consumers exhibit a higher willingness to pay for sustainably produced wine (Forbes, 2019; Wine Intelligence 2022).

In the paper, we develop a dynamic model with conventional production methods which increase production quantities, but which may also reduce consumer willingness to pay, resulting in lower prices. Thus, winery revenue (price x quantity) may increase or decrease. Moreover, winery revenue increases with its own reputation at a decreasing rate according to the law of diminishing marginal product. The effect of a higher regional reputation, given a winery's own reputation, on the revenue of a winery is also ambiguous. On the one hand, higher regional reputation may result in a higher willingness to pay and thus a higher price (type of "free riding" on the region's reputation). On the other hand, for a given winery's own reputation, a higher regional reputation, and thus a bigger "gap" between its own and the regional reputation, may result in consumer movements to other wineries, which reduces revenues.

Our theoretical model spells out in detail all relevant relationships between the variables considered, i.e., how a winery's own reputation and regional reputation affect marginal revenue when it uses more conventional or more sustainable production methods. For example, as consumers may associate a winery's higher own reputation with more sustainable production methods, it makes conventional wine production less profitable. Or as another example, an increase in regional reputation can make an increase in a winery's own reputation even more profitable, as consumer (marginal) willingness to pay for their wine may also rise. Loosely speaking, it may pay off to keep up with regional reputation.

For our dynamic model we can identify a steady state, long run equilibrium. Because of externalities, the market economy equilibrium is not a first-best optimum deviating from the social optimum. An individual winery does not consider that more conventional wine production has a negative impact on resident wellbeing as it is less sustainable. Moreover, the individual winery does not account for its investment in reputation will also contribute to regional reputation, which in turn positively affects resident wellbeing and revenues of all wineries.

As a result, an individual winery produces too much conventional wine not considering its external cost in lowering resident wellbeing and it spends too little on reputation building as the private value of reputation is lower than its social value. Therefore, the private market economy will end up with a lower level of reputation and too much conventional wine being produced as would be socially optimal. We also find that in steady state (in the long run), expenditures on reputation in social (first-best) optimum are lower as in the market economy.

By introducing appropriate policies (taxes to produce more sustainably and subsidies to invest in reputation), a regional authority can correct for these externalities. The use of conventional production methods should be taxed, and expenditures to build reputation should be subsidized, where the tax- and subsidy rates should be time-varying.

To summarize, our theoretical model predicts that due to external effects, sustainable development in the wine sector is subject to corrective taxes to incentivize more sustainable wine production and subsidies to support investments in reputation building.

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# Risk to Reward: The Strategic Advantages of Diversifying Grape Varietals

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**Keywords:** wine, grape varietals, climate risk management

## Climate change and its impact on viticulture

The impact of climate change is increasingly felt globally, and the agricultural sector is no exception. In this industry, climate change manifests in two ways: extreme weather events and changes in weather patterns. The former increases the risk of frost, hail, and disease or pest attacks. The latter leads to prolonged periods of excessive heat or cold and increased instances of droughts and rainfall surpluses.

As with many other agricultural products, the wine industry is also susceptible to the effects of climate change. To produce high-quality grapes, wine production requires a long-term and consistent set of weather conditions. The growth cycle of a vine spans from April to September, and each stage, including flowering, fruit set, veraison, and ripening, is dependent on different weather conditions. For example, sunny and warm weather is essential during flowering and fruit set, while sun with moderate rain and marked day-night temperature differences are ideal during maturation.

Dubourdieu has established five criteria to determine the potential of a vintage based on these stages. To illustrate the impact of weather on the quantity and quality of grape production, we can look at a few vintages in the Valais region and compare them to Bordeaux.

2013: spring was rotten, but (late) summer were beautiful. Thus, despite limited quantities, Valais's quality was generally good with structured and lively wines. On the other hand, Bordeaux could not enjoy the same conditions during the summer, and the grape harvests were low in quantity and quality.

2014: a vintage characterised by unusual moisture that allowed the *Drosophila Suzukii* fly to proliferate. The quantities were ok, but the quality was average in Valais. Bordeaux was doing better, and the quality was generally good.

2015: the exceptionally hot and dry summer resulted in a very good quality vintage, but the quantities were limited.

2016: the summer was slow to set, but the vintage was, in the end, balanced and without major excess with enough rain. The quality was good in Valais and excellent in Bordeaux, and the quantities were comfortable.

2017: it is the year of the freeze. The summer was beautiful and warm, so the quality was good, but the quantities were (very) limited depending on the appellation.

These examples highlight that each vintage is at risk of climate hazards, leading to unpredictable variations in quantity and quality as compared to the historical norm. Thus, it presents a significant risk for wine producers and the wine market, which has unfortunately become a new standard. More

generally, these examples also illustrate that the economic consequences of climate change on wine producers can be significant and far-reaching.

- Changes in grape growing conditions: Changes in temperature and precipitation patterns can lead to alterations in the growing seasons for grapevines. This can lead to earlier or later harvests and affect the quality and quantity of grapes produced. Both may impact costs and revenues for winemakers.
- Increased pests and diseases: Warmer temperatures can increase pests and diseases that can damage grapevines. Producers may need to spend more money on pesticides and other control measures to protect their crops. Moreover, this may hurt efforts to use more sustainable practices in the vineyard and thus hurt revenues as consumers increasingly look out for natural wines.
- Water scarcity: Climate change leads to more frequent and severe droughts in many wine-growing regions. This can limit water availability for irrigation, which is critical for growing grapes. Producers may have to invest in more expensive, energy-intensive water management methods to keep their crops alive.
- Decreased wine quality: Changes in growing conditions can result in lower-quality grapes, resulting in lower-quality wines. This can impact a region's (or a producer's) reputation and reduce the demand and, thus, revenues for their products.
- Vineyard relocation: Some wine regions may become unsuitable for growing grapes due to increased temperatures, changing precipitation patterns, and other environmental factors. Producers may have to relocate their vineyards to cooler, more hospitable areas, which can be expensive and time-consuming. On the contrary, increased competition from regions that used to be inhospitable for grape growing increases and puts additional pressure on revenues.

In addition to these direct effects, climate change also influences the wine industry through indirect channels. For example, it leads to more extreme weather events, such as heatwaves and storms, which can damage vineyards and disrupt production chains. Furthermore, climate change is driving up the cost of inputs such as energy, water, and labour, increasing production costs and reducing producers' revenues and profitability.

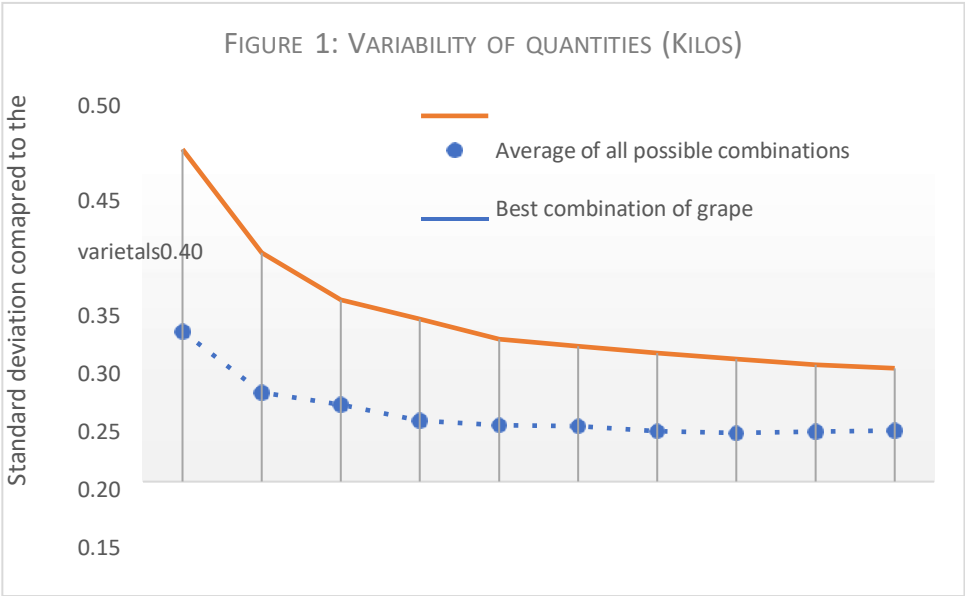
Overall, the economic consequences of climate change for wine producers appear complex and far-reaching. To mitigate these impacts, producers may need to adopt more creative practices. Therefore, we can ask whether it is possible to reduce variability in crop quantity and quality between vintages and thus reduce this risk to the winemaker's profitability.

### **Diversification and climate risk reduction**

The paper examines the following question: is it possible for a winemaker to diversify by exploiting several grape varieties, thereby reducing the uncertainty about the quality and quantity produced? In order to respond to this question, we use data from the Valais region in Switzerland. This idea is based on two observations. First, Valais is characterised by a wide variety of grape varieties, both in white and red. The same situation is found in some areas of Italy and Austria but more rarely in France, where the AOC rules limit the varieties that can be used. In addition, by comparing the Valais grape varieties, they appear to have their specificities and do not all have the same sensitivity to climatic hazards. Thus, some are earlier, more resistant to disease, or naturally more consistent in production terms. Based on these observations, we analyse, using data from recent vintages, whether exploiting a diversified portfolio of grape varieties for both colours reduces climate risk. The results, visible in the two figures below, suggest that this is the case.

Figure 1 shows the relationship between the number of grape varieties harvested (horizontal axis) and the climatic risk captured by the standard deviation of the quantity produced relative to the norm over the analysed period (vertical axis). The solid line shows the average standard deviation for all combinations involving 1 to 10 grape varieties. Thus, with only one varietal randomly selected, the standard deviation is 0.44, which means that there is about a one-third probability for production in a given year to deviate by more than 44% from the norm.<sup>1</sup> This figure shows that it is possible to reduce the risk by better choosing the grape planted. Thus, the first blue circle on the left shows that by choosing Pinot Noir (the most constant grape variety over the period), the standard deviation drops to 0.35. That is good, but diversifying is an even more effective way to reduce the risk.

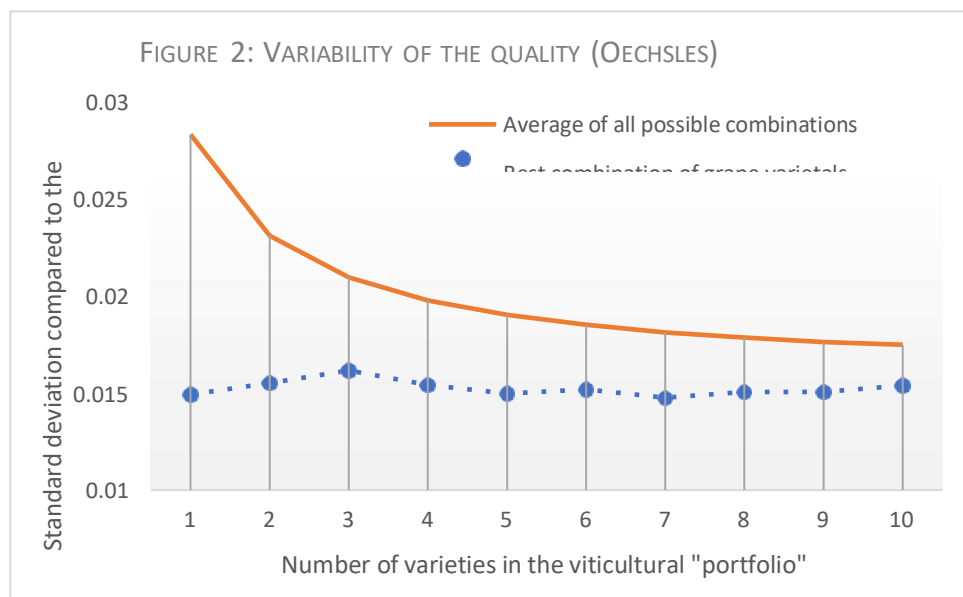
<sup>1</sup> In the case of a normal distribution, two thirds of observations lie between a +1 and -1 standard deviation around the mean (norm).



Increasing the number of exploited grape varieties makes it possible to reduce the standard deviation significantly. The figure shows that with four different varieties, it is possible, on average, to reduce by 40% the variability of the quantities produced. Indeed, the continuous line progressively decreases from 0.44 to 0.27 when we increase the number of varieties considered from 1 to 4. The risk is even halved from eight grape varieties randomly selected compared to the initial situation. Note that this figure makes no particular assumption regarding the weight allocated to the various grape varieties. In a portfolio composed of  $n$  grape varieties, each has a weight equivalent to  $1 / n$ . The dashed line in the figure shows that it is possible to reduce the risk even more if the grape varieties are chosen with particular care: just combining four white and red, late and early varieties, such as Chasselas, Petite Arvine, Pinot noir and Sylvaner, can reduce the climate risk by almost two-thirds.

Figure 2 is similar in construction but focuses on the variation in Oechsle degrees that we consider as a variable measuring quality. Certainly, other dimensions come into play to define a great wine. Nevertheless, to make good wine, one must first harvest grapes at maturity and, therefore, with enough sugar. The figure also shows that it is possible to reduce the risk of suffering from a lack of

maturity or excessive maturity by working with multiple grape varieties. The results are similar to those in Figure 1, except that the vertical axis contains much lower values. This shows that the variations in degrees Oechsle are smaller than in quantity. This is explained by the fact that it is always possible to modulate the harvest dates to return grapes with sufficient maturity.



### Valais: an example to follow, or is it too complex?

In the case of Valais and, more generally, Switzerland, the presence of multiple grape varieties can be explained by local and historical specificities (responding to local demand and customs duties) and a panorama of different terroirs (adoption under conditions). However, the fact remains that the country is ahead of others and could, therefore, serve as an example. The results presented and analysed above go in this direction, are relatively clear-cut and should consequently be of interest to winemakers worldwide. Diversifying the types of grape varieties that a wine producer grows can help to reduce the risk associated with climate change and other environmental factors in multiple ways.

- Increased resilience to climate change: Different grape varieties have varying tolerance levels to heat, drought, and other environmental stressors. By planting a variety of grape types, producers can increase the resilience of their vineyards to changing climate conditions. For example, if one variety is affected by a heatwave or drought, another variety may still produce a high-quality crop.
- Improved crop quality: Diversifying grape varieties can improve wine quality. This is because different grape varieties have different flavour profiles, sugar levels, and acidity, which can result in a more complex and interesting wine.
- Protection against disease and pests: Some grape varieties are more resistant to pests and diseases than others. By diversifying their grape varieties, producers can reduce their



dependence on a single variety and protect their vineyards against pest and disease outbreaks.

- Adaptability to changing conditions: Climate change is leading to changes in temperature and precipitation patterns in many wine-growing regions. By planting a variety of grape types, producers can increase their flexibility and adaptability to these changes, helping to ensure the long-term viability of their vineyards.

- Market diversity: Producing a range of different wine types allows producers to tap into a broader market and reduce their dependence on a single variety or region. This can help reduce market fluctuations risk and ensure a stable income stream.

Overall, diversifying grape varieties can help to reduce the risk for wine producers by increasing the resilience and adaptability of their vineyards to changing environmental conditions. This can help ensure the wine industry's long-term viability and protect against climate change's impacts. However, several potential problems may arise when implementing a diversification strategy of grape varieties. Different grape varieties have different soil requirements, and if the soil in a vineyard is not suitable for a particular variety, it may not grow well. Moreover, some grape varieties take longer to mature and produce fruit than others, which can impact the overall productivity of the vineyard. Thus, managing the growth and quality of a diverse mix of grape varieties is more complex than managing a single one, as each may require different care and attention. It may further require additional investments in equipment, labour, and other resources, which can increase the cost of production. Finally, even if a vineyard can successfully overcome these challenges, there may not be sufficient demand for it in the market, leading to financial losses.

Thus, it is crucial for winemakers to carefully consider these opportunities and potential problems when implementing a diversification strategy and to conduct an in-depth feasibility study considering all possible outcomes, being positive or negative.

# Evaluating Strategies for Adaptation to Climate Change in the wine sector

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In the wine production chain, climate change affects yields and the quality of the wine. Among the various climatic risks, the increase in maximum temperatures significantly affects vineyards and grapes, causing a decrease in the value of production. As a consequence of climate change, there is a loss of territorial suitability in areas traditionally cultivated with vines (Lee Hannah et al., 2013). The wineries with a greater degree of innovation always adopt new technologies in the winemaking processes in order to increase the quality level of the wine. In particular, some of these tools, applied in the transformation phase of the grapes, are also suitable for dealing with the damage caused by high temperatures, allowing wineries to preserve the value of the production and keep the vocation of the territories unaltered.

This research is the result of a study developed within the LIFE project 'ADaptation in Agriculture' - (Acronym: ADA) funded by the European Commission. ADA provides practical support to the agricultural sector and strengthens farmers' skills to cope with and support climate change through a tool that enables farmers and Producer Organisations (POs) to implement adaptation plans. The ADA tool includes: i) information on the present and future of the main adverse weather events (hail, late frost, drought, etc.) that pose a risk to the agricultural sector; ii) a library of the main climate adaptation measures in agriculture; iii) information on the costs and benefits of the adaptation measures listed in the library and an estimate of the cost-effectiveness of implementing each measure. The tool is addressed to operators involved in the three sectors wine, fruit and vegetables and dairy.

Regard wine sector, five measures used in winemaking processes and useful for reducing damage from climatic risks were analysed:

- use of cold through inert gas (solid CO<sub>2</sub>) of food-grade;
- new yeast strains for fermentation;
- use of acidic must;
- membrane technologies;
- production process control system.

In this context we provide a form the report a cost and benefits assessment for the measures above mentioned. To implement the cost and benefits form and to collect the information, we sent a questionnaire to various agronomists, we interviewed thematic experts and sector operators, we carried out bibliographic research. The investigations enabled us to provide the following information for each individual measure:

## Information on costs to be incurred:

- investment cost (if any):
- average annual cost per hectare;

- cost compared with usual practice (if relevant).

Costs vary according to multiple variables: farm characteristics (physical and economic size of the farm, farm location), region, altitude, soil and climate characteristics of the farm territory. Consequently, we provide an average reference cost, varying in a range, useful to guide the farmer's possible decisions in the choice of adopting the measure.

#### Information on benefits:

- degree of effectiveness of the measure with respect to climatic risk: high, medium, low;
- influence on production quality and yield: i.e. positive effect of the measure on production quality and yield, even in the absence of an adverse climatic event;
- environmental benefits;
- possibility of receiving public support.

#### Evaluation

Based on the above-mentioned information, an assessment of the costs/benefits of adopting the measure is provided. Furthermore, a graphical representation of the degree of convenience in adopting the measure is reported based on an exemplificatory estimation model. This model assumes an average damage caused by climate change on average equal or greater to 30% of farm production value and is based on the degree of effectiveness of the adaptation measure. The production value of wineries was calculated using FADN data.

Our findings shows that the adaptation measures considered in wine sector have an initial investment cost, usually medium/high. In the case of use of acidic must there are only implementation annual costs, which are in any case challenging - against a good efficiency relative to their adoption. Large farms, due to their size and resources, can opt for one or more measures with greater ease of cost depreciation.

Otherwise, such depreciation is burdensome for small and medium-sized enterprises (SMEs) and can be an obstacle in their climate change strategies.

However, the small/medium farms could be founded by specific public subsidies (CAP Strategic Plan) in order to adopt measure. Furthermore, for some adaptation measures the offer of technology is wide, therefore it is possible to find solutions compatible with the farm's financial structure (use of cold, membrane technology, production process control system). The use of associationism can also be a solution to reduce investment costs, also.

Overall, the analysis shows that although the implementation of measures presents medium/high investment costs, it is always appropriate to make an assessment on the specific business case, even where the results indicate a lower degree of cost-effectiveness. When deciding on the adoption of measures, it should be borne in mind that costs depend not only on company characteristics, but also on the choice of implementation method and staff training.

These considerations suggest that generally, farmers can find the most correct solution to deal with the risks deriving from climate change, considering the numerous technology solutions of every measure, also in terms of costs to be incurred.

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## Do South African consumers prefer local eco-certified wines

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As eco-certified wines are being produced in increasing quantities and varieties so have the definitions and the labels that accompany them. This resulted in a unclarity with regard to what type of eco-certified wines do customers prefer and what prices they are prepared to pay for them. One major problem associated with the production of these type wines is the need for credibility from the part of the consumers. This is a result of their inability to assess whether the wine production follows the rules required to obtain a certain label. One way of reducing this information asymmetry from the part of the consumers is the usage of clear labels and other sources of information that should provide credible information related to the sustainable credentials of the wine (Leire and Thidell, 2005).

Research performed in this field reveals different outcomes regarding willingness to pay (WTP) for organic wines. A study by Bazoche et al. (2008), found in their study of French wine consumers, that wines produced in environmentally sustainable way were valued similarly to the any other type of wines. There is also evidence found by Loureiro & Hine (2003) of American consumers that were not willing to pay more for the environmentally friendly wines due to the perceived difference in quality. A different outcome is derived from research results on willingness to pay for sustainable Italian wines which indicate that consumers value sustainability attributes of wine positively (Pomarici & Vecchio, 2013). It further indicated that WTPs for the all included sustainable wines were significantly higher. Previous research done by Mihailescu (2015) regarding preferences for organic wine in South Africa indicates a positive relation between income, education levels, and information. The main consensus is that women and younger consumers in general are willing to pay more for sustainable wines (Gow et al., 2020; Lanfranchi et al., 2019; Moscovici et al., 2020; Vecchio, 2013).

As research shows the WTP for wine and the extra purchase amount differs from country to country and needs to be carefully interpreted in order to properly inform the producers of the potential revenue increases.

Another major problem associated with sustainable / organic wines is their higher production costs that can reach prices of between 25 and 30% above the costs of more conventionally produced wines (Sellers-Rubio & Nicolau-Gonzalbez, 2016). These production costs can be mitigated by the willingness of the consumer to pay a premium for the organic wines. Such premium can be justified by the potential benefits that sustainable production can bring to the consumer such as: wines that contains less health damaging ingredients and an increase sustainability of production. A positive willingness to pay for eco-labelled wine could act as a signal to producers in their quest to attract more consumers.

### **Purpose of the study**

A positive willingness to pay would act as a signal to the wine producers for resource allocation towards an increase in production of eco-labelled wines. The goal of the research was to identify the willingness to pay for South African eco-certified wine with focus to five labels: biodynamic, fair trade, organic and sustainable. Specifically, the research focuses on measuring and comparing the potential Willingness to Pay (WTP) for these wines revealed by wine consumers through the use of . In this context five hypotheses were formulated:

- a. An increase in age of the respondents has a negative effect on the WTP for the eco-labelled wines.
- b. An increase in income levels will influence positively the WTP of the consumer that purchase any of the three labels .
- c. A higher level of income leads to a higher WTP by consumers for the three chosen wine labels.
- d. Knowledge of eco-certified labelled wine by consumers leads to a higher WTP for eco-certified wines.
- e. Consumers that have previously purchased eco-certified products will have a higher WTP for eco-certified wine.

### Method and descriptive statistics.

For the WTP question, there are no binary responses, but respondents could decide between six WTP categories. Models with categorical dependent variables in the economic literature are predominantly estimated by applying multinomial logit models (Mogas et al., 2002), which belong to the parametric models. An ordered logistic regression model was used to explain the “Willingness to Pay” for different types of ecolabels (Biodynamic, Fairtrade, Organic, Natural, Sustainable) from a set of quantitative and qualitative explanatory variables.

The chosen instrument for this study was a survey, issued by means of a self-completion questionnaire asking discrete choice questions. The research focused on studying the influence of different variables on consumer preferences for eco-certified wines and the survey questions and contents were similar to the study by Moscovici et al., on consumer preferences for eco-certified wines in the U.S (2020). The research targeted the population of wine consumers in South Africa. The goal of the survey was to get information from a broad sample of wine drinkers, preferably in different ages, genders and incomes. The survey was administered online as it was the best tool to reach a diverse group of respondents with a range of demographic differences such as different ages and incomes. The survey consisted of three sections. The first one focused on the background and habits of the respondent with respect to buying and drinking wine. The second section included questions to gather information on the perspectives and opinions on certifications. Finally, the last section of the survey consisted of questions related to demographics, to get insight on the influence of demographics on the preference for eco-certified wines. The sample size consisted of 210 respondents. The descriptive statistics for the resulting most important model variables can be found in table 1 ( see Appendix 1 for coding).

**Table 1 Descriptive Statistics**

Variable	Obs	Mean	Std. dev.	Min	Max
Bottles	265	6.89434	6.799911	0	40
AvPrice	263	8.700304	9.163988	0	100

Educa	265	4.109434	1.751435	1	7
Certified food_how often	265	2.675472	1.196729	1	5
Income	256	2.980469	1.9086	1	7
Age	264	2.526515	1.552398	1	6
Gender	265	.5849057	.4936706	0	1
Probability to buy certified food	265	3.660377	1.123836	1	6
Wine Knowledge	265	3.34717	1.557071	1	6
Importance BioDynamic	265	3.037736	1.455947	1	6
Importance Fairtrade	265	3.430189	1.480886	1	6
Importance Organic	265	3.222642	1.367734	1	6
Importance Natural	265	2.94717	1.476149	1	6
Importance Sustainable	265	3.373585	1.512592	1	6

## Empirical Results

The ordered logistic regression model for the Willingness to Pay (WTP) indicate that gender and age have has a significant influence on the variable. Female respondents are more attentive to the eco-labelled wines and willing to pay more than their male counterparts. The WTP for all eco-labelled wines decreases significantly with age, which means that younger respondents have a higher probability to pay for a certified wine compared to older respondents. The results further show that the higher the frequency of buying the certified food the higher the willingness to pay for certified wines. Another significant influencing the variable in the case of biodynamic and organic wine is the respondents knowledge of wine which has a positive effect on the willingness to pay. Respondents that put a high importance on the environmental impact of the wine production have a higher WTP across all eco-labelled wines.

**Table 2: Results of the ordered logistic regression for Willingness to Pay for a certified wine**

	Bio	FT	Orga	Nat	Sus
WTP					
No of bottles purchased /month	0.002 (0.019)	0.018 (0.020)	-0.008 (0.019)	0.012 (0.019)	0.034* (0.019)

Average price usually paid /bottle	0.003 (0.012)	0.001 (0.011)	0.004 (0.012)	0.009 (0.012)	0.012 (0.013)
Education Category	-0.036 (0.074)	0.117 (0.073)	-0.024 (0.074)	0.009 (0.073)	0.046 (0.072)
How often buying certified food	0.179* (0.105)	0.201* (0.107)	0.209* (0.110)	0.196* (0.106)	0.182* (0.108)
Age Category	-0.111 (0.112)	-0.239** (0.112)	-0.239** (0.113)	-0.147 (0.112)	-0.287*** (0.110)
Income Category	-0.038 (0.094)	-0.052 (0.094)	-0.037 (0.095)	-0.091 (0.097)	-0.007 (0.092)
Gender (Male = 1)	-0.308 (0.250)	-0.218 (0.250)	-0.721*** (0.251)	-0.454* (0.246)	-0.467* (0.244)
Probability to buy certified food	-0.054 (0.109)	-0.034 (0.110)	0.073 (0.108)	0.154 (0.109)	0.179 (0.110)
Knowledge of Wine	0.135* (0.081)	0.103 (0.083)	0.135* (0.082)	-0.046 (0.081)	-0.032 (0.081)
Importance BioDynamic	0.780*** (0.094)				



Importance Fairtrade		0.692*** (0.094)			
Importance Organic			0.725*** (0.102)		
Importance Natural				0.503*** (0.087)	
Importance Sustainable					0.512*** (0.090)
					(0.090)

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

## Conclusion

The premise of the research was that the South African consumers are willing to pay a premium for eco-labelled wines. This is supported by all WTP models which show an increase in the bid elicited in purchasing the wines associated with each eco-label

The WTP results for the eco-labelled wines confirm the importance of consumer profiles, gender and age in particular in paying a premium. Eco-certification associated with the wines have a further positive impact on the premium WTP. This is especially significant in the case of consumers that place a high importance on the different environmental impact that the wine production could have.

Research shows that not all the considered factors have the same directional and sizeable impact on the willingness to pay a premium revealed.

The results need to be compared with the marginal costs incurred in making eco-labelled wines in order to provide producers with clear information as they make decisions in the allocation of resources necessary for output.

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# The financialization of the bulk wine market : issues and limits of the launch of a futures market

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## Abstract

This article aims to determine to what extent bulk wine can be considered as a commodity and, therefore be subject, to an organized futures market. Although differentiation by quality, defined by expert ratings and/or “appellations”, is an essential characteristic of the world fine wine market, this is not the case for bulk wine. Three key factors make bulk wine a potential “commodity” and legitimize the question we address in this article: (a) the geographic concentration of its production while its demand is globalized, implying significant international trade flows, both physical and financial; (b) its economic homogeneity leading to the inevitable failure of any quality differentiation strategies, and (c) a high price variability. In the first part of the paper, we clarify these arguments and explain, with reference to the existing literature, the conditions leading to the creation of an agricultural futures market. In the second part, we develop an econometric analysis to determine whether preliminary conditions for creating a wine futures market are met, i.e. a high price volatility that could prefigure a demand for hedging on the part of producers, traders and end-user, as well as the implicit existence of an international reference price on the basis of which the price of other wines is set. We use weekly data between March 2000 and October 2020 on the average price of bulk red and rosé wines without geographical indication for each of the three countries studied: Italy, France and Spain. Regarding the first condition, we model the variance of these three countries bulk wine prices to test if there is a high price variability. Regarding the second condition, to test for the existence of a long-run relationship between French, Spanish and Italian bulk wine prices, we rely on different econometric approaches, from linear cointegration tests to vector error correction model (VECM). We find that European bulk wine prices present high variability. Spanish and Italian prices are cointegrated. However there is a short-run relationship among the three countries.

## Introduction

Can wine be considered as a commodity and thus be traded, like many agricultural products, on an organized futures market, such as those proposed by the Chicago Mercantile Exchange (CME)? This question could be widely debated, as wine can appear as a product where differentiation by quality, defined by experts’ notes or by appellations, is important. However, it remains fundamental. Implying that financialization through the creation of a market of financial derivatives (futures contracts in particular) could be considered, three characteristics bring bulk wine closer to a “commodity”, on the contrary to fine wines: (a) the geographical concentration of its production in the face of a globalized demand, implying important flows of international trade, in volume as well as in value, (b) its economic homogeneity and the difficulty of implementing strategies of differentiation by quality; and (c) a significant variability of its prices (Marquet, 1992; Brorsen & Fofana, 2001).

Thus, with regard to the first of these criteria, the main producers are located in Europe. Italy, France and Spain account for nearly half of world production according to the International Organization of Vine and Wine (OIV) (See **Figure 3.A** on the Appendix). The aggregate value of world wine exports (HS Code: 2204) will reach USD 34.36 billion in 2020, and that of the five largest exporting countries (France, Italy, Spain, Chile, Australia) nearly USD 24.22 billion, or more than 70% of the total supply. This

observation is also true in terms of volume (See **Figure 4.A** in the appendix). According to OIV data, the world wine trade reached 105.8 million hectoliters (Mhl) in 2020. These same five countries exported 70.6 Mhl, which represents 66% of the world total. For comparison, the Organization of Petroleum Exporting Countries (OPEC), thirteen countries, assumes “only” 33% of the world supply of crude oil in 2021. If the structure of wine production and exports is concentrated, so is the demand, attesting to a market of the opposed oligopoly type, quite common in the world of raw materials. Spain is the largest exporter by volume in 2021, having sold 23.6 Mhl on international markets with nearly 190 national markets of destination, while Italy has sold 20.68 Mhl in the same year (174 destinations), according to national customs statistics resp. For Spain, however, the five main export markets (France, Germany, Portugal, Italy, United Kingdom) accounted for 63.7% of this volume, which is also observed for Italy (62.4%) or for France, to a lesser extent (56.5%).

The second condition that brings wine closer to a commodity, the affirmation of wine as a homogeneous product might be surprising. The ranges of the main producing countries are, in fact, very wide. While premium wines are the best known and make the viticultural reputation of these countries, the production of basic wines, traded in bulk and transported in tankers, constitutes the main volumes (Alonso-Ugaglia et al., 2019). According to OIV statistics, more than 40% of world wine trade involves bulk. Spanish customs data thus highlight that 12.92 Mhl of bulk wine (HS Code: 220429) were exported by this country in 2021, representing 54.7% of national wine exports by volume. This proportion is however much lower for Italy (17% or 3.77 Mhl) or for France (8.9%, or 1.64 Mhl). Because the demand expressed by the consumer is not so much linked to a terroir as to the grape variety attached to it, the substitutability between different origins can be strong. As an example, we observe a significant variability in the flow of bulk imports into Germany, one of the explanations for which could be linked to this substitutability (See **Figure 1.A** on the Appendix ).

This property of product homogeneity can be observed for all base products that are the subject of a derivative futures market - agricultural in particular - without implying that quality is not a determining factor in their price. Many products can thus be traded on financial markets and thus be assimilated to “commodities”, even though they are known, like wine, for their quality aspect. Among the most representative examples in this area is cheese, which is the subject of a futures contract on the CME (Tejeda et al., 2021). In addition, the European Energy Exchange (EEX) has launched an index on European cheese (curdled and sweet cheddar, young gouda and mozzarella), which could foreshadow the launch of a future based on this index, following the example of those already existing on milk powder, liquid milk, butter or whey powder. There are also numerous research papers that address the question of the feasibility of launching future contracts on agricultural, animal or aquaculture products as varied as tea (Perera *et al.*, 2020), milk (Siquiera *et al.*, 2008; Bialkowski & Koeman, 2018) or salmon (Bergfjord, 2007), among many other examples.

The final characteristic of commodities is the significant variability of their prices on the cash market, with a consequent price risk and the need for players in the sector to manage it via financial derivatives such as futures. It is this ambition that has led to the creation of a futures market for premium wines (the great classified growths of Bordeaux). Extremely differentiated, and therefore not very standardized, these wines were not relevant underlyings for the construction of a futures market. The launch of Winefex (Wine Future Exchange) in September 2001 by the company Euronext thus ended in a very rapid failure (Ali & Nauges, 2003; Mahenc & Meunier, 2006; Masset & Henderson, 2010). However, to our knowledge, no practical attempt, nor academic study, has focused on the idea of a futures market for bulk wine, which is much more favourable than premium wines. The variability of prices is indeed substantial, as is that of unit values (see Appendix 1), while differentiation by quality is not a feasible strategy, in accordance with the point developed above.

Although indispensable, the verification of the three characteristics mentioned above does not, on its own, justify the setting up of a futures market. Numerous other conditions must, in fact, be verified for a future to be launched and, even more so, for it to be adopted by the operators in the sector (Perera *et. al*, 2020). Moreover, it must be recognized that the instability of market prices can easily be managed by commercial contracts, annual or multi-year, with fixed/indexed prices such as those existing in the wine industry. However, these are regularly terminated as soon as instability is significant: if the spot market price is higher (lower) than the contract price, the seller (buyer) may indeed have a greater interest in selling (buyer) on the spot market and pay a penalty rather than respecting the terms of the contract (Cardebat, 2017). Given this counterparty risk inherent in any over-the-counter market, the existence of an organized futures market could thus make sense for the players in the sector. In addition to the benefits in terms of price transparency associated with this financialization (Peck, 1985), they would benefit from a risk management tool that is largely protected from counterparty risk because of the existence of a clearinghouse inherent to markets of this type.

Given the relevance that a bulk futures contract could have a priori for the actors of the wine industry, the first objective of this paper is to measure econometrically the properties of substitutability and high price volatility for French, Italian and Spanish bulk. For the latter, we use a conventional GARCH model, while the former requires us to analyze the co-movements between the prices of these different products, which we do through a cointegration analysis and an estimation of the long run relationship between these different prices. From an operational point of view, a futures market requires a sufficient number of participants and trading volumes to guarantee liquidity, and thus efficiency in hedging. Questioning the existence of a market at the level of a single country would therefore make little sense. On the other hand, it seems more appropriate to consider it on a European scale, but this requires that the dynamics of French, Spanish and Italian bulk prices be strongly correlated and that this correlation be relatively stable over time in order to allow the participation of all European players in this market, but also to limit what is known as the basis risk. To this end, we conduct this study on the basis of weekly prices of Italian, Spanish and French bulk wines between 1996 and 2020. Numerous research articles have focused on analyzing the conditions for the launch, the success or the reasons for the failure of commodity futures contracts (Gray, 1966; Carlton, 1984; Johnston & McConnell, 1989; Bollman *et al.*, 2002; Siquiera *et al.*, 2008; Till, 2015; Bekkerman *et al.* 2017; Tejeda *et. al.*, 2021). To our knowledge, this article is the only one to focus on European bulk wine and provides interesting initial results that allow for a better understanding of how price risk could be managed, within the wine industry, using this kind of derivatives.

The remainder of the paper is organised as follows. The next section describes the GARCH and the linear cointegration approach (VECM) model aimed at determining the magnitude of co-movements between different bulk prices, which is seen as one of the sine qua non conditions for launching a derivative product. The data are explained in Section IV. Section V presents the results and discussions and the last section concludes.

## Discussion

The econometric results obtained in this study highlight that several necessary conditions for the implementation of a futures market on bulk wine are met. First, the persistence of price volatility in the Spanish market is evidence of a price risk for producers and buyers that the development of a derivatives market such as a futures market would allow to hedge. On the Italian wine market, the alternation of phases of high and low volatility could, however, limit the interest of the actors in the sector, but also of speculators whose presence remains one of the sine qua non conditions for the functioning of any derivative product (Gray, 1961, 1966; Till, 2015). It would therefore be necessary to

determine whether there is a volatility threshold below which the use of such futures is no longer of interest to these two categories of actors. Moreover, the launch and then the existence of a futures contract depend to a large extent on the order flows that it generates for the commodity exchange and therefore, all other things being equal, on the size of its market (Perera; 2020). From this point of view, the idea that bulk wine futures contracts can be launched on a strictly national basis makes little sense.

Second, the existence not only of a long-term relationship between the Italian and Spanish markets but also of a short-term relationship between the three bulk markets considered in this study tends to demonstrate that this “market potential” exists. In other words, a futures contract on Italian wine could be launched and used by European operators to hedge their price risk on Spanish bulk wine. Indeed, if a physically deliverable future contract implies standardizing the underlying asset, notably its quality, several physical assets can be delivered if a grading system is put in place and accepted by market operators. Moreover, the existence of this short-term relationship between the three markets suggests that the risk of price decorrelation could be low. The effectiveness of a hedging strategy, and therefore the success of the futures contract on which it is based, depends on the weakness of the basic risk, namely the absence of strong short-term divergences between cash and futures prices. Only the analysis of the comparative dynamics of these two prices allows for an effective measurement of basis risk, but the results obtained by our VAR model are promising.

Of course, the launch of a future contract must meet many other criteria. The most important one, which is not considered in this study, is the gradual acceptance of such a derivative by the wine industry as well as its use by speculators (Till, 2015). This in turn raises the essential question of how this contract is defined (Silber, 1981). The failure of a future contract can indeed be explained by inadequate conditions of standardization (contract maturities, quality of the underlying asset, place of delivery of the underlying), even though the need for price transparency and for an hedging instrument is patent. From this point of view, the results obtained in this article cannot be understood as an assertion that a futures contract on bulk wine would necessarily be useful to the actors of the European wine industry, but that some essential prerequisites for its launch are verified.

## Conclusions

In line with articles analyzing the conditions of introduction, success or failure on agricultural futures contracts, this article is, to the best of our knowledge, the first to focus on European bulk wine. Unlike fine wines, bulk wine can indeed be considered as a commodity due to the absence of real quality differentiation, as well as the structure of its market where production is geographical concentrated in Italy, France and Spain while demand is international. Several interesting results can be highlighted. Using an ARCH-GARCH model, we highlight that there is significant price variability of bulk wine for these 3 countries, whereas our VECM estimates show that market integration and substitutability property are met for Spain and Italy but not for the French market. Our standard VECM modelling framework implicitly assumes that the price adjustment process is linear and symmetric. Testing and considering if the true adjustment process is nonlinear and asymmetric is something that we will do in future research. Finally, by using a VAR model, we also show that there is short-run price co-movement among the 3 countries. It may imply that the basis risk when using a bulk wine future contract to hedge

long or short physical positions of wine buyers or sellers could be reduced which is one of the key components of such a derivative's success. .

We therefore highlight that the necessary conditions for the launch of a bulk wine futures contract are verified without asserting that they are sufficient. Our results pave the way for discussing what should be the technical characteristics of a future contract on European bulk wine. These characteristics will largely depend on the country launching such a future contract and therefore on the different market players involved upstream in its design. If we look at the various European attempts at futures contracts on agricultural products, it is clear that they are not necessarily based on a physical delivery mechanism, but rather operate on a cash-settlement basis involving the definition of a price index and the payment at maturity of the price differential observed between the physical market and the futures market. Beyond the principle of price convergence, the technical conditions that would ensure the launch of such a contract (prevalence of spot transactions, transparency and price risk management needs expressed by the industry, importance of the trading function, etc.) but also its success (technical characteristics of the future contract in line with the needs of the industry, interest of speculators, weakness of the basic risk, degree of "financial culture" of the players, etc.) could be the subject of future research.

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# Technology-based regional wine development: A multi-purpose agrobot design for grape harvest automation

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## ABSTRACT

People's desires under the limits imposed by the pandemic COVID-19 changed significantly. There has been a noticeable decline in the number of people choosing to work in agricultural vocations across Europe. Viticulture in Greece, to date, has a very low rate of automation. A few factors that restrict the use of agricultural machinery include the very small individual area of vineyards, their scattered cultivation (lack of large contiguous areas), their traditional formation without support, and their steep slopes.

In an environment where the effects of climate change are becoming increasingly more noticeable, viticulture appears to be one of the most affected agricultural sectors. Important viticultural chores including winter pruning, budding, defoliation, summer pruning, grape harvesting, and even the development of a new vineyard cannot be completed in a timely manner due to a lack of land workers. Additionally, because the work is finally completed by those who lack the necessary education and/or expertise, it is frequently executed incorrectly and agricultural enterprises are burdened with increased labor costs. All of the aforementioned have a negative impact on the final product's quality.

Precision viticulture has been the subject of extensive scientific study (Arnó Satorra, et al. 2009; Matese and Di Gennaro, 2015), and it has been found that it may be used for a variety of viticultural tasks, including spraying, irrigation, and grape harvesting (Adamides, et al. 2017). Currently, humans conduct the majority of agricultural work manually or with the aid of equipment that is handled by humans. There have been numerous attempts in recent years to automate processes and create fully autonomous robots. Agricultural robots, known as Agrobots, have already been constructed using robotics to support agriculture (Matese and Di Gennaro, 2015). Due to their ability to work continuously, quickly, and with expert precision, agrobots have been established as a sustainable option to fulfill the expanding demands. However, not all tasks can yet be reliably and effectively completed by a single robot. Collaboration between humans and robots has so been given consideration (Bechar & Vigneault, 2016, Vasconez et al. 2019). The application of autonomous collaborative robotics in agricultural operations holds promise for achieving sustainable development objectives and reducing operational costs. Their inclusion in viticulture could lower overall production costs. Moreover, the quality of robotic operation is very important especially if the cultivated grapes are intended for protected designation of origin (PDO) and protected geographical indication (PGI) wine production.

In this paper, our objective is to analyze the process of constructing and utilizing an autonomous robot that uses machine vision in order to perform the harvesting of grapes. For the autonomous harvesting task, the robot requires a number of different capabilities, such as localization, navigation, machine

vision to detect grapes, computational intelligence to determine grape maturity, a manipulator, and assorted end effectors to perform the actual harvesting, etc. For this purpose, we will present the various modules that our proposed robotic platform possesses, and we will describe how these are integrated, taking into consideration the specific environments in which the robot is to operate, i.e., Greek vineyards for wine production in the Drama and Kavala regions (Eastern Macedonia region of Greece). Some preliminary experimental results will also be demonstrated.

Our research involved working with three wineries in Drama (Pavlidis Estate, Nico Lazaridi Wines) and Kavala (Ktima Biblia Chora), which were mapped using an aerial drone in order to provide the robot with appropriate maps of the target wineries. This, in conjunction with other onboard sensors, provides localization capability. Next, navigation is achieved by creating routes and using planning algorithms to follow these routes (Lytridis et al. 2021). While the robot is moving along the predetermined route, it stops when its machine vision module detects a vine trunk. At this point, the robot can use its manipulator to approach the grapes and detect their location, using the camera. The robot can then estimate the ripening process of each and perform grape harvesting using machine vision. Numerous implementations of vision-based techniques have been utilized to estimate the maturity of grapes (Vrochidou et al. 2021), typically by using the grapes' morphological and colorimetric exterior features. The robot will then use its robotic manipulator and approach the mature grapes and, using its end effector, it will cut and transfer the grape to a basket or a second robotic platform whose sole job is to follow the harvesting robot and carry the cut grapes. The end effector attached to the manipulator can be either a robotic hand controlling a cutting tool or another cutting device that was properly designed and constructed.

All three selected wineries primarily produce white, rosé, and red wines of acknowledged quality that best capture the distinctive qualities of the regions they are from. They are having privately owned vineyard and make PGI wines that are marketed both domestically and abroad. Two grape varieties—one white and one red—from each winery were chosen for our study, and numerous samples as well as pictures were obtained at the vineyard during the growing season. At the ideal harvest date, grapes will be picked both manually and by the robot, then vinified separately. To ascertain whether the usage of the robot altered the quality and aging dynamics of the wines, the generated wines will be assessed for their chemical and organoleptic profile.

Could the employment of robots in viticulture add value to the production of local wine and significantly aid in the rebranding of Greek wine? is one of the important questions this study attempts to address. In the past 20 years, there has been made an effort to concentrate on the replanting of Greek indigenous grape varieties and to promote for export specific native varieties – ambassadors of Greek vineyards. However, one factor that raises the selling price of Greek wines is the cost of production. Robotics and precision viticulture, in our opinion, will help to lower production costs, making Greek wines more competitive on the world market. It is imperative though to maintain the high quality of the wines produced in the Drama-Kavala region, and our study demonstrated that this aspect is unaffected.

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# The effect of weather and non-climatic inputs on mean yield and production risk : the case of French wine grapes

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**Keywords :** Weather, French wine grapes, J-P stochastic production function, production risk

## Extended Abstract.

Viticulture, in general, faces a lot of weather-related risks which vary in their importance regionally (Cyr et al., 2010). These risks are mainly related to temperature and rainfall. Spring frosts can be very damaging and the crop never fully recovers. Temperatures that are too low during the growing season can prevent the grape from ripening properly, leading to too much acidity, or it may not ripening at all. At the other extreme, overexposure to sun can lead to injured grape tissue in a condition known as 'sunburn'. Excessive rainfall during summer and early autumn around harvest time can be damaging, resulting in watery grapes or even causing them to split, ferment on the vine and be infected by fungus (Spellman, 1999).

Management of weather-related risks in wine production is reaching growing interest since there is widespread evidence that they have grown rapidly over the recent past in all categories of food production. Wine industry is characterized by added value which is higher compared to other sectors, with the production of diversified products, in some cases with very high unit value so, facing weather-related risks among others, producers can lose a part or the complete production in very short time, finding themselves in a serious financial situation (Seccia et al., 2016).

Wine grapes producers can manage weather-related risks by using various risk management instruments, in some cases to prevent the negative effects of risky activities (*ex ante*) and in others to reduce their consequences (*ex post*) (Seccia et al., 2016). For example, producers could adopt heat-tolerant varieties, rootstocks that are more resistant to water deficit, but also buy crop insurance.

But before developing comprehensive adaptation plans, empirical evidence of the impact of climatic variation on yield and yield risks under farmers' own crop management practices is required (Arshad et al., 2017). A small number of studies have investigated the effects of temperature and precipitation on average yields (Adams et al., 2003 ; Lobbell et al., 2006 ; Schlenker and Roberts, 2009) but none have investigated their effects on the variability of wine grapes yields. Also, studies that account for the mediating effects that crop management practices may have on yield risks also tend to be lacking. Therefore, this article sets out to determine the effect of weather variables and non-climatic inputs on average wine grapes yields and yield variability (production risk). To do this, we will use two sources of data.

The first database used is from the FADN (Farm Accountancy Data Network). Implemented in France since 1968, the FADN is a survey carried out in the Member States of the European Union according to common rules and principles. The basic data is collected from a survey sheet including the farm's agricultural accounts and technical and economic information. Therefore, this database comprises yearly accounting information for commercial farms. These farms are classified according to their economic size and their main production. On this basis, it is possible to build a panel of farms specialized in viticulture, to acquire data relating to the yields of wine grapes as well as data relating to the use of non-climatic inputs (fertilizers,

pesticides, irrigation, labor, land, ...). In addition, we know in which municipality the head office of each farm is located, which is important to associate the weather variables with each farm.

We combine this information with daily weather data obtained using Météo France weather stations. Thus, we obtain high-frequency data relating to temperatures and precipitation used to build weather indicators at the municipality level. We will distinguish two types of indicators: standard indicators and extreme indicators. Among the standard indicators, we will distinguish those that impact, positively or negatively, the yields of wine grapes and its volatility from those that may present a non-linear relationship with them. The extreme indicators make it possible to capture the weather conditions which are likely to wipe out aggregate yields (Jones et al., 2005 ;Roberts et al., 2012 ; Keane and Neal, 2020).

To examine the effect of climatic variability on mean yield level and yield variability, we use the J- P stochastic production function (Just and Pope, 1978). The J-P production function provides not only an estimate of the effect of the explanatory variables on the expected mean yield level but also their effect on the yield variability (Mahmood et al., 2019). The fundamental concept underpinning this approach is that the production function can be decomposed into two segments: the first segment is linked to the mean output level while the second segment is associated with the variability of that output (Cabas et al., 2010; Kim and Pang, 2009; Sarker et al., 2014). The approach allows for estimation of the impacts of an input variable, such as climate or fertilizer, on expected output and its variance (Cabas et al., 2010). An added advantage of the approach is that it does not impose dependence between an item's effect on yield variability and its effect on mean yield (Chenet al., 2004).

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# Simulation of the potential economic effect of a change from AOC to PDO in a wine-growing region in Switzerland

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This analysis aims to simulate the potential economic impact of switching from an AOC (*Appellation d'Origine Contrôlée*) to a PDO (Protected Designation of Origin) system in the region of Vaud (Switzerland). This region still has the AOC system, which differs in many points from the European PDO-PGI (Protected Geographical Indication) system. The switch to a PDO-PGI system for Vaud would lead to a major difference in blending rules. Indeed, the system would change from a situation of AOC allowing blends (60%/40%), coupage (90%/10%), and vintage/grape variety blends to a situation of PDO with restricted possible blends of 85%/15% in the case of Complementary Geographical Denominations and possible vintage/grape variety blends.

The viticulture area of Vaud covers 3'810 hectares (for a total of 15'000 hectares in Switzerland) mostly (60%) planted with Chasselas (indigenous white grape variety), followed by Pinot Noir (13%) and Gamay (9%). For the production of AOC wines, 61 grape varieties are allowed. The surfaces of Chasselas, Pinot Noir, and Gamay tend to decrease in favor of the Chardonnay, Pinot Gris, Merlot, and the Botrytis-resistant varieties Gamaret, Garanoir, and Galotta.

Vaud wine region is divided into 23 production sites, within 3 major AOC appellations (La Côte, Lavaux, and Chablais). The AOC blending rules differ significantly from those of the European PDO. Each production site (Complementary Geographical Denomination) can have a minimum of 54% grapes from their production site, a maximum of 36% from another site within the same AOC region, and a maximum of 10% from other sites in the Vaud wine region (RVV, 2021). This system allows the most reputed appellation to produce enough wine in accord with the demand, especially in the retail market. In the European regulations, PDO wines with Complementary Geographical Denominations can be made with a minimum of 85% from the production site completed by a maximum of 15% from the same PDO (INAO, 2016).

Over the last ten years, the large majority of Vaud wines have been produced in the AOC category. The two other categories, *Vins de Pays* (VdP) and Table wine (VdT) together, represent less than 3% (in 2019). About three-quarters of Vaud AOC wines are *Grands Crus*, while *Premiers Grands Crus* represent about 1%.

The current Vaud wine regulation is based on previous flexible wine legislation concerning blending principles. This system has “undoubtedly benefited two generations of winegrowers, but the repercussions penalize today's producers by making the appellation system of Vaud inconsistent and difficult to understand” (Truffer, 2014).

The method to estimate the potential economic impact of a change to a PDO system aims to determine, with a constant demand for wine as today, whether a hypothetical PDO-PGI system would make it possible to maintain the current turnover of Vaud wines (all distribution channels combined). In this study, the potential increase in demand that would be generated by the hypothetical reform of PDO-PGI is not taken into account but could be the subject of a complementary study.

The estimated production of Chasselas by production sites is calculated according to the surface, average yield, and average achievement rate of the yield (DGAV, 2019). For consumption, data about the retail market and all distribution channels together are combined to reflect the importance of each production site (Mondoux et al., 2022).

Production sites, where production is not sufficient to cover the consumption indicate the presence of blending with other production sites.

For production sites where estimated production is lower than estimated consumption, it is assumed that the missing quantities are supplied by other sites of production (no account is taken of vintage/grape variety blends). The average price of the blended wine in the bottle is therefore not equal to the price on that production site. The proportion of blending is reflected in the price. To do this, the criterion for selecting the blending grapes is cost minimization. The cheapest grape available on the market is used when quantities are missing (while respecting the blending rules).

For sites of production where the estimated production is higher than the estimated consumption, it is assumed that there is no blending. The price of the grape is therefore the one of the production site.

The price elasticity is estimated based on the retail market data. The elasticity is then used to simulate the effect of a lowering of the quantity for the production site with a higher level of blending practices than the authorized one in PDO with Complementary Geographical Appellations (85%). For those production sites, lower quantities available will conduct in a higher customer price.

Changes in quantity are not the only factor influencing prices. Indeed, changes in the blending rule imply changes in the cost of grapes. For this reason, the variation between the current and simulated grape price is applied to the client price in the retail market. To pass on this increase to the final price, the variation is multiplied by 26%. This percentage corresponds to the average importance of the grape price on the final selling price paid by the customer in supermarkets (in 2019).

The turnover is obtained by multiplying the simulated consumption (all distribution channels together) and price (in the retail market).

Results show that, for AOC wines, the drop in turnover would be between -4% and -10%. This decrease is the result of the drop in sales for the most known production sites, which is only partially compensated by the increase in prices. For the other production sites, their sales remain stable compared to the current situation. However, the PDO-PGI reform would lead to a reduction in blending possibilities. The consequence for the less prominent production sites would be that the part of the grapes sold as blending grapes/wines would be subject to stronger competition on the PDO market (equal production but lower demand for blending). A possible perspective would be for a valorization of those wines as PGI. However, there is a risk that the new PGI brands will be less valued than the simulated PDO most known production sites.

Overall, total Vaud production (PDO-PGI) does not vary in these simulations. The distribution of production between these two categories is modified. In France, the distribution of production volumes between PDO (58%), PGI (33.5%), and generic wines (wine without geographical indication) (8.5%) are diametrically different from that of the canton of Vaud (INAO, 2019). The reform of the PDO-PGI could make it possible to redefine the importance of the different appellations as it has been made in the European Union. According to this study, Vaud wine production could be newly segmented into 86% PDO and 14% PGI.

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## Is wine made in drama deserving of protected designations of origin (pdo) recognition?

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The quality scale of Greek wines, based on European Union's legislation, is mainly organized in four categories: protected designation of origin (PDO), protected geographical indication (PGI), basic and bulk wine. European Union's quality policy aims to protect the names of specific products, to avoid fraud and competition from other areas, to promote their unique characteristics, linked to their geographical origin as well as traditional know-how (Meloni and Swinen, 2018). Wine PDOs regions in Greece are essentially the country's historical viticultural and wine-producing regions, having clearly demarcated viticultural zones, based on geographic boundaries of villages rather than on the basis of vineyard plots. Therefore, even in distinguished PDO zones there are plots of vines that produce lower quality grapes. There is actually a huge discussion of the division of PDO zones into sub-zones and mainly into parcels of different quality (e.g. crus and grands crus in France), which are vineyards or terroirs.

Only indigenous varieties are used to define the varietal compositions of Greek PDO wines, with the exception of two regions. Greek PDO zones - such as Mantinea with Moschofilero, Nemea with Agiorgitiko, Naoussa and Amyntaio with Xinomavro and Santorini with Assyrtiko - are historically linked to a native variety. However, there are thoughts on the use of other varieties (mostly international but also indigenous) for blending in order to improve the quality of the wines.

In this paper, our objective is to analyze the possibility of establishing a new PDO wine zone in Drama, Greece. For this purpose, in addition to tracing the origins and journey of viticulture in the region, we will study the means to confirm the quality of the local wines and elaborate on the advantages of a PDO recognition for the wine production in the area.

Drama is a region of northern Greece whose wine history dates back to ancient times. The myth wants the god Dionysus to be raised on the Pangaion Mountain, while on the Falakro Mountain his presence was celebrated with the production and enjoyment of wine. There are continuous written testimonies about the intensive viticulture and wine production in the area. At the beginning of the 20th century the entire massif was full of vineyards. The region began to decline starting in the 1950s as a result of the migration of the locals to central Europe for economic and political reasons. From the few vineyards that remained, the inhabitants produced wine which they sold on the local market. The renaissance of Drama's vineyard began in the early 1980s. The region has no surviving native Greek varieties. Drama has managed to become known for its high-quality wines thanks to the protected geographical indications Drama, Adriani, and Agora (smaller PGI of the region) and their exceptional financial success in the Greek and international wine markets (Lazarakis, 2018).

Currently, four Greek universities and the prestigious wine-making companies of Drama are working together to establish the superior quality and time-stable characteristics of the wines of Drama. To do this, researchers are examining the unique climatic, soil, and topographical features of the region's viticulture areas and how they affect wine production. As the historical, cultural, social, economic significance is acknowledged, it is sought that a new PDO zone be given formal recognition. Our

research specifically examines the behavior of two white grape varieties, Assyrtiko and Sauvignon blanc, and three red grape varieties, Agiorgitiko, Merlot, and Cabernet Sauvignon, during two successive vintage years (2022-2023, 2023-2024). The plots under study combine varying characteristics. Also, grapes were harvested during the period of their technological ripening, and micro-vinifications of 25 kg were carried out using standard vinification techniques under controlled temperature settings in stainless steel tanks. The chemical and organoleptic profile of the produced wines was then examined both immediately after production and one year later.

This study provides for first time insights on quality perceptions of wines and confirms whether a new PDO region for the wines of Drama should be established. The next critical question is how this legislative upgrade for Drama wines can contribute to raise both their recognition and market worth. Further research should be done to determine whether PDO Drama wine consumption would be directly tied to wine tourism and the desire to purchase locally produced wines in this border region.

The establishment of a protected designation of origin creates a favorable dynamic that encourages wine companies to both cooperate and contend with one another. The most crucial areas of collaboration are those involving the assurance of the quality standards set and the promotion of their PDO wine zone. In addition, the close proximity could provide opportunities for lower input procurement costs, information on skilled labor. They could also cooperate in the creation of marketing campaigns, information sharing regarding export opportunities and other cooperative initiatives to reach domestic and international markets, achieving scale economies (Belletti et al. 2017). Lastly, the protected denomination of origin boosts the production process by creating economies both inside and outside of the local system and outside of the individual businesses.

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# The role of the geographical indication signs in increasing the market price for red wines. Evidence from the Italian market

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**Keywords:** geographical indications, price effect, scan-data, Italian red wines

The upcoming policy reform of the EU geographical indications (GIs) is expected to bring changes and innovations in the legislative framework governing GIs, increasing, among the others, online protection for GIs, and simplifying procedures to make GI more attractive for producers. This is particularly important for the wine sector, where GIs were born. Indeed, wine can be considered both an experience (Storchmann, 2012) and a credence (Nelson, 1970) good, as consumers cannot infer quality before its consumption and are able to measure its utility gain or loss only after consumption (Castriota and Delmastro, 2015). Therefore, to differentiate their products, producers should provide elements working as quality cues (Akerlof, 1970), like vintage year, grape variety, or information about the geographical origin (Gal and Jambor, 2020). To date, there are 1,617 wines registered as GIs, more than half of the total agri-food European GIs. While this high development of the GI sector for wines testifies its long history and the strong relation between local terroirs and viticulture (Barham, 2003), some concerns may arise about whether, in a market full of GIs, the GI sign, *per se*, is able to convey additional value. Several studies addressed, directly or indirectly, the question of whether the presence of a GI is able to add value to wine, e.g., increasing its market price (Arancibia et al., 2015; Benfratello et al., 2009; Combris et al., 2000; Gal and Jambor, 2020; Landon and Smith, 1998). However, these studies usually estimate the effect of the GI on one or few specific products. Therefore, instead of the general GI label effect, this kind of studies estimates the effect of the specific GI name(s) (e.g., Prosecco DOC, Bordeaux AOC, vinho do Porto DOC), which likely act as “brands”, thus embodying also a reputational component (Trestini et al., 2020). While this issue is hardly solvable by analyzing a real-market context, it can be alleviated by including in the analysis a large set of different GI names (i.e., with different reputational characteristics) which will allow estimating an average effect of the GI sign that is less dependent from the individual name reputation.

Given this context, this paper, in its first objective, aims to:

Assess the ability of the GI sign to increase the price of wine on the market exploiting a sample including several different GI names

Besides, considering that different products attributes, such as reputation (Costanigro and McCluskey, 2010), wine color (Caracciolo et al., 2011), or vintage (Amédée-Manesme et al., 2020) vary at different levels of price, also the effect of the GI sign might be heterogeneous across price categories. Therefore, as a second objective, this study aims to:

Determine whether the GI sign has a different effect on wine price in different price segments.

The analysis relies on a GfK dataset reporting 57,708 observations of red wine purchases by Italian consumers from large-scale retail channels between October 2019 and October 2021. The dataset contains information about the price of the purchased wine, the presence of a GI, and several other

characteristics of the wine (e.g., size of the bottle, name of the private brand), as well as information about the characteristics of the buyers (e.g., age, presence of children).

Exploiting this information, the first objective will be addressed implementing a simple regression of price on a dummy variable indicating the presence of a GI and a vector of additional market variables (size of the bottle, number of purchased bottles, geographical area, type of retail channel, online purchase, private brand, date of the purchase). The coefficient associated to the GI dummy will tell whether the presence of a GI sign has an effect on the price of wine. It should be noted that this approach is not able to fully separate the effect of the general GI sign (e.g., the DOC label) from the effect of the reputation of specific GI names. However, as mentioned above, using multiple GI names partially mitigate this issue.

The heterogeneity of the GI sign effect with respect to the price distribution will be assessed implementing a quantile regression (QR). As stressed by Davino and colleagues (2013), the QR produces the estimate conditional upon different price percentiles, allowing analysis of the effect of key variables on different price quantiles.

With respect to the results, we expect, in line with other studies on the topic (Gal and Jambor, 2020; Outreville and Le Fur, 2020), to observe a positive effect of the certification. However, we also expect this effect to differ depending on the type of brand and on the price segment the wine pertains to. Specifically, we expect that wines already valued by consumers (i.e., having a higher price), because of the important role of their name reputation, benefit less from the certification, which could conversely add more value to low-priced wines. If this is the case, the effect of the GI sign would be larger in low-price segments.

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# Characterising governance, innovations and sustainability in the French wine industry: a comparison between Cooperatives and Investor Owned Firms

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## **Key words**

Governance, innovation, sustainability, wine industry

## **Background**

Facing the climate change and the need for more environmentally friendly practices all along the value chain, wine industry is in a period of transition, characterized by new form of innovations in order to be more sustainable. In this context, several sustainability initiatives have been launched in the French wine sector to comply with sustainability requirements, whether at the firm or at the chain level (Pavez et al., 2022). These initiatives are strongly anchored in innovation that have been adopted namely by wine co-ops, representing 40% of the whole wine production, seeking for competitive advantages and the fulfillment of social responsibility.

However, managerial decisions for sustainability can be influenced by the type of governance, i.e. Cooperatives and Investor Owned Firms (IOF). Cooperatives, as social economy organizations, play a central role in achieving sustainability. However, contrary to the IOF, cooperatives face a dilemma between their solidarity principles and the competitive and capitalistic needs (Draperi & Le Corroller, 2016). Previous studies showed that beyond governance, size, networking and environmental factors are key performance and innovation drivers (Basterretxea & Martínez, 2012)

## **Theoretical framework**

In our study, we applied a multi-paradigmatic theoretical perspective. We considered the governance structures of the wine chain following Ménard (2018) and Pavez et al. (2022). We also analyzed firm governance, and more particularly hybrids, thanks to the transaction cost economics and the cognitive theory of the firm (Saisset & Codron, 2019). Concerning innovation and sustainability, they can be understood from different perspectives. In this study, we based our research work on the OECD's concept of innovation (2018). Sustainability was based on Brundtland report (1987) dealing with its 3 dimensions (economic, social, environmental) and sustainability performance was based on Elkington (1998) and Marcis et al. (2019).

## **Aims**

Our objective is to understand how the characteristics of wine cooperatives and wine investor owned firms (IOF), as well as their forms of governance, can influence innovation orientation and sustainability performance. In other words, we wonder at what extent different ways of governance (co-op/IOF) can lead to different types of innovations and sustainability approaches.

## Methods

Our methodology is qualitative and based on semi-structured interviews with wine estates, wine cooperatives and wine merchants. We studied 16 firms, located in Occitanie, Provence and Alsace. The 22 interviews to managers and presidents were quasi totally recorded and transcribed. These firms had different governance mechanisms, production orientation, size and commercial strategies. We established the differentiating factors, based on the firm characteristics, to elaborate a typology. Then, a thematic analysis was applied following the step-by-step approach proposed by Nowell et al. (2017), allowing an auditable trace of coding, interpretation and representation of textual data.

## Results and discussion

Our results show that innovations for sustainability are not only determined by the legal form but also by their business model, such as cooperatives innovating in their governance by benchmarking leading capitalistic firms.

Process-related innovations were the most frequent and mainly concerned packaging, mostly oriented to recycling improvements (i.e. bottle deposit system), as well as vineyard (new agro-ecological practices), and irrigation from wastewater treatment plants. They were followed by organizational innovations, often related to governance (e.g. stakeholder committees and governing boards, horizontal and vertical alliances). Commercial (e.g. online sales, brands and labelling) and process innovations (e.g. extraction of local yeasts, new niche wines) were more numerous in the biggest and more decentralized firms (of which some wine co-ops). Upstream oriented firms developed significant governance innovations towards their stakeholders. Standards seemed to be the most widespread means to signal sustainability, especially for some IOF with numerous vineyards, developing direct exports. Corporate Social Responsibility (CSR)-oriented firms were prone to measure sustainability performance. Firms also implemented more flexible voluntary commitment strategies.

Only a little part of the declared innovations can be considered as complete sustainability ones, whereas almost 50% were just economic centered. This situation was very contrasted thanks to CSR, but not systematically linked to a type of firm.

Professionals pointed out that Protected Denominations of Origin could hinder innovation, namely concerning new resistant varieties and new oenological practices. They didn't appear either as sustainability-oriented. However, Protected Geographical Indications seemed more flexible to innovate, mainly because it allows for greater flexibility in the use of new varieties and blends to diversify the commercial strategy towards new markets.

## Contributions and implications

This study underlined the great diversity of the wine firms in terms of types of innovations and sustainability orientation. It provides an insight and understanding of the main concerns and efforts undertaken by wine firms to meet competitiveness and sustainability challenges, such as water management, pesticide use reduction, development of organic and biodynamic viticulture, internal and external social initiatives. Also, it allowed us to design a typology of wine firms based on their governance characteristics and strategies.

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# Parallel session XI-

Consumers & Demand

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# Predictive modelling of willingness to pay for Portuguese sparkling wine consumers

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Wine is widely perceived as an experience good whose market structure is typical of monopolistic competition, where product's informational differentiation plays a key role in consumers' decisions as well as in their willingness to pay (WTP). Drawing on Lancaster's (1966) characteristics consumer approach, the WTP has been generally estimated through the hedonic price function that models the WTP as a function of objective and subjective good attributes as well as a set of consumers' socio-economic characteristics. Since its inspection the WTP estimation has been dominated by a theory-driven modelling paradigm, in which the researcher imposes a structure on the data, assuming that the consumer makes decisions based on the utility theory. An optimal model is chosen by comparing and applying econometric approaches to different specifications in terms of functional forms and selected variables. However, is not sure that the econometric model chosen is a good descriptor of the underlying data- generation process and if can be used to predict and make assertive inferences (Rodriguez et al., 2020). To overcome this potential drawback, recently have been emerging alternative modelling and estimation techniques based on data-driven and supported machine-learning approaches, which enlarges the traditional choice modelling approach (Cranenburg et al., 2022).

Beyond other research questions, Cranenburg et al.(2022) point out the need for additional research integrating and comparing the results of the two modelling paradigms, the econometric and machine learning approach, which constitutes the first and main research question (RQ1) of this paper. In answering this question, a second research question (RQ2) arises: what are the main predictors of the WTP for Portuguesesparkling wine consumers?

To collect the data, a questionnaire was designed, based on a literature review and experts' opinions, covering a wide wide range of questions related to sparkling wine WTP, consumption habits, consumer tastes, preferences, knowledge, purchasing behaviour, and socio-economic characteristics of respondents. Data were collected in September 2022 through an online survey distributed by a specialized market research company, obtaining a sample of 800 Portuguese sparkling wine consumers, who answerfor WTP and a total of 35 potential predictors or features.

In theory-driven modelling, since the explained variable WTP is expressed in classes whose coding conveys a ranking, the regression order probit model is used. The normality of the residuals is tested through the chi-square statistic and the likelihood ratio test and the ratio of cases correctly predicted are used as measures of goodness of fit. The predictors are chosen according to their level of statistical significance.

The estimated order probit is estimated considering the price (in euro) range order (WTP), respectively, 296 (37%), 272 (34%), 168 (21%), and 64 (8%) observations of the sample. The null hypothesis of errors normally distributed is observed, the value of the likelihood ratio test also confirms that the parameters are globally significant at 1% and the ratio of cases correctly predicted is 45%. Based on the decreasing level of significance (1%, 5%, and 10%), the main predictors of the WTP are: the income; the consumer is also the one who buys or purchases the product; the Champagne brand; the importance given by the respondent to a set of variables related to awards, categories,

sweetness, production method, organic and production region; the genre; the local of residence; to be a consumer of red wine; to buy sparkling wine as a gift; the brand; not being DOP/AOC.

In the data-driven approach, the identification of (statistically significant) predictors of WTP, among a vast set (pool) of potential explanatory variables, and the development of a model of WTP based on these predictive variables is performed using machine

learning (ML), whose procedures are named Feature Selection (FS) and Model Training, respectively. Also, in the ML context, estimating the WTP in terms of price range classes is a classification problem, since classification is a type of supervised ML technique in which an algorithm “learns” to classify new observations from examples of (input and output) labelled/categorical data.

In this study, we train and test classification models with (i) the MATLAB Classification Learner Toolbox (CLT); and (ii) the Orange, an open-source ML and data visualization software, with build data analysis workflows visually, with a large, diverse toolbox. The CLT allows the user to explore the data, select features, train, validate, and tune classification models for binary or multiclass problems. The user can select, use and test different FS algorithms to rank the features, namely minimum redundancy maximum relevance (MRMR) algorithm, univariate feature ranking for classification using chi-square tests (Chi2), ReliefF algorithm with k nearest neighbours (ReliefF), one-way ANOVA for each predictor variable grouped by class (ANOVA), and the Kruskal-Wallis Test (Kruskal-Wallis). The features are sorted by decreasing order of the scores. For Chi2, ANOVA and Kruskal-Wallis, the features are ranked using the p- values since scores correspond to  $-\log(p)$ . With the Orange software, the workflow followed an initial data analysis according to scoring methods. These methods performed a features selection, using information gain (InfoGain), chi-square and linear regression methods. The next step was to extract a data sampler to be used in supervised learning.

Supervised ML can be explored with a large number of classifiers from different classification model types, including decision trees, discriminant analysis, support vector machines, logistic regression, nearest neighbours, naive Bayes, kernel approximation, ensemble, and neural network classification. Some of these models can be optimizable and CLT includes hyperparameter optimization to tune the models with different options and optimizers, including Bayesian optimization, Grid search and Random search.

To find the best model and, therefore, the explanatory variables with the greatest predictive potential, in our research, all FS algorithms were used and all classification models available in CLT and Orange were trained. Training of the classification models

was also carried out for a wide range of different conditions/options, including different sets of features, selected with different algorithms.

The application of the FS algorithm selected the variables or features described in Table 1, which covers a wide wide range of questions related to sparkling wine WTP, consumption habits, consumer tastes, preferences, knowledge, and purchasing behaviour of respondents.

Table 1 – Description of all the variables or features selected by at least one of all the AL available algorithms

Variable	Description	Variable	Description
Income	The net family income	BuySparkling	The consumer is also who

	per month		buys
Champagne	The brand Champagne	ImpDEC1, ImpDEC2, ImpDEC3, ImpDEC4, ImpDEC5, ImpDEC6	The importance is given personally by the respondent to a set of variables related to production region, wards, categories, sweetness, production method, and organic.
Genre	Male or female	Residence	The local residence
ConsRed	To be a consumer of red wine	BuyGift	To buy sparkling wine as a gift
Impbrand	Importance of the brand	NotAOC	Not being a DOP/AOC production region
ConsSpirits	Consumption of spirituous	ConsSoft	Consumption of soft drinks
ClasTrad	The traditional method of production	Marital	Single or married or equivalent
Tavora	AOC production region	Charmat	Charmat method of production
Bairrada	AOC production region	Sparklingcons	Sparkling consummation

Table 2 shows the top 12 features selected using all the available algorithms, namely minimum redundancy maximum relevance (MRMR) algorithm, univariate feature ranking for classification using chi-square tests (Chi2), ReliefF algorithm with k nearest neighbours (ReliefF), one-way ANOVA for each predictor variable grouped by class (ANOVA), the Kruskal-Wallis Test (Kruskal-Wallis), and the Information Gain (Info. Gain). The results reveal some similarities between the results obtained with Chi2, ANOVA and Kruskal-Wallis. The features sorted in the first positions with the last two

algorithms are the same whereas the features identified with Chi2 only differ in the order between some pairs of successive features. The two other algorithms (ReliefF, MRMR, Info. Gain) deleted other features in a different order. However, some features tend to be selected and appear in

the top positions (e.g., Income, Champagne, NotAOC, ClasTrad). Only 12 features selected with Chi2 had p-values below 5%. The features selected with the other FS algorithms are similar. These results motivated the decision to train the classification models only for the top 12 features selected by Chi2, Relief and MRMR FS algorithms. The InfoGain FS algorithm was the only one which select the larger number of features associated with the importance of specific champagne characteristics.

**Table 2** – Top 12 features selected using the algorithm MRMR, Chi2, ReliefF, ANOVA, Kruskal-Wallis Test and Info. Gain

MRMR	Chi2	ReliefF	ANOVA	Kruskal Wallis	Info.Gain
Income	Income	Champanhe	Champanhe	Champanhe	Income
Residence	Champanhe	ConsSpirits	Income	Income	ImpBrand
BuySparkling	NotAOC	NotAOC	NotAOC	NotAOC	ImpDCE3
Champanhe	ClasTrad	Marital	impBrand	impBrand	Champanhe
BuyGift	impBrand	ClasTrad	ClasTrad	ClasTrad	ImpDCE5
ConsSoft	BuySparkling	Tavora	BuySparkling	BuySparkling	ImpDCE1
ClasTrad	Tavora	Charmat	Tavora	Tavora	NotAOC
Prosecco	BuyGift	Bairrada	BuyGift	BuyGift	ImpDCE6
ConsRed	Charmat	BuyGift	Charmat	Charmat	Sparklingcons
Tavora	ConsSoft	impDCE1	ConsSoft	ConsSoft	ImpDCE2
impBrand	ConsRed	Income	ConsRed	ConsRed	ClasTrad
Charmat	impDCE3	BuySparkling	ConsSpirits	impDCE3	ImpDCE4

In total, 31 classifiers of all types of classification models were trained. The accuracy of these models ranges from 32.0% (for the Fine Tree model with MRMR FS) to 41.5% for the Ensemble Subspace Discriminant model with Chi2 FS). In general, models trained with features selected with Chi2 have slightly better accuracy than those trained with features selected with ReliefF and MRMR. The Logistic Regression model has been the one with higher accuracy in the Orange Toolbox, independent of the FS method, and has its higher accuracy value of 35.0% with the Info.Gain FS method. The results also reveal that the models that present the worst accuracy are the decision trees and neural network



types while the ones that present the best performance are, unsurprisingly, all the optimizable and non-optimized models based on discriminant analysis.

In summary, the results show some similarities between both approaches. The accuracy or ratio of cases correctly predicted is slightly higher in the ordered probit model than in the highest of the ML methods, 45% against 41%, respectively. There is also a trend towards similarity in the main predictors provided by both approaches, highlighting the relevance of the variables income, place of residence, the consumer is also the buyer, the Champagne brand, buying sparkling wine as a gift, consumption of red wine, not being PDO/AOC. Additionally, the ordered probit stresses the significance of the six variables that express the personal importance of the respondents given to a set of variables related to production region, awards, categories, sweetness, production method and organic, it is not observed in the ML algorithms, excluding in the Info.Gain. Indeed, are these 6 statistically significant variables that lead to higher accuracy of the econometric model, as its exclusion reduces to 41.5% the ratio of cases correctly predicted.

The full paper is organized as follows. Besides the introduction, section 2 presents the data, section 3 the methods (approach), section 4 describes and discusses the results, and, finally, section 5 is devoted to final remarks.

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# A structural demand model of fine wines' characteristics: Does buyers' heterogeneity matter?

*Benoit Faye (Inseec Business School), Eric Le Fur (Inseec Business School)*

Understanding the value of a fine wine bottle has been the aim of a great deal of research using the hedonic method. Based on the characteristics' separability of heterogeneous goods (Lancaster, 1966), the hedonic method developed by Rosen (1974) and Brown and Rosen (1982) has been broadly applied in the field of wine during the last three decades. In their recent literature review, Outreville and Le Fur (2020) list more than one hundred articles concerned.

Technically, the hedonic method is a two-step process. The first step estimates the hedonic function describing the influence of each wine characteristic (e.g., winery, vintage, critics' rating, age) on the sales price. Then, the derivatives of the hedonic function for each characteristic estimate the marginal value (implicit price) of an additional unit of each characteristic. In the second step, the marginal bid functions estimate the influence of wine and buyer characteristics on the implicit price of a specific wine characteristic. Hence, the influence of buyers' characteristics on individual willingness to pay for a wine characteristic may discuss a possible heterogeneity in agents' preferences.

However, in the fine wines market, the scarcity of information about agents prevents the development of the second step, primarily because of the nondisclosure agreements by auction houses. Therefore, agent homogeneity is the underlying assumption of each wine hedonic study<sup>1</sup>. Thus, our paper is the first to develop the second step by integrating auction bidders' characteristics for the Bordeaux and Burgundy fine wines, the most super-plus premium traded worldwide. We focus on the demand side, and the purpose is to examine the buyers' profile influence on wine characteristics' willingness to pay.

Most hedonic studies selected socio-economic empirical counterparts (age, income, gender, occupational categories) to describe buyer profiles. However, these variables are unlikely to differentiate willingness to pay in such a luxury market. Instead, the recent literature focuses on two differentiating elements. First, the buyer's country of origin describes an unfinished globalization process in which cross-cultural studies (e.g., Rodrigues & Parr, 2019) emphasized the persistence of cultural, even genetic (Bargain et al., 2020), differences in wine characteristics appreciation. Second, the buyers' status (amateur vs. professional) may influence their preferences. Masset (2022) examines a demand-side segmentation of the Bordeaux fine wine market and outlines different appreciations of wine characteristics (expert score, age, vintage quality) according to buyers' segment (investors, connoisseurs & wine passionates). Therefore, three proposals will structure our research agenda by discussing the buyers' status effect (P1), the country-of-origin effect (P2), and their interaction effect (P3).

Our data are from the leading French wine auction platform, iDealwine. To the best of our knowledge, iDealwine auction house is the only one to specify the status (professional and amateur) and the origin (country of residence) of the auction winner<sup>2</sup> in their monthly reports of the best sales. Between 2013

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<sup>1</sup> The recent study of Oczkowski (2022) concerning the Australian winemakers' marginal supply function is an exception but does not involve the demand-side.

<sup>2</sup> "the person who wins the lot on which he/she bid last, being the highest bidder". <https://www.idealwine.net/les-encheres-idealwine-comment-ca-marche/>

and 2021, we recorded 20,774 bottles sold for Bordeaux and Burgundy wines. For each sale, we record the hammer price and the wine characteristics (vineyard, vintage, age, number of bottles per lot), to which we add the Wine-searcher critics' aggregate score and the vintage score provided by the Hachette guide.

We use the approach of [Rosen and Brown \(1982\)](#) and the numerous works that experienced and contributed to the hedonic method, notably in the fields of real estate, industry, and ecology.

In this first step, econometrical problems are common. To deal with the unknown functional form of the hedonic function, we select the most flexible hedonic functional form using restriction test within the quadratic Box–Cox. The trade-off between the goodness of fit and the RESET test results discriminates among the different restrictions ([Dubé et al., 2011](#)). Furthermore, the Variance Inflation Factor (VIF) values must control the multicollinearity.

In the second step, econometrical problems are more specific. [Brown and Rosen \(1982\)](#) pointed out an identification problem in estimating the marginal bid function because the bid function and the marginal bid function contain the same information. Few empirical solutions exist to deal with this issue. First, different functional forms may be used in each step (e.g., [Quigley 1982](#)). Second, the hedonic function may contain more variables than the marginal bid function. Thus, the marginal bid function specification may be reduced to the variable of interest. However, the selection process of the variables in each equation is a matter of the analyst's judgment and experience with the data ([Freeman, 1979, p. 168](#)) and must be convincing. Third, hedonic price functions can be estimated on data groups by market segment (e.g., [Palmquist, 1984](#); [Bartik, 1987](#); [Brasington, 2003](#); [Zabel & Kiel, 2000](#)) or by period (e.g., [Beron et al., 2001](#)), while data are pooled in the second step. However, segmentation must be relevant, and Chow tests must confirm the significant difference in price distributions between sub-samples. Finally, instrumental variables are used in the second step to differentiate information in each stage (e.g., [Bartlik, 1987](#), [Epple, 1987](#); [Oczkowski, 2022](#)). Nevertheless, the opportunity in this way depends on the quality of the instruments ([Palmquist, 2005](#)). In short, empirical solutions to the identification problem are often multiple and depend on a data framework.

All the solutions prescribed within the literature will be applied at each stage of our wine hedonic approach. Our contribution is fourfold. First, we add the wine market to the markets set already explored by the hedonic second-step method. Second, to our knowledge, our paper is the first to provide evidence of the significant effect of amateur status on the implicit price of main fine wine characteristics. Third, we show some significant effects of buyers' origin on the implicit price of main wine characteristics. Finally, we specify some effects on implicit prices by crossing status and origin. These results question the preference convergence of auction buyers of super-plus premium wines in a globalization context. For academics, the working assumption of buyers' homogeneity should be explicit in fine wine hedonic studies, and we should be aware that our results are mean estimates. For professionals, this first estimate of a structural demand model offers the opportunity for optimal buyers' segmentation.

The remainder of this paper project will be organized as follows: Section 2 presents the theoretical and econometrical framework; Section 3 describes the literature concerned and our proposals; Section 4 highlights the data; Section 5 details the methodology; Section 6 presents the results; Section 7 discusses the results, and Section 8 concludes.

# It's all about sparkling wine - consumer trend analysis of sparkling wine in Germany

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## Introduction

Consumer behaviour regarding the consumption of sparkling wine in Germany has attracted growing attention in recent years. Globally, Germany has the highest per capita consumption with 3.2 mhl in 2018, followed by France with 2.6 mhl and the USA with also 2.6 mhl. The United States experienced significant growth during the 2008-2018 period, with an average annual rate of 7% (OIV, 2022). A study by Nielsen (2018) showed that the German sparkling wine market has experienced steady growth in recent years. Germany is an important sales market for sparkling wine, especially for the regions of Rhineland-Palatinate and Saxony.

Sparkling wine is considered a special treat and is often associated with special occasions. A study has shown that sparkling wine in Germany is mainly consumed by occasional consumers, who often make their choice based on the occasion, taste, and price (Ford, 2019). Another study by Euromonitor International (2020) showed that when buying sparkling wine in Germany, consumers mainly pay attention to taste, followed by brand and price. It was also found that the dry and semi-dry styles are the most popular, with men and frequent consumers preferring a lower residual sugar content, while women and occasional consumers prefer a higher sugar content.

Overall, it can be concluded that consumer behaviour regarding the consumption of sparkling wine in Germany is influenced by various factors, such as the occasion, taste, brand and price. While there is plenty of research about still wines, sparkling wine remains something of an unknown area. Our study is needed to further investigate and understand consumer behaviour regarding sparkling wine consumption in Germany.

## Methodology

The study was conducted in October 2022 with 817 participants, 617 of whom are sparkling wine consumers. A panel provider was used to ensure a representative sample. The screening criteria included age, gender, geographical distribution and wine/champagne consumption. The population quotas of the Federal Statistical Office were used as a basis so that a cross-section of the population could be represented. The questionnaire is divided into different sections, which add up to record the current habits of German consumers with regard to the purchase and consumption of sparkling wine. A preliminary study was conducted to test the software specifications of the questionnaire. The data set was checked and cleaned for possible outliers, duplications and "fast movers". This reduced the sample of a total amount of 500 participants. Data analysis was performed with the software SPSS; data were mainly analysed descriptive and in more depth with the help of manually created target groups. The target groups are defined by age groups (16-29 years, 30-49 years and >50 years) and gender.

## Results

As the literature review revealed, special occasions are an important driver for sparkling wine consumption as opposed to still wine. This suggests that the segment tends to be dominated by

occasional consumers. In our study, 40% of respondents who do not drink still wine consume sparkling wine, but two-thirds of the participants consume sparkling wine less frequently than once a month. This confirms the assumption that sparkling wine is dominated by occasional consumers. It is also possible to point to a certain linear correlation between the consumption of still wine and sparkling wine. With an increase in still wine consumption, the consumption of sparkling wine also increases in approximately the same proportion. The main motive for purchase is taste, followed by brand/winemaker and price, as the literature has already shown. Which brand and thus which type of sparkling wine is chosen depends on the occasion and can vary considerably. The main styles are dry and semi-dry. Men and "high-frequent consumers" tend to prefer lower residual sugar levels, while women, older consumers (>50 years) and "infrequent consumers" prefer higher sugar levels. Mixed drinks with sparkling wine are playing an increasingly important role in the sparkling wine market, especially among younger (<30 years) consumers and women.

In terms of distribution, German consumers typically purchase from food retailers and discounters - this accounts for more than 80%. Commercial sparkling wine brands, such as "Rotkäppchen" and "Henkel", is widely chosen for nearly all occasions in Germany. Champagne is more popular for special occasions and is often chosen by men. Young consumers and "high-frequent consumers" tend to select sparkling wines that are specific to the occasion. On certain occasions, there is often no preference for sparkling wine (15%) or none consumed at all (30%). In daily life, sparkling wines that fall within the price range of 3.00-9.99€ are commonly purchased. However, when a special occasion arises, customer segments tend to have a similar willingness to spend more. Notably, "high-frequent consumers" exhibit a particularly high willingness to pay for premium options during such events. As the frequency of consumption increases, the knowledge about different categories and brands of sparkling wine improves, even though the majority of consumers are already familiar with the major commercial sparkling wine brands.

Almost 20% of respondents would like to drink less in the future. Here, perhaps non-alcoholic sparkling wine can support this decision. After all, 44% of respondents have already consumed non-alcoholic sparkling wine. The reasons for this were mainly situational reasons, such as driving, or just curiosity about how this new category tastes. Qualitatively, the non-alcoholic sparkling wines were rated as good or very good by 53 % of the participants.

Despite both sparkling wine and still wine being categorized as alcoholic beverages, their consumption, preferences, occasion, trends and purchase decisions vary greatly. This highlights the importance of understanding the unique characteristics and nuances of the sparkling wine market in order to effectively target and market to consumers.

The study is supported by the Association of German Sparkling Wine Producers.

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# The role of behavioural antecedents and consumption occasions in green innovation acceptance: the case of wine in can

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**Keywords:** green innovation, consumption occasion, traditionalism, authenticity

Packaging is not just a container, but it also has a relevant role in protecting wine and communicating the attributes of a wine to consumers (Otto et al., 2021). Despite packaging itself does not directly relate to wine quality, it becomes an important quality cue in the consumers' eyes (Tootelian & Ross, 2000). According to the cue utilization theory and judgmental heuristics, consumers are likely to use wine packaging attributes to formulate expectations about the intrinsic attributes of the wine, and in turn influence behavioral intentions (Orlowski et al., 2022).

In order to meet the increased demand for environmental sustainability in wine from consumers, and convenience in storage and transport from producers, innovative and more sustainable wine packaging than traditional glass bottle is increasing importance in the wine industry. Wine in can represents one of these innovation in the world of wine.

Consumers, especially in the Old World of wine, are still reluctant to embrace and adopt this green innovation, partly because they do not recognise it is more environmental friendly than the traditional glass packaging (Ruggeri et al., 2022).

This research aims at understanding the drivers and barriers in adopting green innovation, and in the acceptance of wine in can by consumers from Italy and France, two traditional wine consuming and producing countries. In order to meet the research objective, two studies were built.

Study 1 analyses the role of consumption occasions in the adoption of green innovation. This study applies a discrete choice experiment hypothesizing two different consumption occasions for wine: everyday consumption or special occasion. A sample of 659 Italian respondents was recruited by a panel provider and randomly assigned to one of the two treatments, asking them to imagine being in the situation of choosing wine for one of the two consumption occasions and faced with eight choice tasks combining four options plus the no-choice option, like in Figure 1.










A main effects, fractional factorial optimal in the differences orthogonal design (Street et al., 2005) was built including packaging type (a 75cl glass bottle or three 25cl cans), eco score labelling (from A+ as the most sustainable label to G as the least one) and price (four price levels from 2.99 euros to 7.49 euros in line with the price of sparkling wine with no geographical indication in Italy) as attributes. Random Utility Models are applied to analyse collected information (Train, 2009).



Figure 1. An example of choice task

Study 2 analyses the role of behavioural antecedents in green innovation acceptance. A sample of 659 respondents from France was recruited from a panel provider and randomly assigned to one of three groups. The first group, the control group, was asked to assess a glass bottle of sparkling wine, the second group a sparkling wine in a can, and the third group a sparkling wine in a can with information on the fact that a can is more environmentally sustainable than glass (Figure 2).

**Figure 2.** Products to be assessed by the three groups

Group 1	Group 2	Group 3		
		<div><p>La <b>CANETTE EN ALUMINIUM</b> est beaucoup plus durable que la <b>BOUTEILLE EN VERRE</b>.</p><p>Qu'est-ce qui est <b>ÉCONOMISÉ</b> quand une tonne est recyclée ?</p><table><tr><td><p>14.000 kilowatt heures d'énergie économisées</p><p>6.545 Litres de pétrole économisés</p><p>7,6 m³ d'espace économisé dans les décharges</p></td><td><p>42 kilowatt heures d'énergie économisées</p><p>19 Litres de pétrole économisés</p><p>1,5 m³ d'espace économisé dans les décharges</p></td></tr></table></div> 	 <p>14.000 kilowatt heures d'énergie économisées</p> <p>6.545 Litres de pétrole économisés</p> <p>7,6 m³ d'espace économisé dans les décharges</p>	 <p>42 kilowatt heures d'énergie économisées</p> <p>19 Litres de pétrole économisés</p> <p>1,5 m³ d'espace économisé dans les décharges</p>
 <p>14.000 kilowatt heures d'énergie économisées</p> <p>6.545 Litres de pétrole économisés</p> <p>7,6 m³ d'espace économisé dans les décharges</p>	 <p>42 kilowatt heures d'énergie économisées</p> <p>19 Litres de pétrole économisés</p> <p>1,5 m³ d'espace économisé dans les décharges</p>			



Each group was called to assess the Product Image (through a 4-item scale developed by Balabanis and Diamantopoulos, 2011) and Purchase Intention (a 3-item scale from MacKenzie et al., 1986). Study 2

analyses these attitudes in the light of Product authenticity (a 3-item scale by Beverland and Farrelly 2010), Green Behaviour (a 6-item scale by Haws et al., 2014), Domain Specific Innovativeness (a 5-item scale by Goldsmith, 2000), and Traditionalism (a 5-item scale by Rabadán, 2021). Structural Equation Models are applied to analyse the collected information.

The first results highlight the role of consumption occasion in consumer acceptance of green innovation, with wine in can more tolerated when the wine is bought to be consumed during everyday consumption occasions than for special occasions. Further, the eco score labelling has a higher impact on consumer utility when the wine is chosen for special occasions. The analysed behavioural antecedents show that they significantly influence consumers' willingness to adopt green innovations.

Results from both studies could be useful for wine producers in defining differentiation strategies based on green packaging innovation and reaching new market niches.

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# Exploring Relative Inflation Through the Vehicle of Champagne - Measuring the Experience of Luxury Inflation

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**Key words:** champagne, relative inflation, stratification, strategic research site

## **Abstract**

How do people recognize when they were better off economically? Relative to what? The idea that there were “good old” days may be supported by the higher nominal value of the dollar from the past, but that inflationary concept does not take into account the improvements in technology and quality of life over time. If we only consider the price of a perpetually-changing basket of goods and services to define inflation, we are not capturing a concrete experience of inflation, just the change in value of the currency.

In 1994, William Nordhaus wrote:

During periods of major technological change, the need to construct accurate price indexes that capture the impact of new technologies on living standards is beyond the practical capability of official statistical agencies. The essential difficulty arises for the obvious but usually overlooked reason that most goods that we consume today were not produced a century ago.

Using CPI with its evolving indexes certainly has its place and value. However, the statistics necessary to incorporate the changes in the evolving technology and living conditions may be as Nordhaus wrote, “beyond...practical capability.” However, we can work out concrete, unchangeable units to measure something real about inflation, even as quality of life, income, and costs become nearly unrecognizably different from one century to the next.

The standard system of measuring inflation using CPI has its place. CPI does not, however, offer a way to understand if life is getting economically better or worse, given the extreme changes over time in what resources people at different income levels have access to. While the inflation rate from 75 years ago might make today’s prices feel painfully high, positive changes in overall quality of life suggest we are living in relatively better economic times—though newsheadlines may suggest otherwise.

Using a real, tangible good or product that has not changed over time can serve as an anchor to view the economic world through a near constant lens or prism. An anchor allows us to relativize the cost of other goods that are evolving at their own rate within their own product lifecycle.

Our anchor is champagne.

The purpose of this research is to show how different income groups are better or worse off today compared to the past by reviewing what happened to the relative price of champagne—a luxury good that has remained stable in terms of product, use, and means of production over the years—to their income.

Are people better off today, or were they better off in the past—how can we tell?

Inflation is measured in various ways, and historically it has always affected different socio-economic groups differently, but there has not been an objective measure of these differences. Consumer Price Index shows us generalities, but says nothing about the experience of inflation by different income quintiles.

Using champagne, we are able to measure price inflation on a consistent and precise manner for different income groups over a long period of time by asking how many hours of work each quintile would have to perform to obtain the necessary disposable income to purchase each of the champagne brands and their tiers (entry-level, mid-range, flagship). These are analyzed over time to see how inflation affects each income level. Using the datapoints of champagne prices, this research demonstrates the different experience of inflation by five wage earning groups over the past 75 years.

This may appear to be narrow research, looking at only one thing—champagne—however this is a strategic research site because its character can offer insights and allow one to make observations about the effects of inflation on real lives, irrespective of whether or not champagne was actually purchased by people in these income groups.

The question of who is better off, is relative. What were the fond good old days, and what did that might mean? It may not quite have been the good old days, depending on who you are comparing yourself to. Relative to what? Relative to that year, or relative to the best ever?

How can it be that people think the best days are behind them? As things change, the bar of what is standard continues to be pushed up, so “better” never seems to happen compared to the past.

Champagne is a product that hasn’t changed over time, and it has always been considered a luxury item. In that way it makes for a perfect product to use to ascertain relative inflation over time.

### **Strategic Research Site**

Champagne prices were acquired from UC Davis Libraries and the author’s own personal collection of Sherry-Lehmann wines shop catalogs creating a strategic research site. In this way a long-term, self-contained, primary data source maintaining the consistency of relative variables, which permits parallel comparisons across time for three different tiers of champagne (entry- level, mid-range, flagship) was created. Three different brands of champagne are used (Bollinger, Louis Roederer, Moet & Chandon).

**Each catalog functions as a time capsule.** Thus, the strategic data site draws upon more than 350 such time capsules. Each time capsule is published by the same wine store with the same motivation (perspective, interests, goal, purpose). The details and designs of the catalogs have evolved over time, however the primary objective to encourage customers to buy wine remains unchanged.

Using the datapoints from this strategic research site, evaluation is made using the five different income levels to determine how each level is affected by inflation using the number of hours work that must be completed in order to obtain the disposable income necessary to purchase a bottle of champagne from each of the brands’ three tiers.

The income data draw on figures provided by the U.S. Census Bureau and are for the entire United States (U.S. Census Bureau, 2016). Five income brackets are distinguished, the lower

four quintiles and lower limit of the top 5 percent of families of all races. They are further distinguished by gross (pretax) income and disposable family income.

Computation for disposable income is calculated by subtracting government entitlement payments, Social Security, disability and Medicare, New York State income tax liabilities, New York City income tax liabilities, and federal income tax liabilities from gross wages. Standard deductions are calculated based on a single person's exemption, multiplied by two, to normalize standard deductions across time.

Adjusted gross income is then applied to historical nominal federal income tax rates for single filers to calculate the federal tax liability (Tax Foundation, 2013).

Social Security, Medicare, and disability payments are calculated by applying the rate for each year in the study (Social Security Administration, 2017). New York City and New York State income tax liabilities are calculated for each year (New York Department of Finance, 2012).

Also utilized are local and state income tax deductions, whereby the income that is subject to federal income tax is reduced by the amount of local income taxes paid or by the standard deduction allowed, whichever is larger.

### **Underlying Value of Research**

The inflation of experience...

Concretely, we're talking about champagne prices, but the broader implications of this is what it takes to get into luxury. To purchase champagne, what resources are required, and how difficult is it for someone to obtain them?

From entrée level luxury to flagship level, economic classes experience inflation differently. Surprisingly, what we see is the absolute level of entrée is cheaper for all income quintiles over the seven decades described, as demonstrated by the prices of the entrée level of champagne in each brand. However, going up in luxury level, it has generally become more expensive in real inflation terms.

Comparing different income strata to different tiers of champagne, by determining how many work hours it would take to buy a bottle over time, we can use this concrete measurement of inflation to answer questions that ask when different groups of people were economically better off—based on their economic experience of their financial ability to access this archetypal luxury product, champagne.

In this way, the notion that we were economically “better off in the good old days,” can be objectively evaluated.



# Parallel session

## XII-

Industrial Organization & Management

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# Impact of resource allocation and diversification strategies on performance measures in the post-Covid period: an application to Spanish wineries

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**KEYWORDS:** Spanish wineries, Performance, Covid-Crisis, Strategies.

## **EXTENDED ABSTRACT**

The Covid-19 pandemic has been a shock to business activity. Paradoxically, the agri-food sector in general, and the wine sector, has been less affected as it is considered a basic sector. The restrictions imposed by the Spanish government on the cancellation of leisure activities and the closure of catering establishments directly affected the commercialization of wine. Wineries had to transform their activity in order not to lose their sales capacity, reallocating their resources to preserve their competitive position. This reallocation has been influenced by the circumstances before each winery's covid situation.

Although the situation improved significantly after the end of the confinement, the third and fourth quarters of 2020 are still far from the pre-pandemic reality. The year 2021 can be considered the first post-covid year, so it is important to analyze the situation of wineries in terms of economic-financial performance.

Spain is one of the countries considered traditional in the wine sector, with the largest vineyard surface area in the world (13%), and one of the main wine producers (15%). Therefore, it is important to analyze the post-pandemic situation of the Spanish wine sector to detect changes in the sector's behavior.

This paper aims to analyze the impact of the allocation of financial and commercial resources on post-covid economic-financial performance measures. For this purpose, in this paper, in addition to using traditional measures of economic-financial performance, such as Value Added, ROA or Cash Flow, we use a measure of profitability that also considers the level of risk, the Sharpe ratio (Sharpe, 1966). This index is a standard measure of investment return analysis, at equal risk. Mutual funds use this ratio as a selection criterion. We consider it to be an appropriate measure to establish whether the profitability obtained by companies whose performance is higher as a function of their level of risk, and we believe that it is one of the contributions of this study to the debate.

The independent variables of the study are related to the resources available to the wineries pre-covid. Thus, the following elements are identified:

*Lagged performance measures and their strategic risk* identified based on quartiles of variance.

*Slack resources.* The existence of financial constraints hinders corporate decision-making. In the context of business shock, it is relevant to identify whether those wineries with the financial or potential slack impact a better performance measure in subsequent years. Available slack has a consistent and positive effect on short-term economic profitability. Other types of slack (Agustí-Pérez, Galán and Acedo, 2020) show

persistent effects on profitability, but, in the case of recoverable slack, with a negative sign that contradicts the benefits provided by these resources. Finally, potential slack has only a permanent effect on financial profitability, but the sign changes depending on the economic context considered.

*Financial structure of the pre-covid company.* The financial structure of companies is fundamental for dealing with a period of crisis. During the crisis, smaller companies face additional constraints and higher costs in accessing financing than bigger listed companies. These difficulties arise from the specific characteristics of these firms; for example, difficulty in accessing the public capital market, shorter track record, greater information asymmetry, higher failure rate, fewer opportunities available to owner-managers for wealth diversification, and less availability of collateral (Zubair, Kabir and Juang, 2020).

*Foreign market orientation.* Orientation towards international markets has led to an improvement in the competitive position of Spanish wineries (Ferrer et al. 2022) and, in some cases, the possibility of continuing to compete in the market. Variables such as export orientation or positioning in specialized search engines allow smaller wineries to access not only international markets but also direct sales as a marketing channel.

*Diversification of the business model.* Wineries are one of the sectors with a highly diversified business model. Activities related to wine tourism are one of the best indicators of this measure. Spain is a country with a high impact of tourism and wineries have taken advantage of this duality to diversify their business, complementing their winemaking activity with tourism. Gomez, Pratt and Molina (2019) perform a meta-analysis showing the importance of this activity.

In line with previous literature, the control variables to be considered are related to age, size, and region.

To carry out the research, a database has been constructed consisting of the financial statements of Spanish wineries, as well as information on commercial resource allocation. From the SABI database, our sample consists of the financial statements of wineries with NACE code 1102, located in Spain and active status in the year 2021. These data have been completed with data extracted from other sources, such as the websites of the analyzed wineries.

The provisional results allow us to validate some of the hypotheses raised above:

The performance measures are considered adequate to understand the competitive situation of the wineries in the post-covid period.

The existence of financial slack before the Covid period has allowed the companies to continue their activity during the crisis period.

The financial structure of the wineries based on internal resources has had a positive impact on performance measures.

Foreign market orientation is an activity present in the wineries with the best performance indicators.

The diversification of the business model based on wine tourism and direct sales favours performance measures.

In conclusion, Spanish wineries have survived the post-covid period and it is expected that the new strategies developed during this period will strengthen their position in the international market.

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# Determinants of blockchain technology adoption: the case of the Italian wine supply chain

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**Keywords:** Blockchain technology, Adoption, Digitalization, Wine

## Introduction

In the agri-food industry, blockchain technology (BCT) was recently introduced to optimize supply chain processes by improving traceability and reducing transaction times, food fraud, and inefficient processes (Costa et al. 2013, Fernandez et al, 2020). The intrinsic characteristics of BCT, namely transparency, immutability, shared consensus, etc, make this technology a tool to potentially improve food supply chain performances. To date, different studies tried to estimate the companies' intention to adopt this technology (Kamble et al., 2018; Orji et al., 2020; Wamba et al., 2020; Kumar Bhardway et al., 2021; Chittipaka et al., 2022; Dehghani et al., 2022). However, notwithstanding the potential role of blockchain technology in the agri-food supply chain, the determinates of blockchain technology adoption in this sector are still poorly explored in the literature, except for the wine sector (Yadav et al., 2020; Adamashvili et al., 2021; Galati et al., 2021; Saurabh & Dey, 2021; Stranieri et al., 2021). Indeed, among agri-food production, the wine industry is one of the supply chains in which the BCT is mostly spreading. This is due to a set of aspects. Firstly, this sector is generally subjected to a high number of frauds (ICQRF, 2021). Secondly, BCT is important in the wine industry because the missing guarantee of the product origin and quality could betray the customer's trust (Cuel & Cangelosi, 2020). Finally, due to the fact that the wine industry has a high number of sustainability standards and processes, BCT could be a valid tool to support these needs (Luzzani et al., 2021).

## Objective

In order to understand which are the driving factors, barriers, and motivations that lead entrepreneurs to the possible implementation of BCT, the aim of this paper is to assess the determinants affecting the adoption of this technology by Italian wine producers. This study was developed in the framework of the project WEBEST - Wine EVOO Blockchain Et Smart Contract- financed by PRIN (Progetto di Rilevante Interesse Nazionale) - Ministry of Education, University and Research. The project aims to evaluate the applicability of BCT to support traceability, protect against fraud and promote transparency in international trade for an increase in the excellence of Italian agri-food, including wine.

## Methodology

To explore the factors affecting Italian wine entrepreneurs' BCT adoption, an online questionnaire was designed. The questionnaire was structured into different sections. The first section includes questions on the degree of knowledge of BCT; the second part focuses on determinants affecting blockchain adoption based on a specific scale developed by Queiroz et al. (2020); the third part presents a set of questions related to the objective and the willingness to pay to implement the BCT in the winery. Finally, the socio-demographic characteristics of wine producers and their wineries are collected. In detail, the scale used in this study was based on items following five constructs: facilitating conditions, performance expectancy, trust, social influence, and effort expectancy. A five-point Likert scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree) was used to record participants' responses. The data were analysed using descriptive, bivariate, and multivariate statistics. All statistical procedures were performed with STATA software.

## Results

The research presented in this study tries to understand the behavioural intention to adopt the blockchain technology among the wine producers. This sector is particularly strategic for the Italian economy thanks to its numbers in terms of production and sales. Moreover, it represents a very receptive sector in terms of technological innovation unlike other types of production in the agrifood context. In details, this study shows drivers and barriers which would lead the wine producers to adopt the BCT. Through the use of the questionnaire, we identify the possible enablers factors, as well as the level of awareness and trust in blockchain technology.

## Conclusions

Digitalization through blockchain is an innovative solution that should be part of the modern strategic management approaches of winery producers. The findings of this analysis are of interest to develop strategies aimed to ensure the effectiveness of this innovation for firms operating in the wine industry. BCT could guarantee product authenticity, origin, and quality, starting from the raw materials of origin and moving along the supply chain. However, it is important to know that the adoption will require a change in organizational structures and, in particular, the need for highly qualified human resources able to implement, manage and maintain the new technology. Further studies can test the practical implementation of BCT, in selected case studies, to support the traceability and the quality of Italian wine production.

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# Spanish wine routes. Differences, similarities and consequent strategic implications

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## Introduction

Porter (1998) defines a cluster (also known as industrial districts) as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate”. On a different stream, Martínez-Falcó et al. (2023) state that “wine tourism activities are structured as a cluster through wine routes”. Both definitions lead to conceive wine routes a cluster. It is, we can identify wine routes as regions where the activity of wine tourism has become specialized by the presence of different agents that bring support to it through varied, but complimentary economic activities.

The existence of wine routes can boost the economic dynamization of rural, depopulated areas (Marco-Lajara et al., 2023), as activities related to the service sector are developed together with agricultural and productive activities of the wine sector, such as crop growing, crop harvesting and wine production, among others. However, the strategies that are implemented by firms, organizations and different institutions must match the features of the environment, it is, they must have strategic fit (Guerras Martín & Navas López, 2022). In addition, the latter source also explains that strategic fit creates a mismatch between the new strategy and the firm, so organizational changes are needed in order to a proper implementation of the mentioned strategy. For this reason, analyzing the characteristics of wine routes (in this case, those located in Spain) and potential differences among them will provide some indications to decision-makers (managers, investors, politicians...) to improve the practices, policies and strategies in those areas that are considered as wine tourism clusters.

## Objectives and methodology

The main objective is to characterize the population of Spanish wine routes. In more specific terms, it is intended to describe the potential geographical scope of each wine route, the components (wine cellars) for each of them and the features of each of those components.

In order to assess the geographic scope of wine routes, an analysis through the known as Voronoi Tessellation or Voronoi Diagram is developed. This tool shows “regions of proximity for a set of sites in the plane where distance of points is defined by their Euclidean distance” (Erwig, 2000). It is, Voronoi Diagram consists of a tool that shows the points in the space that are closer to a certain given reference in comparison to other given references. In order to do so, the package *deldir* developed by Turner (2021) for R language is used.

For the rest of variables considered, a direct measure of the population has been developed or, if not possible, an analysis of variance has been done. As the variables considered do not meet the precepts of normality and variance homogeneity necessary for an ANOVA parametric test, the

Kruskall-Wallis test has been used to comply adequately with the statistic requirements (Goss-Sampson, 2018).

To gather all the information necessary of the total population (N=747), the SABI database has been used to collect an initial sample that, by a depurating process for missing values and inactive firms, has led to a final sample of 402 records, which accounts for 53.8% of the total.

## Results

Once applied the prior procedures, differences have been detected among wine routes. For example, while some of them show high areas of influence (through the Voronoi Tessellation), others appear to be highly limited in space. Regarding differences in economic and financial terms, the various Kruskal-Wallis tests show that asymmetries appear in medium values for assets, sales and final profits among wine routes, while no differences in medium number of employees are found to be statistically significant.

## Conclusion and discussion

The results previously shown prove that differences among wine routes exist in most of the variables considered. These differences trigger the need for further research that analyzes the best practices for wine routes as a group, as well as for their members, given the importance these clusters can have in the economic development of rural, unpopulated areas. In addition, the fact that wines routes seem to be quite different from one another forces to the creation of individualized studies, for which public and academic institutions may have a key role, as a deep knowledge of the region is needed in order to account for their particularities.

## Limitations and future developments

Despite the conclusions extracted, the work faces some limitations. One of them is that the analysis is limited to the 2021 year, as prior years do not have full information available, or are affected by the COVID-19 pandemic (World Bank, 2022) and may bias the future, potential generalization of results. Another limitation is that variables have been analyzed individually, thus possible relations among them, as well as mutual influences, are not considered.

However, this work is intended to be a prior step for further developments. More specifically, future works include the creation of explanatory regression models that provide a relative measure of the contribution each variable has on the value of wine routes (as well as the impact of wine routes in their regions), and predictive models that allow to foresight the impact that different politics, strategies and environmental changes may have on the performance of wine routes.

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# An industrial policy for territorial development: the case of the wine industry of Aragon (Spain)

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**Keywords:** wine industry, industrial policies, wine cooperatives

The cooperative model was successfully developed in the Spanish viticulture on the last century. Its objective was to defend the interests of small and medium grape producers and to encourage investment in order to modernize the production of wine. However, as time went by, many of these winemaking cooperatives remained as a local producer and predominantly made in bulks. In Aragon the cooperatives dominated the viticulture, in the eighties, in the main parts of production areas. However, they began to experience the difficulties of evolving towards a wider structure that integrated both vertical and horizontal processes and that improved farmer's revenues.

Many governments have been trying to promote economic development of their territory by acting directly on its productive structure. This work analyzes the intervention of the Aragonese government in the regional wine industry from the eighties to the present day. Face to the above-mentioned problems, in the nineties, the government of Aragon, started an industrial policy executed mostly by a public agency for regional development, the Instituto Aragonés de Fomento (IAF), in two stages and in the four protected designations of origin (Borja, Calatayud, Cariñena and Somontano).

The first stage consisted of promoting the creation of wineries that had the capacity to move towards packaging and international exposure and could stimulate the sector in the main productive areas. In order to this, it participates in mercantile societies and invited other cooperatives and financial entities to be part in the project. The second consisted in the exit of the public capital of some of the wineries in which the IAF has a stake and the permanence in the rest. This is an ambitious and heterodox model of agro-industrial policy that needs to be assessed.

The result of this policy was the creation of leader's wineries in every DO of Aragón. The important work of the IAF in the Aragonese wine sector can be considered both part of an industrial policy -agro-industrial in this case- and cooperative; industrial because it has contributed to strengthen the productive sector with companies with deep roots and territorial impact and cooperative because in general it has relied on this type of social economy entities to constitute these new entities of greater size and capacity. Although it is not certain that the first action of the Aragonese government in the wine industry was part of a strategic plan to promote the creation in each of the production areas of the territory of a modern and competitive winery with the capacity to pull the rest of the sector, and less so with a cooperative base, there is no doubt that later the IAF's support has been systematic and has gone far beyond the participation in the companies created under its auspices, It has been the catalyst for all the wine development processes by participating directly in the activities necessary to bring these business projects to fruition: promoting the studies, inviting all the actors involved, facilitating dialogue and cooperation between the main players, setting up the company, bringing in financial

partners (who would otherwise have been difficult to attract) and imposing professional management from the outset. In addition, the IAF has also granted public aid in some areas.

The result of a policy that began in 1991 and whose last action was in 1999 has been the creation of a diverse mosaic of wine companies, whose common denominator is the cooperative base, and the participation of financial entities hand in hand with the IAF. In 1999, at the height of the IAF's involvement in the Aragonese wine sector, the five wineries created to promote the sale of bottled wines in the four existing Appellations of Origin. At that time, the success of the model seemed unquestionable, particularly due to the miracle of the Somontano wineries which, starting from almost nothing, came to be considered the most prestigious in Aragon, an example of good production and commercial management, not to mention their capacity to revitalize a region of low economic intensity. Aragón needed an effort of this nature, intense and direct, as its vineyards were being severely weakened by successive grubblings and restructuring. Lacking in the 1980s large wineries and a prestigious image in national and international markets, its grapes were going to produce bulk and unrefined wines of little value.

It is not easy to assess this policy, since there are many factors to take into account, and over time its shortcomings have perhaps become more evident. Although the model promoted by the Aragonese government has injected capital and energy into the development of its wine sector, it has not been able to prevent a sharp fall in its productive potential. Moreover, despite having created leading wineries in their respective areas, it has not been possible to avoid crises that have led to the sale -as in Somontano, where it is paradoxical that the first and most successful experience has ended with the dismantling of the foundational structures- or instability -as in Calatayud-, which shows that the presence of external actors such as the public administration or the financial entities themselves, which are financing the companies in which they participate, are not a guarantee of good performance.

Additionally, in terms of cooperative integration, it was initially incomplete and, what is more serious, it has not progressed over time, showing a worrying rigidity in both Cariñena and Campo de Borja, the two most successful ones; which may be due both to the economic difficulties experienced by the participating wineries and to the precarious situation of some of the candidates, which the former have not been interested in absorbing. In any case, this is clear evidence of the difficulties of endogenous cooperative growth. On the political level, the strategy of the IAF is not clear either, as it currently remains in the shareholding of 3 wineries. Although its exit from the first two created seemed to put an end to the policy of supporting the development of the Aragonese wine industry initiated in the nineties to start the withdrawal, since 2009 there has not been any significant movement and at present there is no clear strategy for the wine industry on the part of the government of Aragon.



## **A proposal for the generation of supra-appellation of origin in the case of Spanish wine based on consumer perceptions**

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Appellation of origin (AO) have been an element of regulation in the markets of wines in the Wine Old World. In addition, because of the increase in quality that they have promoted, they have become an element of (collective) reputation that increases the value of the wines. Also, the names of the AO are an intangible asset that contributes to the process of internationalization of wineries.

However, the emergence of new AO and the growing fragmentation in some countries prevent them from functioning as brands in international markets, especially in the most remote ones. Only the large AO, or those that have acquired a high reputation in the international market, operate as brands in the international market.

A potential policy in this regard for the international consumer is the reduction in the number of AO. In this sense, this possible reconfiguration of the AO must manage to reconcile the fragmentation tendencies of the old ones and the generation of new denominations with the guarantee of quality and similarity of the production of the wineries within the different AO.

This paper proposes the generation of supra-AO from the grouping of the current ones, so that they can operate at these two levels simultaneously. For the domestic market, it is likely that this concentration would mean a loss of variety, which is why the current denominations would probably continue to operate as a brand. But abroad there would be a reduction in the number of AO variety, which allows a greater presence of these new supra-AO in each of the markets, which in some way allows their establishment as a brand.

We developed a methodology that intends that the grouping of denominations is done in such a way that the final consumer can identify the similarities between the wines of a certain denomination. It is the tastes of the consumers that, in the last instance, guide the process of conformation of these supra-AO.

For this, Vivino's tasting notes are taken for more than 12,000 Spanish wines. Based on the flavors detected by consumers and expressed on this website, a methodology is developed that, based on a series of cluster methods, establishes a grouping of the flavors of these wines. Next, based on the belonging of the wines to the different appellation of origin, a potential grouping of the current denominations is established.

Next, a set of robust and sensitivity tests of the methodology are established: some of the criteria used for the incorporation of wines or denominations in the sample are modified and an analysis of potential changes in the grouping is carried out using bootstrapping. In this way we test the sensibility of the analysis on both the sample used and the cluster techniques. In this way, the final proposal is established in probabilistic terms of similarity. Finally, we use some geographical criteria for refining the proposal.

Ultimately, the proposal for the Spanish case does not imply the elimination of the current denominations, but rather the establishment of a group for commercial purposes that, respecting the current business dynamics that have improved wines, makes the denominations operate as true brands in the markets, international, especially in the most remote ones.



# Parallel session

**XIII-** Territories & Tourism

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# The Effect of Winery Video Content on Consumer Perceptions of Wine Quality and Prices

Natalia Velikova (Texas Tech University), Tatiana Chameeva (KEDGE Business School), Marc Faget (KEDGE Business School), Bogdan Olevskiy (Texas Tech University)

**Introduction** – Video marketing has been found an effective tool for delivering messages, increasing engagement, educating customers, attracting visitors, and overall, for developing long-lasting relationships with target markets (Smith, 2011; Hollebeek & Macky, 2019). In the modern technology-driven world, consumers have an overwhelming variety of videos to choose from. Equally so, wineries have many different ways to determine the focus of their video content. One common type of videos produced by wineries is *educational*. In such videos, wineries can announce new releases, educate consumers about the styles of their wines, different vintages, or winemaking processes. *Brand videos* are also commonly used with a primary purpose of increasing brand awareness and creating relationships with customers. For example, by boosting engagement with the key winery personnel (e.g., ‘ask our wine experts’) or by featuring personalities (e.g., ‘meet the winemaker’), the winery ‘humanizes’ the brand and builds trust. Through video content, wineries can also create and maintain *affective relationships* with their customers – for example, by offering videos that generate expectations about visiting cellar doors. For this strategy, *sensorial* (stimulating the human senses) and/or *emotional* (generating positive feelings and moods) characteristics of the experience are most commonly applied into the video content. The question remains, however, what effects these strategies have on consumer perceptions of the quality of wine and wine prices.

**Need Statement and Purpose** – As consumers become more adept at using various technologies, the need to study consumers’ reliance of video content as an information source becomes apparent. Our work advances an understanding of how video content marketing influences consumers perceptions. Specifically, the current study explores (a) whether the content of winery videos can enhance consumer perceptions of wine quality; and (b) whether perceptions of wine prices change depending on video content.

**Conceptual background** – Attracting tourists to visit cellar doors can be a promising beginning of a long-term relationship between the winery and its consumers. As Alant and Bruwer (2010) noted, “the battle for visitors’ attention is first fought at the level of providing a unique experience at the cellar door (or winery facility) that could be transposed into brand loyalty, repeat visitation and spreading the word” (p. 192). Consumers use various sources to obtain information about wine. A potential visitor may use wineries’ videos to determine which winery to visit (Manno et al., 2016). Woodside and Dubelaar (2002) found that tourism video advertising largely influences tourist behavior, forms a positive cognitive image, and significantly increases tourists’ expenditures. Recent literature increasingly acknowledges the importance of video features (Brezeale & Cook, 2007), videos structure and content (Loui et al., 2007), and video’s emotional appeal (Lewis et al., 2010). Kim & Mattila (2011) examined consumer evaluations of hotel website video clips and suggested six dimensions of videos: user

interface, aesthetics, customization/personalization, assurance/trust, flexibility, virtual human interaction. Tessitore, Pandelaere, and Van Kerckhove (2014) found that reality TV affects people's perception of destination in both cognitive and affective dimensions. By extending the stimulus-organism response model to the social media context, Li (2019) explored video application users' visit intentions. The findings validated the positive influence of short video on destination image, perceived interactivity, and users' visit intention. Our study further explores this proposition in the context of videos produced by wineries. Specifically, our research examines consumer perceptions of product quality and prices based on different types of video content, approached through the proposed model of four dimensions of consumer tourist experience: *sensorial, cognitive, pragmatic and relational*.

**Design/methodology/approach** – The empirical data were collected in two markets: France and the US. Sixty-five respondents were asked to watch four short videos representing the four components of wine tourist experience. After watching the four videos, the respondents ranked the wineries depicted in the videos in terms of their personal preference for visitation. Furthermore, respondents were asked to elaborate on their choice of the wineries they were *most willing* and *least willing* to visit. Using the resulting data comprised of 581 narratives and basing on the consequent textual data analysis, our research explored the motivations for a visit, the occasions, wine quality perception and willingness to pay for a bottle of wine at the wineries.

**Findings** – The study reveals the important role of the four experience dimensions - cognitive, pragmatic, emotional and relational - in creating consumer perceptions about the company and its products. Statistically significant differences in the perceptions of wine quality and wine price for most/least attractive wineries to visit were observed and will be presented.

**Practical implications** – The current research enhances the existing understanding of the video content and its influence on future visitors' perceptions of wine, winery, product quality and prices. The work offers practical implications for wineries on how they can position their communication messages according to different dimensions of the video content. These implications for practitioners may further improve their relations with potential visitors to their winery.

**Keywords:** wine, video content, cognitive, pragmatic, emotional, relational, tourist experience

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## The effect of wine tourism on the sustainable performance: Evidence of the Spanish wine industry

*Javier Martinez-Falco (University of Alicante), Eduardo Sanchez-Garcia (University of Alicante), Luis-Antonio Millan-Tudela (University of Alicante), Bartolomé Marco-Lajara (University of Alicante)*

Wine tourism can play a decisive role in regional development through the generation of economic and social welfare, as well as through the preservation of the environment in which the activity takes place. In this way, this type of tourism can show its potential through the three dimensions of the Triple Bottom Line: economic, social and environmental. From the following study we intend to find out whether wine tourism activity has a positive influence on the economic, social and environmental performance, i.e. the sustainable Performance of Spanish wineries, given that, although the contribution of this activity to territorial development has been extensively studied from an economic, social and environmental approach, to the best of our knowledge, there are no previous studies that have tried to address the impact of wine tourism on the sustainable performance of Spanish wineries. Thus, this study, far from the macro approach applied in previous research, aims to analyze the wine tourism-sustainable performance link through a micro approach focused on the main actor of the wine tourism activity: the wineries.

There are several reasons for choosing the Spanish wine context for this research. Firstly, according to the latest data provided by the International Organization of Vine and Wine (OIV), Spain is a benchmark in the sector, occupying first place in the world in terms of vineyard surface area and volume of wine exported. However, the importance of the wine industry for Spain is not only determined by economic variables, but also by social and environmental factors, since the sector favors the welfare of citizens, as well as the preservation of the heritage and the environment in which the wineries operate. Secondly, wine tourism is becoming increasingly important for Spanish wineries. Thus, since the creation of the “Wine Routes of Spain” tourism product in 2008, more and more wineries have decided to develop and promote this type of tourism, with 35 wine routes currently existing in the Iberian country. Thirdly, wine tourism is an activity with an increasingly strategic component to ensure the survival of Spanish wineries, since it acts as a distribution channel for direct sales in the winery, counteracting the decline in wine consumption in homes, as well as favoring the generation of brand ambassadors.

The study population consists of all companies included in the National Classification of Economic Activities (CNAE, by its Spanish abbreviation) code 1102 associated with manufacturing, which according to the data provided by the Iberian Balance Sheet Analysis System (SABI, by its Spanish abbreviation) database is made up of 4,373 companies. For the selection of the sample, based on the literature review conducted and the scales selected, an online questionnaire was developed, managed and administered through the Qualtrics application between September 2021 and January 2022. Initially, 216 responses were obtained in total. Nevertheless, after a filtering and cleaning process, 202 responses were considered valid. It should be noted that this questionnaire was intended to be answered by the general managers of the wineries. Likewise, there is similarity between the population data and the data obtained in the sample, given that the three Autonomous Communities with the highest representation in the population are those with the

highest representation in the sample. Similarly, there is a certain proportion between wineries that carry out wine tourism activities (57.43%) and those that do not (42.57%).

The technique used to test the proposed theoretical model was structural equation modeling (PLS-SEM) by means of the SmartPLS software version 3.3.9. The technique enables the analysis of a network of relations between variables, which may be unobservable, i.e. latent variables. This makes the technique particularly useful in the field of management, where this research is framed, given that most of the constructs analyzed are not directly observable. In this sense, the technique is particularly useful for testing the proposed model since sustainable performance is a latent variable. Furthermore, the study sample (n=202) exceeds the minimum sample size of 100 required to apply this technique (Hair et al., 2019). PLS-SEM is also recommended for analyzing direct effects between variables and has been previously used to carry out studies within the field of management in the wine industry, which highlights the suitability of the technique used (Knight et al., 2019).

The study allows us to observe the heterogeneity in the impact of wine tourism activity on the three types of performance, since wine tourism has a greater influence on economic performance, followed by social and environmental performance. This can be explained by the direct contribution of the activity to improving business profitability, given that, by acting as a distribution channel, it increases direct sales of wine in the winery, enables an increase in the profit margin per bottle of wine sold (given that the profit margins of intermediaries are eliminated), allows the promotion of cross-selling and incremental sales by being able to offer different products in the facilities and recommend the most expensive ones, facilitates direct contact with customers and enables the generation of brand ambassadors, creating a sentimental link that will result in wine sales in the long term. These mechanisms make it possible to increase the economic performance of wineries and, therefore, guarantee their long-term survival.

Regarding the link between wine tourism and social performance, the study shows a positive and significant relationship between both variables. This can be explained by the improvement in the conditions of the different stakeholders as a result of the successful development of wine tourism activities. As has already been explained, those wineries that carry out wine tourism activities can see their profitability increase, which can lead to greater security and stability for the workers who work in the winery, by improving their competitive position. The workers can also see their jobs enriched, given that, by increasing the diversity of the winery's activities, they can also increase their possibility of specializing in other fields of the wine sector, in this case, in wine tourism. However, not only the workers can benefit from the implementation of wine tourism activities within the wineries, but also the society in which the winery operates, since wine tourism acts as an element that spreads the history, heritage and gastronomic culture that surrounds the wine-growing territory in which the wine tourism activities are carried out, thus strengthening its wine identity. In this way, wine tourism can meet the demands of the different stakeholders that affect or may be affected by the winery's activity.

The relationship between wine tourism and environmental performance, despite being positive and significant, is the one with the lowest intensity. This may be due to the fact that this type of wine tourism can improve green performance through indirect mechanisms, given that the activity increases the stock of ecological knowledge among its employees as a result of: (1) the interaction between winery members to be able to adequately transmit the practices carried out by the winery to wine tourists, (2) the green training courses received by those in charge of carrying out the wine tourism activities to increase their green knowledge and (3) the environmental questions/suggestions of the wine tourists who come to the wineries.





# Factors affecting the wine experience: the case of Urla vineyard (wine) route, Turkey

*Nuray Turker (Karabuk University Safranbolu), Ozde Erkoc (Independent Scholar)*

Understanding the wine experiences of tourists is fundamental in order to find out tourists' characteristics, motives, and preferences visiting wine regions, and the development of wine tourism. Using Pine and Gilmore's four stages of economic progression, Quadri-Felitti & Fiore (2012, 2013) applied the 4Es (Entertainment, Educational, Esthetics, and Escapist) to wine tourist activities. Their study on the Lake Erie Wine Country Trail showed that esthetic experience had the greatest influence on establishing a memorable wine-tasting experience. Tourists are enriched by sensual environments such as the winescape, unique lodging and wines, driving rural roads lined with vineyards, and art and craft fairs at wineries. Mason and O'Mahony (2007), identified six themes which are important for a memorable food and wine route experience for the culinary tourist: cuisine, lifestyle, regionalism, environment, rurality, and health. Some other studies determined different factors; the atmosphere at the event, the nature of the event, the wines, the scenery at the winery, the opportunity to do more than just taste wine, the uniqueness of the experience, the opportunity to learn more about the wines, the opportunity to interact with the wine maker, to meet people at the event, signage, free wine-related gifts, activities for children, live entertainment, quality of amenities, and entertainment quality (Saaymana & van der Merwe, 2015a).

Saaymana & van der Merwe (2015b) determined four factors namely qualities of the route, food and entertainment, information dissemination, and amenities which affect the wine experience of tourists on their study conducted at one of the South Africa's largest wine routes, the Robertson Wine Route. In the research, results showed that amenities was the most influential factor while the qualities of the route was the least. Therefore, the results of the research studies which focussed on wine experience are changeable that the experience of visitors differ from region to region

Little research has been conducted on wine tourism in Turkey. Therefore, it makes this paper significant in terms of the contribution to the wine literature. Results provide valuable insights for the owners of the wineries and the local authorities to create satisfactory wine experiences and to develop and market the wine route more effectively.

This paper aims to determine the factors affecting the wine experience of tourists visiting Urla Vineyard (Wine) Route. Urla Vineyard Route is located in the Aegean Region which has been a major producer of wine for thousands of years, currently producing more than 50% of Turkish wines. It lies the city of Urla which is far from an hour drive from İzmir.

Wine producers of Urla developed the Urla Vineyard Route in order to promote Turkish wines and to sustain the old tradition of wine making of Anatolia. Seven vineyard owners, consisting of Urla Winery, MMG Winery, Mozaik, Urlice, USCA, Limantepe and Urla Vineyard, united their efforts under the umbrella of Urla Viticulture and Wine Producers Association in 2015. With the Urla Vineyard Route, the owners of the vineyards aim to make the region an important destination for wine tourism, such as the cities of Bordeaux and Tuscany.

The wineries in this route are chateau-type local wineries. Urla's wineries have been carrying on a wine tradition with its indigenous grapes such as Bornova Misketi, Sultaniye, Boğazkere, Foça Karası, Gaydura, and the ancient Urla Karası considered as a lost grape variety and brought back from extinction. Also wines are produced from international grapes like Cabernet Sauvignon, Sauvignon Blanc, Merlot, Shiraz, Chardonnay, Sangiovese, Nero d'Avola. In addition to wine tasting, the route offers many trekking and bicycling opportunities, horse riding activities, accommodation facilities in boutique hotels where people can experience the local culture and savoring meals at gourmet restaurants. Also, people can enjoy 20 different 'olive-paths', created by the municipality of Izmir to stimulate cycling and hiking tours in the area.

In order to determine the factors influencing wine experiences, the reviews of tourists on Tripadvisor were examined. Between the years of 2016 and 2022, there were 478 reviews (mostly reviews of the Turkish visitors) about the wineries, accommodation facilities, restaurants, and the wine route. However, 361 reviews were considered as some of them were irrelevant to the subject. In this study, a quantitative approach was adopted and Maxqda Analytics Pro 2020 program was used to analyze the data.

The first phase was started to transfer the reviews to a word document. Then all reviews in the text read by authors. Considering the text and the literature, a code scheme was determined. Then, using these codes, first categories then the main themes were determined by grouping the meaningful and related categories.

For the reliability of the research, the data set was encoded by three different researchers which are experts on gastronomy and wine. Codes obtained from other researchers were combined using the project merge tab in the Maxqda program. Then, reliability and validity analysis were carried out through the consensus tab between encoders. After the agreement on the codes, sub-themes and main themes were created.

The results revealed eight factors influencing the wine experience of visitors. These are ambiance and atmosphere, the behaviours of staff and knowledge about wine, taste of food, wine tasting, wines produced from local grapes, price of wine, wine produced from international grapes, and boutique winery. Frequencies of the factors and main themes affecting wine experience are shown in Figure 1 and Figure 2.

The most important factor affecting the wine experience is (1) the ambiance and the atmosphere of the winery and the region followed by (2) the behaviours of staff and their knowledge about wine, and (3) taste of food offered at the winery and the restaurants. Results show that the nature, the scenery of the vineyards, and the ambiance of the wineries affect the wine experience of the visitors. However, courtesy and helpful behaviours of winery staff, their knowledge about grapes, wine, its taste, and production process etc. are other influential factors. Visitors give emphasis to the food and dishes, their taste, and service quality which are served at restaurants located in the wineries and also food (snacks, cheese, etc.) offered during the wine tasting activity.

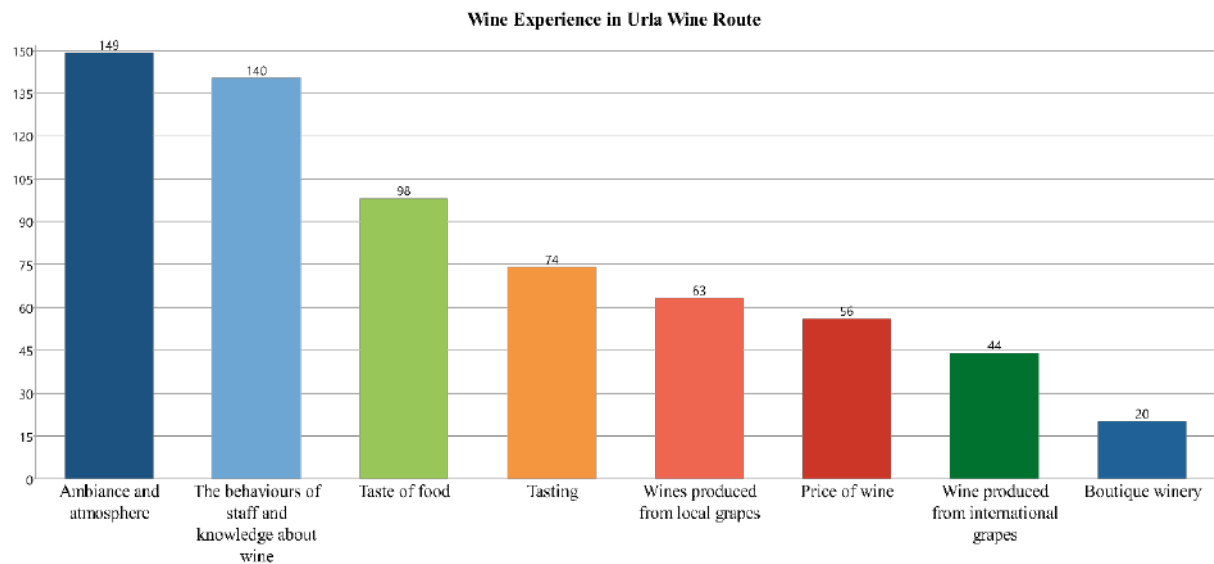


Figure 1: Frequency of factors

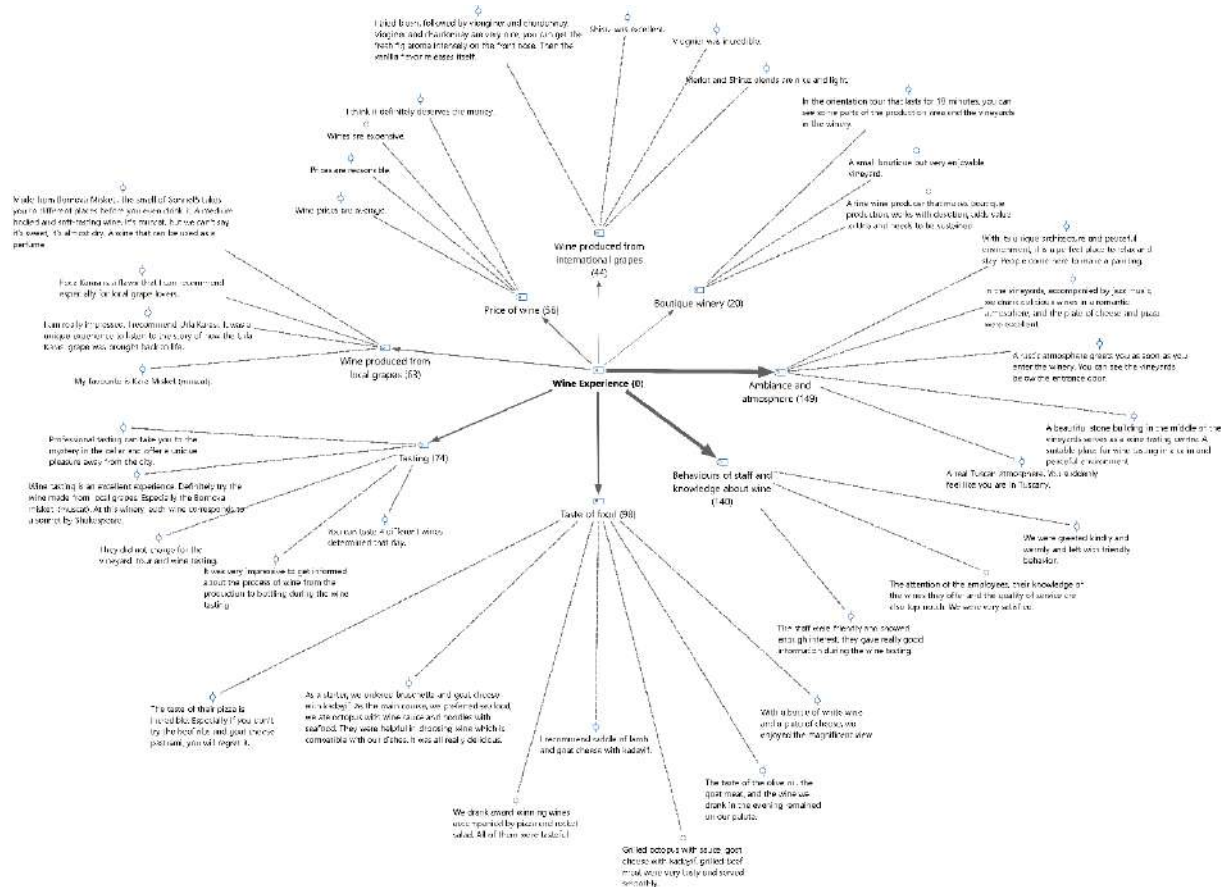


Figure 2: Main themes affecting wine experience

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## Issues at stake when monitoring wine tourism activities' economic performance

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**Introduction** – Economic performance is a multidimensional concept that includes tangible economic indicators such as financials indicators and productivity factors, but also conveys human, social, cultural and environmental aspects (Agarwal et al., 2019; Jradi et al., 2019). Sustainability is a recent issue but it is increasingly relevant for wine business' value creation (Ouvrard et al., 2020). Assessing wine tourism performance is neither streamlined nor straightforward, and wine tourism research lacks economic studies (Anđelić et al., 2019). Financial projections are often insufficient to reach the best decision when observing a winery's economic performance. A large amount of soft information must be included in order to get a better picture of the strategy decision process. This issue is notably raised by Agarwal and Hauswald, (2010a) in financial research on small and mediums enterprises (SMEs). As a result, one could wonder how including this type of qualitative and subjective information contributes to the correct evaluation and management of wineries' performance for entrepreneurs and their financial stakeholders. Drawing a detailed and coherent picture of a wine company's economic performance and taking wine tourism projects into account to assess performance presents serious challenges for wineries. Strong studies such as Tafel & Szolnoki's, (2020) define the impact of wine tourism in a regional approach, however no microeconomic model at the winery's level has been designed yet. This research thus introduces a performance assessment model that includes subjective information such as the uniqueness of the site, the quality of the wine tourism experience, the workload division between production and wine tourism activity, the winery development's sustainability (Lamoureux et al., 2022), as well as profitability indicators. All of these make monitoring of the wine tourism project easier for the winery managers and facilitate negotiation with their financial stakeholders.

**Need Statement and Purpose** – Nowadays, the winery manager position surpasses the agricultural function of wine production and requires a versatile set of skills in entrepreneurship, ranging from decision-making, strategy development and diversification strategy. The development of wine tourism activities by a wine estate certainly relies on the wine production tool (Hall et al., 2000), but it could also be considered as a service as it goes beyond merely offering wine tasting by including venues (Altschwager et al., 2017), hospitality services, and leisure (spa, sports, walks). Wineries' business is currently turning into servitization. The concept of servitization of business arose in the 80's and is defined as follows: "*adding value to [...] core corporate offerings through services*" (Vandermerwe & Rada, 1988). Consequently, this segment of the wine sector should also apply servitization business models. The quality of the relationship between winery owners or managers and their loan officer would subsequently be impacted by this entrepreneurial approach. The loan officer would have to adapt to this shift in the wine company, and get acquainted with entrepreneurship's risks. This paper explores how the development of wine tourism activities could enhance the economic performance of a winery, including their sustainability issues and social responsibility, for instance the wine industry employs 600 000 people in France. This work contributes to our understanding of wine tourism's

impact on wineries' performance and the ongoing economic discussion around how to assess such an impact (Tafel & Szolnoki, 2020).

**Conceptual background** – Few models that include the CSR dimensions in the financial indicators have been developed and are currently in use. Among them are Agarwal et al.'s, (2009) which applies to rural areas, Migliaccio & Tucci's, (2019) focusing on wineries' economic situation, and the recent microeconomic study by Faria et al., (2020). One could argue that agricultural models are not adapted to wineries that offer wine tourism experiences and should actually be replaced by service economic performance model. The latter implies value creation indicators that depend on the business model and the market orientation (Maydeu-Olivares & Lado, 2003).

Lastly, relevance of the data and reliability of the indicators is often a disputed issue. The capacity to collect replicable accounting data that could be complemented with specific, hard to replicate soft information (Agarwal & Hauswald, 2010b) about the winery's management and its tourism activity is an important issue to consider when gathering and organizing information.

**Design/methodology/approach** – In a mixed-method approach, we have interviewed loan officers who specialize in the wine sector in the *Nouvelle Aquitaine* region (20 loan officers, 4 different banks, for an average of 45 minutes discussion per interview), in order to identify key indicators and financial ratios considered to have the most weight on a company's economic performance. On the basis of the analysis of these transcripts, we have built a performance model that includes accounting information (Remeňová et al., 2019) as well as qualitative information concerning their opinion on their clients' wine tourism projects. We are planning to build a quantitative database at a later stage to verify this model, and determine success factors for wine tourism projects.

**Findings** – The differences between the importance given to key indicators by wine companies developing tourism activities and by the financial stakeholders who assess profitability of their wine tourism activities are observed and the analysis will be presented at the conference.

**Practical implications** – As Lamoureux et al. (2022) pointed out, a flourishing wine tourism business benefits to all the winery's stakeholders from the winery business' owner to regional attractiveness. Banks and investors are directly concerned by the assessment of economic performance in order to grant loans and contribute to the sustainable development of the wine sector of their region. The current research enhances the existing understanding of the performance indicators and how they are interpreted by different stakeholders. Finding a middle ground between small independent wineries and their loan officers could directly affect the quality of wine tourism development and its economic impact for the wine region. In conclusion, being able to monitor and optimize wine tourism activities' profitability and economic performance could make a colossal difference for resource optimization and business sustainability.

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# Territorial and Demographic Implications of the Viti-vinicultural Economy in Europe: The Case of Castilla-La Mancha (Spain)

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**Keywords:** Depopulation, wine sector, Castilla-La Mancha, Robust Error model

Depopulation poses a demographic challenge in many regions of Spain, particularly in those of a more rural character. This phenomenon is not contemporary, but rather the result of a historical process initiated in the 1950s and 60s of the last century, when the modernization of agriculture caused the loss of many jobs and the rural exodus to cities. Currently, the agricultural active population in the Spanish countryside is only 5%.

However, depopulation is not an exclusive phenomenon of Spain, as it is evidenced in other countries such as Poland, Russia, Japan, the United States, Italy, Germany or Greece (Johnson et al., 2015; García and Espejo, 2019; Camarero and Sampedro, 2019; Surchev, 2010; Rajovic and Bulatovic, 2013; Haub and Toshiko, 2014). Therefore, the depopulation of rural areas has become one of the great concerns of public administrations. In the European Union, various initiatives have been launched to revitalize the rural environment and face this problem within the framework of a sustainable rural policy with LEADER methodology. These initiatives seek to alleviate the effects of rural depopulation and contribute to the development of territories, promoting the creation of employment, improving quality of life, and the sustainable use of natural resources.

Spanish public institutions have demonstrated, as well, their concern for this phenomenon by taking measures such as the creation of a Commissioner for the Demographic Challenge and a National Strategy against the Demographic Challenge. These actions have also been extended at the regional level, such as in the case of Castilla-La Mancha, where a commissioner has been created to address the situation in rural municipalities and Law 2/2021 has been approved to confront depopulation and improve the development of the rural environment in the region, as well as the establishment of priority areas for Integrated Territorial Investment (ITI).

Depopulation in Spain is caused by various factors, such as negative vegetative growth (Gómez-Limón et al., 2007), population aging (Camarero, 2020), and migratory movements (Rees et al., 2017). The latter no longer respond to a specific agglomeration phenomenon (Rodríguez-Pose, 2018), but are more complex, including transfers from rural municipalities to others with the same characteristics and transfers from smaller nuclei to the county seat, due to factors such as the globalization of mobility, the delocalization of production and residence, the increasing separation between the workplace and the place of residence, and the progressive integration into the international economy, this has favored the formation of hybrid territories in which the articulation between the rural and the urban emerges as a key factor of social transformation (Sanz and Martínez, 2019). In Southern Europe, the wine sector has an important social, economic, and environmental value, and above all has been consolidated in recent decades as an instrument that articulates the rural territory. On the one hand, it brings and fixes the population to the rural environment, enabling small municipalities to survive and fight against depopulation.

On the other hand, it increases the business and employment opportunities of the wine value chain, from the production of wines in wineries located in areas close to the vineyards, or from other activities such as the wine-tourism that involves these same companies together with hospitality, restoration, and tourist services. In short, employment, income, business presence, or environmental sustainability will be key variables in the territories of its demarcation and, therefore, concentration and maintenance of population in the rural environment.

In this context, we propose the following hypothesis: the development of agricultural activity centered on woody crops, mainly vineyards, which generate high economic, social, and environmental yields in the region of Castilla-La Mancha (Spain), can be configured as effective tools to curb the loss of population of some municipalities of the region, enabling the creation of jobs and the articulation of the territory.

To confirm this hypothesis, and to ultimately reveal the social importance of the wine sector, an

$$Y_i = \sum_{k=0}^h \beta_k X_{ki} + u_i$$

Eicker-White Standard Error or Robust Error model will be proposed,

where the random disturbance  $u_i$ , follows a normal distribution of zero mean,  $E(u_i)=0$  and

the variance of the error is not constant,  $Var(u_i) = \sigma_i^2$ , es decir,  $u_i \sim N(0, \sigma_i^2)$

. With this model, from asymptotic results, confidence intervals will be obtained and hypotheses

$$\sigma_i^2 = E \left( \frac{\sum_i x_i^2 \sigma_i^2}{\left( \sum_i x_i^2 \right)^2} \right)$$

will be tested, using the estimation proposal for errors of Eicker-White. As an endogenous variable, a Geographic Population Concentration Index (Y) of the smallest municipalities (i) of a region (on average of less than 5,000 inhabitants); and as exogenous variables (X) the viticultural, social, economic, and environmental characteristics of those municipalities will be introduced. The case study will be focused on Castilla-La Mancha (Spain), a region in the south of Europe that mixes the interior and Mediterranean combination, an eminently rural territory, with the largest vineyard and the highest wine production among the regions of the world and with a determining correlation of the double presence of wine and population, as well as areas at high risk of depopulation where the vineyard does not exist or is testimonial.



# Parallel session

## **XIV-** Regulation & History

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## A methodological investigation of the literature on moderate alcohol consumption

*Stefano Castriota (University of Pisa), Paolo Frumento (University of Pisa), Francesco Suppressa (University of Siena)*

Alcohol abuse is one of the leading causes of death, especially among male and younger consumers. According to the World Health Organization, more than 200 health conditions are connected to harmful alcohol use, ranging from liver and cardiovascular diseases, road injuries and violence, to cancers, suicides, tuberculosis and sexually transmitted diseases.

While excessive alcohol consumption has indisputable negative consequences, the effect of moderate alcohol consumption is less clear. For long time a consistent body of literature has shown the positive or null effect of moderate consumption. In most observational studies the association between alcohol use and health was U or J shaped, and moderate alcohol use (that is, 1-2 drinks per day) was found to have a mild negative or possibly null association with cardiovascular diseases and diabetes. This belief was so rooted in the academic community that, in the Dietary Guidelines for Americans 2010 provided by the U.S. Government, the health advice was that moderate alcohol use is protective against the aforementioned diseases and reduces all-cause mortality.

However, in the last decade this consensus has gradually weakened. A series of scientific studies started to claim that there is no safe level of alcohol intake. Subsequently, prestigious newspaper - e.g. the New York Times in 2018 and 2023 - quickly republished this information, adopting this new point of view. The same dynamic has also pervaded the institutions responsible for public health and policy. For instance, the Dietary Guidelines for Americans 2015 do not claim beneficial effects of moderate consumption anymore and do not recommend that people start drinking for any reason. Further, in September 2022 the WHO Regional Office for Europe approved the “European framework for action on alcohol 2022-2025”. According to this document, the WHO suggests reducing per capita alcohol consumption by 2025 (from a 2010 baseline) by ten percentage points. Concretely, they suggest that European governments undertake actions such as increasing taxes, implementing minimum pricing policies, increasing minimum age restrictions, introducing total bans in and around sporting and cultural events, limiting content and frequency of commercial communications, and so forth.

The WHO strategy appears to be well-defined; according to it, there is no safe level of alcohol intake, and there is no distinction among typologies of alcoholic beverages (e.g. spirits and wines should be subjected to the same restrictions). This approach seems to be at odds with the previous WHO’s strategy, which mainly focused on reducing the harmful level of consumption. The approach is also distant from the Cancer Plan approved by the European Parliament in February 2022 focused on tackling excessive – rather than average – consumption. This shows that even among institutions there is no consensus on the effects of moderate alcohol intake. Assuming that European countries implemented the policies proposed by the WHO, a 10% reduction in alcohol

consumption would cause company bankruptcies, job losses and damage to tourism. The alcoholic beverage industry includes producers, distributors, sellers, hospitality providers such as hotels, and has a relevant role in the economy.

In front of clear scientific evidence on serious health issues arising from moderate alcohol consumption the economic consequences could eventually take second place. However, it appears there is not scientific consensus on this topic. The problem arises because in alcohol (and food and drugs) studies it is not possible to carry on long-term randomized controlled trials because of both ethical and practical reasons. Indeed, the literature on the long-term effects of alcohol on health relies on observational studies where a large share of articles shows at least one of the following statistical and methodological flaws: publication bias, omitted variable bias, inclusion of former drinkers in the teetotalers' group ('sick-quitter hypothesis'), poor recall of past alcohol consumption and underestimation of the real alcohol intake, nondistinction for ethnicity, inappropriate use of linear models in place of non-linear models. Nowadays, one of the best methods to remedy some of these problems is to carry out the Mendelian Randomization study. This methodology provides an alternative approach similar to Instrumental Variables to establish the causal role of moderate alcohol consumption in a suitable population where a genetic variant affects alcohol metabolism and thereby alcohol use (see van de Luitgaarden et al. 2022). However, also this approach is not immune to other sources of bias, such as omitted variable bias and underestimation of real alcohol intake.

In this work, in the first section we explore all the aforementioned sources of bias. In the last section, we open a discussion on the measures proposed by the WHO. Without clear statistical evidence of the damages caused by moderate alcohol consumption on health, the WHO strategy could be detrimental. If the overall impact of moderate alcohol consumption on mental and physical health were null or even positive, then the focus of policymakers should be on tackling alcohol abuse. Even assuming that moderate alcohol consumption had a mild negative effect on health, it is striking that the medical literature considers exclusively the statistical significance of the parameters of alcohol intake, irrespective of the magnitude of its effects. A key variable to understand the supposed negative consequences of moderate consumption – and on which we know nothing so far – is how shorter life expectancy eventually becomes and/or what share of the aforementioned 3 million deaths is directly attributable to this kind of consumption versus non-moderate behaviour and abuse.

# Innovation and European Wine Regulation

*Tilman Reinhardt (University of Bayreuth), Yasmine Ambrogio (University of Bayreuth), Laura Springer (University of Bayreuth)*

The global wine sector is characterized by constant innovation on all levels of the value chain: from viticulture and oenology to marketing and distribution. Innovation is a key factor for the sector's economic strength and future growth (Riou and Lempereur, 2015). It is also critical for dealing with the significant sustainability challenges of wine production (Mailly et al., 2017; Ponstein et al., 2018), such as high pesticide use and GHG emissions or health related issues.

Regulation is a critical factor for the development and diffusion of innovation. It is especially important in "mission-oriented" (Hekkert et al., 2020) or "eco" innovation systems (Greenacre et al., 2012) in the context of sustainability transformations, which are characterized by strong directionality and high urgency (Cecere et al., 2014). At the same time, new technologies can pose significant challenges for legislators, and might in certain cases even require a complete "reinvention" of the existing regulatory framework (Cortez, 2014).

In our contribution, we seek to assess the "innovativeness" of European wine regulation in the light of the sector's current challenges.

At the outset, EU wine regulation, i.e. the Common Market Organization Regulation (EU) 1308/2013 and its delegated and implementing acts, do not explicitly consider innovation as a regulatory objective. To the contrary, the regulations' focus lies on the preservation of wine quality and authenticity, especially through the protection of Geographical Indications (GIs), which are considered essential for promoting economic value. To protect GIs, wine regulation covers almost all aspects from the vineyard to the glass, including for example mandatory schemes of authorizations for vine plantings, national vineyard registers, accompanying documents and certification for all transports of wine and grape must in the EU, inward and outward registers as well as compulsory stock and harvest declarations at the producer level (cf. Reg. (EU) 2018/273) as well as an EU-wide isotopic database (cf. Implementing Reg. (EU) 2021/1007). In line with the standards set by the Organisation Internationale de la Vigne et du Vin (OIV), the Delegated Regulation (EU) 2019/934 also concerns almost every aspect of wine production, i.e. ingredients, additives, enrichment and the specific oenological practices.

To investigate how this dense regulatory framework accommodates innovations on different levels of the value chain, we focus on three major innovations that have been the subject of the most recent changes to the EU framework in Regulation (EU) 2021/2117. These innovations concern different levels of the value chain, namely:

- Innovative practices in viticulture, especially fungus-resistant grape varieties
- Innovative oenological practices, especially de-alcoholized wines
- Innovative packaging, especially digital labelling

As an analytical lens, we employ the Technological Innovation Systems (TIS)-framework proposed by Bergek et al., 2008. This framework can be considered the workhorse model of innovation system analysis in the context of sustainability transformations (Köhler et al., 2019). Building on evolutionary economics it emphasizes the non-linearity of the innovation process and the co-evolution of knowledge, organizational structures and institutions (Greenacre et al., 2012). It has seen broad application in the areas of renewable energy and health technology but has also been used to analyze agricultural technologies (Reinhardt, 2022). At its core, the TIS-framework proposes a systematic analysis of the “functional dynamics” of an innovation system, i.e. seven processes that are seen as essential for the system’s performance: Knowledge development and diffusion, guidance of search, entrepreneurial experimentation, market formation, legitimation, resource mobilization and development of positive externalities. These functional dynamics are affected by technological properties of a given innovation, but also social and other context factors, including regulation.

In our analysis, we combine a detailed regulatory analysis for the different innovations and EU wine law with stakeholder assessment through expert interviews (regulators and producers).

Our findings suggest a mixed picture. Obviously, the dense and complex regulation with its focus on preservation rather than flexibility presents many obstacles to innovation by limiting entrepreneurial experimentation, market formation and resource mobilization for new technologies and products. Very often, there is a necessity to actively adapt regulations at different levels (OIV, EU, national law as well as individual GI product specifications) even for minor technical advances. In some cases, however, the dense regulation also appears to benefit innovation, especially by reducing uncertainty and providing legitimation in the eyes of producers and consumers. It thus can also positively affect the formation of markets for innovative products. The integrated governance especially at OIV level also enables a rapid dissemination of ideas. In some cases, the high specificity of wine law allows for the active development of new niches, such as digital labelling, which can even provide positive externalities for other sectors.

Our analysis concludes with policy recommendations: Clear principles, greater transparency and streamlined procedures should guide the process of allowing new viticultural and oenological practices. Existing experimental clauses should be used more proactively. “Regulatory sandboxes” might be created even within the framework of GIs.

On the whole, the regulatory framework needs a reorientation towards sustainability and innovation in line with the ongoing debate on food system transformation (von Braun et al., 2023). If this paradigmatic change is accomplished, however, wine regulation might also provide a good model for a “systemic” framework, that integrates economical, ecological and health concerns and allows for broad stakeholder participation on all regulatory levels.

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# The adoption of fungus-resistance grapevines: an analysis of producers approach in the Italian region of Veneto

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## Keywords

sustainability, viticulture, innovation, PIWI, Veneto, wine

## The adoption of fungus-resistance grapevines: an analysis of producers approach in the Italian region of Veneto

### Background and objectives

The attention to sustainability aspects of viticulture has grown in last years, involving not only consumers but also producers, institutions and policy makers. One evidence, at European level, is given by the reform of Common agricultural policy (CAP) which has introduced some changes geared toward making the viticulture of the future more environmentally friendly.

For example, starting from January 2023, it will be possible to identify as DO also wine “*obtained from vine varieties belonging a cross between the Vitis Vinifera species and other species of the genus Vitis*” (Reg. 2021/2117). Considering that fungus-resistant vines (FRV) obtained through hybridization programs exists, this policy change will be very significant for DO wine producers. These varieties, also known as PIWI<sup>3</sup>, in fact have resistance genes from American or Asian species, which confer lower susceptibility to the most common fungal pathogens, making them a sustainable innovation for the wine sector.

The current climate change scenario in fact is even more negatively affecting the viticulture and the sustainability of the entire national and international wine supply chain (Ashenfelter and Storchmann, 2016; Santos et al., 2020). For these reasons, it is necessary to adopt innovative strategies to deal with the effects of climate change, in a sustainable way. In this regard, the new CAP introduces and encourages the possibility to conduct a more sustainable viticulture, through the use of FRVs which allow the reduction of the use of chemicals for treatments, that as known, when overused may have negative environmental and social impacts (Fouillet et al., 2022; Tsakirakis et al., 2014).

Although there is not much information regarding the spread of these varieties in Europe, some authors have pointed out that while a significant number of farms adopt these varieties, the area under vines involved is very limited (Finger et al., 2022).

Despite the effective tolerance of these varieties to powdery mildew and downy mildew, (Pedneault and Provost, 2016) and although there seems to be consumer interest for wines produced by fungus-resistance varieties (Vecchio et al., 2022), the winegrowers still appear rather reluctant to their cultivation. The adoption of this innovation is in fact obviously not

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<sup>3</sup> German for “*pilzwiderstandfähig*,” meaning “fungus-resistant vines”

without obstacles (Montaigne et al., 2016), especially because involves a radical change in winegrowing farm production, as it requires replacing old varieties with fungus resistant ones.

Given the importance of this varieties as innovation to conduct a more sustainable viticulture, this study aims to investigate the ways and approaches by which the use of these varieties is spreading among early adopters, investigating the population of PIWI wineries from Veneto, which is the region with the highest percentage of area planted with resistant varieties in Italy. This region, located in the North-East of Italy, is also relevant because is the second Italian region with the highest area under vines, that for 2022 was equal to 97.495 ha (ISTAT, 2022) and is famous in world for the production of sparkling wines such as *Conegliano Valdobbiadene Prosecco DOCG and Prosecco DOC*, and also high-quality red wines such as *Amarone della Valpolicella*.

## Data

The research has been conducted analyzing data provided by AVEPA, the venetian payments agency, about declarations of area planted with fungus-resistant varieties. In addition, data about PIWI wines producers and wines has been collected from the official websites of the PIWI Veneto association (<https://www.piwiveneto.it/aziende-vinicole-piwi/>), wineries websites, through phone interviews with wineries from October to December 2022, and face to face interviews with key informant. Face-to-face interview will be conducted to collect information about possible problems related to PIWI wines production and market, that wineries are experiencing.

## Results

The analysis of data has shown that Veneto is the main producer of Italy of PIWI grapes, with an area under vines with fungus-resistance varieties around 526 ha (less than 0,6% of the total area under vines). Although the surface is very limited, it has grown a lot in the recent years, recording an increase of more than 500% compared to 2018. The vineyards are located mostly in the provinces of Treviso and Verona, which are also the provinces with the largest area under vines of Veneto. Generally, the extension of vineyards is very limited in term of size, which almost always is less than one hectare, and it is very common to find rows of fungus-resistant varieties in the midst of *Vitis Vinifera* vineyards.

37 are the varieties registered as PIWI in the Italian national register of vine varieties, but among these, only 24 are authorized for the cultivation in Veneto, 13 of which are white varieties and 11 are red varieties.

Data analyzed shows that around 61% of the total area under vines with PIWI is cultivated with white grapes. Among these the most cultivated, in descending order, are Sauvignier Gris B., Bronner B., Solaris B., Johanniter B. and Sauvignon Rytos B.. The remaining 39% is represented by red grapes, especially Merlot Khorus N., Cabernet Volos N. and Cabernet Cortis N..

The use of resistant varieties has an impact on vineyard management and production costs. However, it is not possible to homogeneously define whether this type of vine variety can have only positive and/or negative repercussions for the winegrower. It is indeed very important to consider species-specific aspects of the vine, such as vigour, earliness or production capacity (yield/hectare). Interviews with key informant in fact has highlighted the choice of these varieties

must be considered with regard to the context in which they will be planted and with regard to the intended use.

Regarding the production of wines, data show that there are just over 60 wineries that claim to produce wines made from FRVs. When looking at the total number of wine types produced per winery, there are about 14 wineries producing less than 10% of wine types with resistant varieties. Around 19 wineries produce a number of types of PIWI wines between 10% and 29% of the total number of wines, while only 4 wineries produce between 30% and 49%. In the end, 4 wineries produce a number of PIWI wines between 50% and 99% of the total types of wine produced and 23 wineries produce only wine from FRVs.

In addition, about 36% of wineries declares to conduct environmentally friendly production of wines, guaranteed by certifications such as organic, biodynamic, or integrated production (SQNPI).

Among the wines produced by the wineries, about 67% are made from a single FRV, 26% are the result of blending two or more FRVs, and only 7% are made from FRVs and *Vitis Vinifera* grapes.

Another data of great interest is related to the price positioning of these wines, which compared to the average price of the labels sold within the same company, are in most cases in the medium-high position.

## Conclusion

The analysis of data shows a reasonable interest from Veneto winegrowers about FRVs. Although, in fact, the area planted with these varieties is still limited, the number of farms using FRVs is already quite significant.

This, of course, can be related to the uncertainty associated with the adoption of innovation and also to the Italian policy framework that currently does not allow the use of these varieties in DO wines (L. 238/2016), which thus results in a cautious attitude by producers.

Considering the importance and the great potential of FRVs as innovations that enable more sustainable viticulture, the area under FR vines and the number of farms involved may increase when new varieties, including once with more resistance, and more information about cultivation, defense and winemaking techniques will be available.

Future face-to-face interviews will clarify the current economic performance of Veneto Piwi wines and the difficulties faced by producers, outlining a picture of what may be the future growth perspective in the market of these wines.

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# Wine and first wave globalisation: a case study in reception

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**Keywords:** globalisation, wine, United Kingdom

## Abstract

Recent work (eg Anderson and Pinilla, 2022) has shown that ‘the share of the global wine market that was exported was no higher at the end of the first globalization wave than it was in 1860, at just 5%’.<sup>4</sup> By comparison with other product categories wine was much less affected by the first wave of globalisation. However, the recent work in this area has focused on producer countries. This paper will present a case study of reception by focusing on the British market between approximately 1840 and 1900.

The paper uses British wine books, newspapers and magazines in conjunction with import data, sales figures drawn primarily from the extensive archive of W. & A Gilbey, the dominant distributors of wine and spirits in the UK in the 19<sup>th</sup> century, and contemporary price lists to show how and to what extent first wave globalisation changed British consumption patterns.

As the 16<sup>th</sup>- and 17<sup>th</sup>-century diaries of Samuel Pepys and John Hervey confirm Britain had long been a major market for what Ayuda *et al* term ‘high end bottled wines’, but throughout the first wave of globalisation until the outbreak of the First World War, Britain accounted for less than 1% of world wine consumption.<sup>5</sup>

The Cobden-Chevalier Treaty between England and France in 1860, hailed then and since as a major impulse to European free trade, set in motion a series of duty reductions and licensing changes designed to make ‘light’ (i.e. unfortified) wine a major British beverage. The stated aim of William Gladstone, the Chancellor of the Exchequer, was to change the long-established British preference for the fortified wines of the Iberian Peninsula. To an extent he succeeded. Wine became an important component in middle-class sociability. Imports of French wine rose some 600% in the decade after 1860 and French claret became a staple ‘dinner wine’.<sup>6</sup> The wines from Hungary in particular, Greece and Austria also benefited from increased advertising and increased sales. James Denman, a highly effective promoter of ‘pure’ wines from Hungary and Greece, claimed that in 1867 that ‘few would have dared to prophesy that Mr. Gladstone's liberal commercial policy [...] would have produced so great a change as has since been effected in the habits of the nation’<sup>7</sup>.

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<sup>4</sup> Anderson, K. & Pinilla, V. "Wine's belated globalization, 1845–2025." [In eng]. *Applied economic perspectives and policy* 44, no. 2 (2022): 742-765.

<sup>5</sup> Ayuda, M.-I., Ferrer-Pérez, H. & Pinilla, V. "Explaining World Wine Exports in the First Wave of Globalization, 1848–1938." *Journal Of Wine Economics* 15, no. 3 (2021): 263-283.

<sup>6</sup> Nye, J. V. C. (2007) *War, wine, and taxes: the political economy of Anglo-French trade, 1689-1900*. Princeton and Oxford: Princeton University Press.

<sup>7</sup> Denman, J. L. (1867) *Wine and its Adulterations*. London: J. L. Denman.

In agreeing Denman's contemporaries pointed to factors noted by subsequent historians of globalisation: the importance of tariff reductions, the advantages derived from 'commercial intercommunication', by which they meant development of the European railway networks, and the reduction in powers of such 'powerful class-interests' as the British brewing trade. They espoused the argument that trade lessened the danger of war, claiming with the *Glasgow Herald* in 1860 that 'a volley of champagne corks [is] preferable to the expert shooting achievements of either British Volunteer or French Garde Nationale'.

But were they right in their analysis? John Nye has challenged the view that Britain in the 19<sup>th</sup> century was an ideologically consistent promoter of free trade that ushered in first wave globalisation, arguing instead that reduced tariffs were a mercantilist tool aimed at revenue enhancement. How important was the post-1860 'revolution' brought about by Gladstonian policies? To what extent did it reflect the impact of globalisation and what role did Cobden-Chevalier play?

Firstly, it should be noted that an increase in the range of available wines started before 1860. As early as 1848, Douglas Jerrold's populist *Weekly Newspaper* was running articles on wines from Portugal, Austria, Hungary, Germany, the Americas (Chile and Peru), Greece, Italy, Sicily. Companies such as the 'Foreign Vineyard Association' (1854) or 'Hungarian Vineyard Company' (1857) were active before 1860. In 1869, Alfred Gilbey rightly noted the 'almost infinite' range of wines then available to the British public but his central point was less the availability than the fact that 'wines [...] are generally cheaper in England relatively than in any other part of the world'.<sup>8</sup> Gilbey also referred to the benefits of 'improvements in locomotion and transport but his words were but an echo of remarks made by another trade promoter, James Caird, in *The Times* in 1856. Such remarks indicate an awareness of the potential for globalisation as we now understand it – but they did not drive significant change in the British wine market.

Secondly, the increasing range did not translate into major volume for 'new' wines. The wines of the Cape of Good Hope, having lost the preferential duty advantages conferred on them earlier in the century declined. French wine joined the existing duopoly of Spain and Portugal whilst Hungarian wine was taken up by Gilbey's as part of their core stock. But, in the broader picture, the volume of 'other wines' (i.e. all but those from France, Spain and Portugal) remained static at around 10% of imports.

Non-tariff barriers remained. The patchy advertising for 'new country' wines suggests that importers struggled to find local agents / merchants willing to take stock. *Le Moniteur Viticole*, the French wine trade journal, suggested in 1860-1 that the different commercial and retail infrastructure in England was a major issue. In France, most sales were in cask for home bottling. England lacked the facilities and expertise and, in the view of the French trade press, until there were shops and bars where wine could be bought by the glass or the bottle there was little or no chance of the English lower or lower middle class adopting French drinking habits. Letters exchanged between French producers and their English agents revealed frequent problems with invoicing and payments. Overt racism pervaded comments on wine making quality and practices – particularly in the southern European basin.

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<sup>8</sup> Gilbey, A. (1869) *Treatise on wines and spirits of the principal producing countries*. London: W. & A. Gilbey Ltd.

The British taste did change but far more slowly than Gladstone or his supporters expected. His duty changes boosted wine in general but the principal beneficiaries were – until late in the century – sherry and port plus French wine, notably claret and champagne. As *The Times* put it in 1865: ‘the consumption of "wine" did, indeed, increase, but chiefly of "wine" as previously understood.. [...] People's taste remained fixed on sherry’. ‘Empire wines’ – notably those from South Africa and Australia – began to be important in the inter-war years but the switch to a broader repertoire of wines in the British market was the work of the second wave of globalisation.

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## Emperors as kingmakers: A rare illustration of both instant and lasting Veblen effects

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Veblen described how affluent consumers are motivated by a desire for social status and seek out scarce or unique goods that are in vogue among an aristocratic or economic elite. In Veblen's work and elsewhere, the taste for and expenditure on fine and rare wines is often cited as a classic example of such "aspirational" consumption. Several questions are left hanging in this particular segment of economic behavior: When does a good become conspicuous? How long can reputation effects last? How do they reflect changes in relative income levels (which, in the post-globalization world of fine wine, corresponds to global relative incomes)? We investigate these questions by focusing on a unique "natural" experiment in terms of unexpected and sudden reputation shock, namely the official 1855 Bordeaux wine classification. We test the instantaneous effect of this ranking on the relative prices of goods that suddenly represented ostentation, i.e. Bordeaux first *grands crus* (first growth), and test for potentially lasting effects that have made it a global iconic good for the wealthy, especially in the recent period characterized by the rise of *nouveaux riches* from Russia and Asia.

Specifically, for the 1855 Exposition Universelle de Paris, Emperor Napoleon III requested a classification system for France's best Bordeaux wines that were to be on display for visitors from around the world. Brokers from the wine industry ranked the wines according to a château's reputation and trading price, which at that time was possibly more directly related to quality. The wines were ranked in importance from first to fifth growths. All of the red wines that made it on the list came from the Médoc region except for one: Château Haut-Brion from Graves. The official 1855 classification of Bordeaux wines was born, possibly generating a pure Veblen effect by creating significant price differences between the different *grands crus* compared to their initial price differences (the latter probably reflecting their quality differences). During the 20th century, many wine critics argued that the 1855 classification had become obsolete and did not provide an accurate guide to the quality of wines produced in each estate. Several proposals were made to change the classification, and an unsuccessful attempt at revision was made in 1960. It is therefore interesting to test and quantify the extent to which the reputation of these wines, and the differences between them, have remained entrenched and generate a long-term Veblen effect.

We test this double Veblen effect, the instantaneous 'coronation' effect and the long-term reputation effect, both arising from the 1855 endorsement by experts and an Emperor! We use historical price series from an English broker for the 19<sup>th</sup> and 20<sup>th</sup> centuries. We find that the price surge in 1855 is proportional to the rank of the wine and very significantly larger for the first growth. The global price premium declines during the second half of the century and tends to disappear. It reappears and soars with the globalization of the years 1980-2010, and especially since the early 2000s. This result is not attached to old bottles: we confirm it using recent prices of new wine, i.e. Bordeaux *en primeur* wines, for the more recent period. We measure Veblen



effects using simple regressions of price on growth ranks and wine expert rates to proxy quality. These results are consistent with Veblen's observations that in a leisure economy where basic consumer needs are satisfied, the demand for conspicuous goods increases. When supply is relatively constant, as in the case of Bordeaux wine production, global demand for such a luxury good may be boosted by an increase in the relative wealth of the world's rich, including the rapid influx of *nouveaux riches* from China and Russia in the last stage of globalization. This necessarily results in a rapid increase in the price differential of the very top wines compared to the other exclusive wines, which we document.



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