Determinants of Export Engagement in German Wineries: The Role of Business Strategy and Value Chain Configuration

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Abstract

Purpose – This study examines which firm characteristics, business strategies, value chain (VC) configurations and managerial characteristics are associated with three dimensions of export engagement among German wineries: export propensity, export intensity and export market breadth.

Design/methodology/approach – The study draws on the value chain framework, the resource-based view (RBV) and dynamic capabilities (DC). It analyzes firm-level survey data from 256 German wineries, collected within an international research project. Export propensity is estimated with a logit model, and export intensity and market breadth with ordered probit models. These are complemented by average marginal effects and robustness checks, including models restricted to exporting wineries.

Findings – Business model characteristics, particularly premium and luxury/icon positioning and organic production, are consistently associated with all three export dimensions. In contrast, value chain configuration and managerial characteristics show outcome-specific associations, with different factors relevant for export participation, intensity and geographical breadth.

Practical implications – Winery managers may benefit from aligning internationalization decisions with their strategic positioning, value chain organization and managerial competencies. Policymakers could complement territorial promotion with support for product differentiation and export-related skills.

Originality/value – By jointly examining three export dimensions, the study shows that the factors associated with export entry do not necessarily match those associated with export intensity or geographical reach.

Keywords: Wine Export; Resource-Based View; Value Chain Configuration; Dynamic Capabilities; Germany.

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1. Introduction

Operating in today's competitive environment requires firms to adapt continuously to changing conditions, including by identifying and seizing opportunities beyond national borders. This particularly applies to the wine industry, where exports have consistently increased since the 1990s [1]. With a growing number of market participants, re-exports and rapid technological advancement, wine trade is becoming increasingly complex and more strategically relevant [2]. In 2024, the share of exports relative to total consumption is estimated at 47%. Although total wine exports have

increased and Germany ranks among the top ten countries in international wine trade, exports of domestically produced German wine have declined. At the same time, the industry faces a growing need to identify new markets, while structural changes and technological advances are reshaping the global wine value chain. Against this backdrop, Germany presents an interesting case. On the one hand, German wines have gained international relevance, particularly in white wine production and global market presence [3,4,5]. On the other hand, despite a large increase in total export volume (including re-exports) between 1990 and 2019 (from 400,000 hl to 2.8 million hl), the export volume of domestically produced (excluding re-exports) wines declined from 1.97 million hl to 1.04 million hl over the same period [6]. Today, Germany is the world's largest wine importer in terms of volume (ranked 1st in 2024 and 2023) [7]. It is the 7th largest wine exporter worldwide in terms of volume (3.1 mhl) and 8th in terms of value (1 billion €) with a re-export rate of 16.3% [8]. With low average export prices pointing to a limited focus on premium exports [8], local consumption decreasing and wine producers suffering from full cellars and decreasing prices, it is critical to investigate the underlying factors for German wine producers' export behavior.

Within the thematic complexity, one aspect is the wineries' heterogeneous ability to control and reconfigure specific stages of the value chain (VC). This includes transformations of technologies and marketing practices, and the distinct value chain logics and business models characterizing Old World and New World producers. Value chain reconfiguration may itself emerge as a response to increasing market internationalization. In this sense, export is important as both a driver and an outcome of value chain reconfiguration processes [1,9,10].

Recent technological advances for wine production and promotion leading to new business models and value chain reconfiguration raise questions regarding how wineries plan and manage their value chains, including managerial and strategy adaptation to gain access to international markets. Export behavior is commonly investigated through two dimensions: export propensity, the likelihood that a firm engages in export activities, and export intensity, measuring the share of total production volume that is exported. To further refine the analysis, this paper additionally considers export market breadth as a complementary dimension of firms' international engagement.

The contribution of this study lies in jointly examining these factors across three dimensions of observed export activity in the German wine sector: export propensity, export intensity, and export market breadth. In particular, the analysis combines measures of value-chain configuration and change with business and managerial characteristics, while export market breadth extends the assessment to the geographical breadth of wineries' international engagement.

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It is structured as follows: Section 2 presents the theoretical background, followed by methodology and results in Sections 3 and 4, Section 5 discusses the findings, concluding with managerial and policy implications in Section 6.

2. Literature Review

Although export and international competitiveness are recurring themes in wine economics research, firm-level evidence remains relatively fragmented across different determinants and dimensions of export performance and engagement. This study focuses on the firm level and adopts perspectives from the value chain framework (VC), resource-based view (RBV), and dynamic capabilities (DC) for a holistic intraorganizational view to interpret export engagement in the wine sector.

Porter [11,12] competitive strategy and value chain frameworks provide a basis for understanding how firms pursue cost advantages and differentiation through the organization of their activities. The value chain framework, in particular, examines how primary and support activities contribute to value creation and competitive positioning. In the wine industry, these strategic choices are further shaped by sector-specific characteristics, including territorial embeddedness and relationships among actors along the value chain [13,14]. From this perspective, wineries' export engagement may be associated with how they configure their activities, allocate resources, and pursue differentiation or cost-oriented strategies. However, export participation alone does not necessarily indicate superior economic performance or competitive advantage.

The RBV complements this perspective by explaining heterogeneity in export engagement among firms operating within similar value chains, emphasizing the role of valuable and difficult-to-imitate resources such as reputation, brands, relational assets, and territorial identity [15,16,17,18,19]. However, foreign trade is dynamic and increases competitive pressure, requiring firms to continuously anticipate and respond to changing external conditions by adapting their resource base. This characterizes firms with a high level of dynamic capabilities. Dynamic capabilities are defined as the ability to integrate, build, and reconfigure internal and external competences [20]. From this perspective, such capabilities may be relevant to firms' ability to respond to changing international market conditions. Mybes and Hanf [21] propose that organizations with high degrees of DC cultivate capabilities that enable iterative, adaptive, strategic responses. These capabilities have been identified as key drivers of internationalization and export engagement [22]. This raises the question of how firms that previously have been successfully operating in a more limited context (such as domestic

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wine producers) adopt international activities or how internationalization is integrated in their overall strategy and value chain.

In this study, these theoretical perspectives provide a framework for selecting and interpreting observable firm characteristics rather than direct measures of the underlying theoretical constructs. The VC perspective is reflected in measures of wineries' orientation, differentiation, and changes across operational activities, while the RBV motivates the consideration of firm-specific resources such as human capital and language skills. The DC perspective informs the inclusion of variables capturing changes in operational practices and managerial approaches to change. However, these variables should be interpreted as theoretically motivated proxies: they capture observable practices and orientations potentially associated with adaptive capabilities, rather than direct measures of dynamic capabilities themselves.

Empirical studies have identified numerous factors impacting export propensity and export intensity. The most commonly studied firm characteristics include firm age and size. Other studies also found management characteristics, including individual age, education or experience, internal resources, partnerships or innovation to play a relevant role in the determination of export propensity, intensity and success [23,24,25,26]. Since managerial characteristics can also foster and influence internal dynamic capabilities, an interplay of these factors can be assumed in the development of export activity.

Sustainability practices and organic production may contribute to business model innovation and reputational differentiation [27,28]. Depetris-Chauvin et al. [29] further examine the relationships between managerial characteristics, organic production decisions, and volume- and value-based export performance in the Spanish wine industry.

Wine tourism can strengthen differentiation [30,31]. However, in other contexts, an excessive focus on service-oriented activities is negatively associated with export engagement, suggesting trade-offs in value-chain configuration and resource allocation [32].

Regarding geographical origin as a source of differentiation, Depetris-Chauvin and Fernández-Olmos [26] identify geographical market focus as a factor associated with wineries' export engagement. From a complementary perspective, Ferrer and Villanueva [33] compare winery business models across wine-producing regions characterized by different competitive environments, highlighting how value chain decisions and market strategies vary across contexts.

Moreover, high-exporting firms are those that reorganize their value chain to serve foreign markets, adopting "good exporting practices" and upgrading toward higher value-added functions, both from

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a general [1], and from a country-level perspective [9]. In the case of Germany, on the one hand, German wineries demonstrate substantial innovation activity the whole value chain [34], on the other, Hanf [35] highlights the persistence of a dual wine market structure, which constrains producers' ability to pursue differentiation strategies and underscores the importance of aligning organizational strategy with value-chain positioning.

Overall, innovation plays a fundamental role in exporting: wineries aiming to succeed in international markets may benefit from adopting detailed planning and strategic approaches and human capital [36], especially associated with foreign languages and high-level education [9], and managerial personality traits [26].

Building on previous firm-level studies, this paper contributes by jointly examining business strategy, value-chain configuration and change, and managerial characteristics across three dimensions of observed export activity in German wineries: export propensity, export intensity, and export market breadth. The latter extends the analysis to the geographical breadth of wineries' international engagement. Accordingly, the study addresses the following research question: Which firm characteristics, business strategies, value-chain configurations, and managerial characteristics are associated with export propensity, export intensity, and export market breadth among German wineries?

3. Material and Methods

This study draws on data from a global firm-level questionnaire developed within an international research project coordinated by the Haute Ecole de Gestion de Genève on wineries across 23 countries. The dataset comprises 5,294 complete responses, making it the first large-scale, internationally comparable firm-level database for the wine sector [37].

The German survey was conducted between 27 November 2020 and 31 May 2021. The target population was identified from a list provided by Wines of Germany, covering 2,189 wineries across all German wine-producing regions and cross-checked, where available, against regional winery lists. The survey was administered online through KeySurvey. All wineries were contacted by email at least twice, followed by telephone contact with non-respondents. The study considered wine-producing firms, including cooperatives and large cellars engaged in wine production, while bottlers and merchant firms not involved in production were outside the target population. A total of 264 complete questionnaires were received, corresponding to a response rate of 12.06%. Eight observations were subsequently excluded from the analytical sample due to missing information on

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winery age, resulting in a final sample of 256 wineries. No imputation was performed. Numerical responses were screened for implausible values and, where necessary, respondents were contacted directly to verify the information provided. In 81.06% of completed questionnaires, the respondent was the winery owner. Participation was voluntary and anonymous, and respondents could discontinue participation or opt out of further contact at any time. This sampling approach, based on broad coverage of the target population and geographical representation across wine-producing regions, is consistent with approaches adopted in previous industry-level surveys [38].

The dependent variables capture three complementary dimensions of wineries' internationalization and are reported in Table 1. The export-related questions referred to the winery's average export activity over the previous five years. Export Propensity indicates whether a winery participates in foreign markets, distinguishing exporters from non-exporters, and is measured as a dichotomous variable. Export Intensity measures the extent of international engagement as the percentage of the winery's total production volume that is exported, measured using categories, as illustrated in Table 1. Export Market Breadth captures the geographical scope of wineries' international engagement and is measured by the number of foreign destination countries served by the winery. However, this measure captures geographical breadth only and does not account for the distribution or concentration of export volumes across destination markets.

These three outcomes capture complementary dimensions of wineries' international engagement rather than economic export performance. They do not measure export profitability, productivity gains, or the risk-adjusted economic returns from exporting.

Table 1: Dependent variables description.

Dependent Variables		
Export Propensity	Frequency (n)	Percentage (%)
No	110	43%
Yes	146	57%
Export Intensity		
0%	110	43%
>0% to ≤5%	50	19%
>5% to ≤15%	53	21%
>15% to ≤30%	21	8%
>30% to ≤50%	12	5%
>50% to ≤70%	6	2%
>70% to ≤100%	4	2%
Export Market Breadth		
No countries	110	43%
1-5 countries	95	37%
6-10 countries	27	10%
11-15 countries	12	5%

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>15 countries	12	5%
Total	256	

Independent variables are a multidimensional set of factors considered in explaining wineries' internationalization outcomes. Drawing on literature, Table 2 describes the explanatory variables used in the empirical analysis and illustrates how they are organized into four conceptual blocks reflecting different dimensions of wineries' export behavior. The first block captures Firm Characteristics, including Winery Age, Production Volume, and Region, which describe the structural and contextual features of the winery. In terms of winery location, Germany has 13 separate wine regions. In this study, the regions are clustered in five categories (Baden-Württemberg, Bayern, East Germany, Hessen, and Rheinland-Pfalz), following the division proposed by Tafel and Szolnoki [31]. The second block refers to the Business Model and Strategic Orientation, encompassing variables related to market positioning and revenue structure, such as Price Range, Organic, Other Revenues, and Luxury & Icon Segment. The third block focuses on Value Chain Configuration, including the Value Chain Orientation Score, Value Chain Base/Premium Differentiation, and the Value Chain Stability Score, which reflects how wineries organize, differentiate, and adapt their activities along the value chain. The fourth block captures Managerial and Organizational Aspects, including human capital, University Degrees (n), English Speaker, and managerial attitudes toward decision-making and change, measured through variables such as Planning, Starting, Principles, Ending, and In Retrospective. Descriptive statistics for both dependent and independent variables are reported in Annex 1.

Table 2: Independent variables description.

Group	Variable	Description
Firm Characteristics	Winery Age (years)	Number of years the winery has been active in the market since its establishment (continuous).
	Production Volume (ln)	Natural logarithm of the winery's total wine production volume, originally measured in liters (continuous).
	Region	Geographical region in which the winery is located: Baden-Wuerttemberg, Bavaria, East Germany, Hessia, and Rhineland-Palatine (categorical).
Business Model and Strategic Orientation	Premium Price Range	Price range of the winery's most common retail price segment, distinguishing between Commercial wines (< €10) and Premium wines (€10–€40) (Dummy).
	Organic	Indicates whether the winery engages in certified organic wine production (Dummy).
	Other Revenues (≤10%)	Share of revenues from non-wine activities, coded as 1 when these account for 0–10% of total revenues (including no non-wine revenues) and 0 when they exceed 10% (dummy).
	Luxury & Icon Segment	Indicates whether the winery produces wines positioned in the luxury and/or icon segments (Dummy).
	Value Chain Orientation	Predominant strategic orientation across 27 value chain activities, determined by comparing the frequency of cost- and quality-related motivations. Classified as cost-oriented when cost motivations prevail, quality-oriented when quality motivations prevail, and balanced when

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		frequencies are equal (reference category). Tradition- and regulation-related motivations are excluded from the classification (categorical).
V*alue Chain Configuration*	Base/Premium Differentiation	Indicates whether the winery differentiates its value chain practices between base and premium wines (Dummy).
	Value Chain Stability Score	Proportion of operational practices in the vineyard and cellar stages remaining unchanged over the previous ten years, calculated as the number of unchanged practices divided by 21. Values range from 0 (all 21 practices changed) to 1 (none of the 21 practices changed), with higher values indicating greater value chain stability (continuous).
Managerial and Organizational	University Degrees (n)	Number of employees holding a university degree, measuring the absolute availability of university-educated human capital (continuous).
	English Speaker	Indicates whether the winery staff communicates in English (Dummy).
	Planning	Approach to project implementation, coded as 1 for advance step-by-step planning and 0 for improvisation (dummy).
	Starting	Approach to initiating the best-received change, coded as 1 for an idea subsequently implemented and 0 for trial-and-error or other responses (dummy).
	Principles	Approach to decision-making when introducing change, coded as 1 for applying general principles and 0 for examining situation-specific details (dummy).
	Ending	Approach to project completion, coded as 1 for concluding the project and moving to another and 0 for continuing to make improvements (dummy).
	In Retrospective	Retrospective evaluation of completed projects, coded as 1 for satisfaction with project outcomes and 0 for dissatisfaction (dummy).

The empirical analysis was conducted using Stata 18. Three econometric models were estimated to examine different dimensions of export engagement. First, export propensity was analyzed using a binary logit model, where the dependent variable takes the value 1 if the winery exports and 0 otherwise. Second, export intensity was examined through an ordered probit (*oprobit*) model, with seven ordered categories ranging from 0% exports to more than 70% of total production volume (see Table 1 for all categories). Third, export market breadth was analyzed using an ordered probit model with five ordered categories reflecting the number of export markets (see Table 1 for all categories). All logit and ordered probit models were estimated using robust standard errors (Huber–White sandwich estimator). All models include the same set of firm-level, strategic, and organizational covariates. Variance Inflation Factors (VIFs) are reported in Annex 1. All values fall below conventional thresholds, suggesting that multicollinearity among explanatory variables is not a major concern.

As a robustness check, two additional ordered probit models were estimated on the subsample of 146 exporting wineries to examine export intensity and export market breadth conditional on current export participation. Given the smaller subsample, these models use a parsimonious specification excluding regional controls, for which some categories contain very few exporting wineries. The results are reported in Annex 4. An influence analysis using Pregibon's DBETA was also conducted for the export propensity model. Excluding the five observations with the highest DBETA values broadly preserved the main associations, although some estimates and significance levels changed

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(Annex 5). As an additional robustness check, winery age was log-transformed in all three models. The results remained broadly consistent with the baseline specifications, with no substantive changes in the main findings (Annex 6).

To facilitate the interpretation of the estimated coefficients, average marginal effects (AMEs) were calculated and averaged across the 256 observations in the estimation sample. For the binary logit model, AMEs refer to the predicted probability of being an exporter (outcome = 1), while for the ordered probit models, they refer to the predicted probabilities of exporting more than 70% of production volume in liters (outcome = 6) and exporting to more than 15 countries (outcome = 4), respectively. For binary and categorical explanatory variables, AMEs represent discrete changes in predicted probabilities relative to the reference category, whereas for continuous variables, they represent derivatives. All marginal effects are expressed in percentage points and reported in Annex 3.

4. Results

The results of the three models are presented in Table 3, while detailed coefficients and average marginal effects (AMEs) are reported in Annexes 2 and 3, respectively.

Model 1 – Export Propensity. The model reports a pseudo-R^2 of 0.318. Regarding winery characteristics, age is positively associated with export participation, while East German wineries exhibit a significantly lower probability of exporting relative to the reference region (−33.5 percentage points, pp; $p < 0.01$). Production volume and the remaining regional contrasts are not statistically significant. All four business model variables are positively and significantly associated with export propensity. Premium price positioning (+22.8 pp), organic production (+20.0 pp), other revenues (+13.4 pp), and luxury/icon positioning (+20.7 pp) are associated with higher predicted probabilities of exporting. Regarding value chain configuration, quality orientation exhibits a tentative positive association with export participation relative to balanced orientation (+17.4 pp; $p < 0.10$). Value chain stability is also positively associated with export participation (+16.0 pp; $p < 0.10$), while differentiation between base and premium production practices is associated with a 14.0 pp higher probability of exporting ($p < 0.05$). Among managerial and organizational characteristics, the number of university degrees is tentatively positively associated with export participation (+2.9 pp; $p < 0.10$). Idea-driven change initiation (*Starting*) is positively associated with export propensity (+13.2 pp; $p < 0.05$), whereas *In Retrospective* exhibits a tentative negative association (−15.4 pp; $p < 0.10$). The remaining managerial variables are not statistically significant.

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Model 2 – Export Intensity. The model reports a pseudo-R^2 of 0.184. Winery age is positively associated with export intensity, while regional differences are observed, particularly for Rhineland-Palatinate. Production volume is not statistically significant. All business model variables exhibit positive and statistically significant associations with export intensity. The AMEs for the probability of exporting more than 70% of production indicate increases of 2.4 pp for premium positioning, 2.1 pp for organic production, 0.9 pp for other revenues, and 2.5 pp for luxury/icon positioning. The latter two marginal effects are significant at the 10% level. Regarding value chain configuration, differentiation between base and premium practices exhibits a tentative positive association in the ordered probit estimates ($p < 0.10$), although its AME for the highest export-intensity category is not statistically significant. Neither value chain orientation nor stability exhibits a statistically significant association. Among managerial and organizational characteristics, English-speaking capacity is positively associated with export intensity, with an AME of +1.0 pp ($p < 0.05$) for the highest category. *In Retrospective* exhibits a tentative negative association in the ordered probit estimates ($p < 0.10$), although its corresponding AME is not statistically significant. The remaining managerial variables are not statistically significant.

Model 3 – Export Market Breadth. The model reports a pseudo-R^2 of 0.253. Winery age is positively associated with export market breadth. Production volume exhibits a tentative positive association in the ordered probit estimates ($p = 0.100$), although its AME for the highest category is not statistically significant. Regional differences are also observed, with East Germany negatively associated with the probability of exporting to more than 15 countries and Rhineland-Palatinate positively associated with this probability. All four business model variables are positively and significantly associated with export market breadth. The AMEs for the probability of exporting to more than 15 countries indicate increases of 6.3 pp for premium positioning, 3.0 pp for organic production, 2.3 pp for other revenues, and 6.5 pp for luxury/icon positioning. Regarding value chain configuration, differentiation between base and premium production practices is positively associated with export market breadth, with an AME of +2.0 pp ($p < 0.05$) for the highest category. Value chain orientation and stability are not statistically significant. Among managerial and organizational characteristics, the number of university degrees is positively associated with export market breadth (+0.5 pp; $p < 0.01$). Idea-driven change initiation *Starting* also exhibits a positive association (+2.3 pp; $p < 0.05$). The remaining managerial variables are not statistically significant in the ordered probit estimates.

The conditional estimates for exporting wineries (Annex 4) reveal some differences compared with the full-sample results. Luxury/icon positioning remains positively associated with both export intensity and market breadth, while organic production and premium price positioning are associated with conditional export intensity and market breadth, respectively. Value chain stability exhibits a

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negative association with conditional export intensity, whereas winery age remains positively associated with market breadth. These differences are further discussed in the following section.

Table 3: Overview of statistical results (* $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$). Note: Significance stars refer to the coefficients of the explanatory variables.

	Model 1		Model 2		Model 3	
	Export Propensity		Export Intensity		Export Market Breadth	
Winery Profile	Coef.	p-value	Coef.	p-value	Coef.	p-value
Winery Age (years)	0.003	0.019**	0.002	0.011**	0.002	0.001***
Production Volume (ln)	0.163	0.339	0.034	0.590	0.114	0.100*
Region	YES		YES		YES	
Business Model						
Premium Price Range	1.476	0.010***	0.809	<0.001***	0.956	<0.001***
Organic	1.305	0.002***	0.607	<0.001***	0.448	0.012**
Other Revenues (≤10%)	0.839	0.014**	0.357	0.025**	0.419	0.013**
Luxury & Icon Segment	1.372	0.016**	0.765	<0.001***	0.902	<0.001***
Value Chain Configuration						
Value Chain Orientation						
Cost	1.094	0.147	0.037	0.939	0.057	0.902
Quality	1.139	0.092*	0.122	0.798	0.149	0.742
Base/Premium Differentiation	0.887	0.015**	0.306	0.076*	0.365	0.040**
Value Chain Stability Score	1.039	0.096*	-0.111	0.718	0.365	0.212
Managerial and Organizational						
University Degrees (n)	0.187	0.071*	0.039	0.137	0.082	0.008***
English Speaker	0.529	0.181	0.420	0.021**	0.304	0.121
Planning	-0.005	0.989	0.007	0.960	-0.077	0.621
Starting	0.857	0.013**	0.155	0.296	0.374	0.018**
Principles	0.035	0.917	-0.152	0.317	-0.051	0.747
Ending	-0.016	0.971	-0.051	0.826	0.060	0.801
In Retrospective	-1.051	0.080*	-0.651	0.084*	-0.447	0.175
Pseudo-R^2	0.3175		0.1839		0.2526	
n	256		256		256	

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5. Discussion

The results of the three models provide evidence of associations between winery characteristics and three complementary dimensions of export engagement. Winery age is positively associated with export propensity, export intensity, and export market breadth. Several previous studies have also found a positive effect of winery age on export propensity and intensity, adopting the argument that older firms tend to be more established and have accumulated greater experience, [24,25]. Yet in some studies, winery age was not statistically significant [23] or negative [39].

Winery size, expressed as total produced volume, is significant only for export market breadth, which differs from previous literature. While several authors found a positive effect of winery size on export intensity and propensity [24,26,40], other authors found no significant effect of size [25].

Regional differences are observed across all three dimensions of export engagement. In particular, wineries located in East Germany exhibit a significantly lower likelihood of exporting compared with those in the reference region, while additional significant regional contrasts emerge for export intensity and export market breadth.

Geographical origin may influence consumers' perceptions of wine quality and differentiation, although the relationship between regional reputation and wineries' export engagement cannot be directly established from the present analysis. Previous research highlights the role of wine attributes in product differentiation [41] and the information value of geographical indications [42].

However, these regional differences can also generally point toward the structural differences of the regional clusters, such as size and yield. Internationally renowned wine regions which are historically strong in export, but smaller in size (such as Mosel), cannot be examined in isolation at this aggregated level of analysis.

Results on business models show a clear pattern. Business model characteristics are positively associated with all three dimensions of export engagement, although their estimated marginal effects refer to different outcome probabilities and are therefore not directly comparable in magnitude.

Wineries that focus on the premium segment or the icon and luxury segments are more likely to export and be associated with higher export intensity and more export destinations. These results are consistent with previous studies [25,39], indicating that access to foreign markets is more likely for premium products, including organically produced wine.

Among the business model characteristics examined, organic production and luxury/icon positioning exhibit particularly strong positive associations with export propensity. These findings are consistent

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with previous studies, which indicate that organic production is linked to higher export volume [29], and that there is export potential for German organic wines, despite its structural limitations [28]. A potential explanation for these findings may be that organic wines are particularly sought after in some export destinations, such as Scandinavia, where regulated markets strategically drive availability of organic wine [43].

Regarding value chain configuration, the findings reveal distinct patterns of association across the three dimensions of export engagement. Quality orientation and value chain stability exhibit tentative positive associations with export propensity, while differentiation between base and premium production practices is positively associated with export propensity and market breadth, with a tentative association also emerging for export intensity. These findings suggest that different aspects of value chain configuration may be relevant to different dimensions of wineries' international engagement, rather than exhibiting uniform associations across export outcomes. Furthermore, the positive association between value chain stability and export participation should be interpreted cautiously, as the cross-sectional evidence does not establish whether established production practices preceded or followed wineries' involvement in foreign markets. Interestingly, the exporter-only estimates reveal a negative association between value chain stability and export intensity, suggesting that established production practices may be associated differently with participation in foreign markets and the degree of export engagement among wineries already exporting. The positive associations of quality orientation and differentiation between base and premium production are consistent with previous studies emphasizing the role of quality differentiation in wine export performance, particularly in terms of export volumes [9,26]. Yet international data portray Germany as a high-volume trader with low average prices, contrasting with the differentiation-oriented characteristics observed among the sampled wineries. This contrast reflects two patterns in the German wine market: on one hand, Germany is a high-volume trader and re-exporter, benefitting from its historic trade relationships and geographic position with many trade partners in close proximity [8]. On the other hand, there are predominantly premium producers that export small volumes (i.e. dry premium Riesling or organically produced wines) to specific target markets. In fact, premium-led differentiation is associated with all three dimensions of export engagement. Interestingly, other case studies [44] suggest that hybrid strategies help export engagement rather than a specific strategy.

Concerning human capital, the number of employees with a university degree shows a positive association with export market breadth and a tentative positive association with export propensity, while English-speaking wineries are positively associated with export intensity. These findings differ from previous studies, where the manager’s education shows no effect on export propensity and

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intensity [23] and the number of spoken languages has a positive effect on both export propensity and intensity [26]. Therefore, these findings suggest that the associations between human capital and export engagement may also reflect other internal, regional, or structural characteristics of wineries.

Regarding managerial and organizational characteristics, although the variables do not directly measure dynamic capabilities, the findings reveal different associations across the dimensions of export engagement. Structured planning does not exhibit a statistically significant association with any of the outcomes examined. In contrast, an idea-driven approach to change initiation (Starting) is positively associated with export participation and market breadth. This finding complements Depetris-Chauvin et al. [36], who distinguish between the role of planning in determining what is innovated and that of emergent processes in shaping how innovation spreads within organizations and markets. The association observed for (Starting) may be interpreted in light of the dynamic capabilities perspective, which emphasizes the role of managerial initiative and adaptation in responding to changing environments [20,21,22]. However, the variable captures a reported approach to initiating change rather than sensing or seizing capabilities directly.

A different pattern emerges for post-project evaluation (*In Retrospective*). Wineries reporting dissatisfaction with completed projects exhibit a tentatively higher probability of export participation, while a negative coefficient for post-project satisfaction is also observed in the export-intensity model. However, the corresponding marginal effect for the highest export-intensity category is not statistically significant. Although post-project dissatisfaction could be consistent with a more critical evaluation of organizational outcomes, the variable does not establish whether such evaluations translate into subsequent learning or adaptation. Accordingly, these findings should be interpreted as associations between managerial approaches and export engagement rather than direct evidence of dynamic capabilities.

Finally, our results provide insights into the associations between strategic positioning, value-chain configuration, and the three dimensions of export engagement. By distinguishing between export propensity, export intensity, and export market breadth, the analysis provides complementary evidence on how winery characteristics are associated with different dimensions of international engagement.

5.1 Export engagement through the value chain

Export propensity is associated with several strategic, value chain, and organizational characteristics. Business model variables, including premium price positioning, organic production, other revenues,

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and luxury/icon positioning, exhibit positive and statistically significant associations with export participation, consistent with the relevance of differentiation-oriented strategies among exporting wineries. Regarding value chain configuration, quality orientation and stability exhibit tentative positive associations with export propensity, while differentiation between base and premium production practices is positively associated with export participation. These findings suggest that both the orientation and organization of production activities may be relevant to wineries' participation in international markets, although the underlying mechanisms cannot be established from the present analysis. Among managerial characteristics, idea-driven change initiation is positively associated with export propensity, whereas post-project satisfaction exhibits a tentative negative association.

Regarding export intensity, all four business model variables remain positively and significantly associated with higher export-intensity categories. Within value chain configuration, differentiation between base and premium production practices exhibits a tentative positive association, whereas general value chain orientation and stability are not statistically significant in the full-sample estimates. However, the conditional analysis restricted to exporting wineries reveals a negative association between value chain stability and export intensity. This contrasts with the tentative positive association observed for export propensity, suggesting that established production practices may be associated differently with participation in foreign markets and export intensity among wineries already exporting. Among managerial characteristics, English-speaking capacity is positively associated with export intensity, potentially reflecting the relevance of communication capabilities in international commercial activities.

Export market breadth exhibits a further pattern of associations. Business model characteristics remain positively and significantly associated with the geographical extent of international engagement. Regarding value chain configuration, differentiation between base and premium production practices is positively associated with export market breadth, whereas general value chain orientation and stability are not statistically significant in the full-sample estimates. Among managerial and organizational characteristics, university education and idea-driven change initiation exhibit positive associations with export market breadth. These findings suggest that reaching a wider range of foreign markets may be associated with a combination of differentiated production practices and managerial characteristics, although their specific contributions cannot be established causally.

Taken together, the findings reveal both commonalities and differences across the three dimensions of export engagement. Business model characteristics exhibit consistent positive associations with export propensity, intensity, and market breadth in the full sample, while the conditional estimates

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confirm selected associations, particularly for luxury/icon positioning. In contrast, value chain configuration exhibits outcome-specific patterns: quality orientation and stability are tentatively associated with export participation, whereas differentiation between base and premium production practices is associated with export propensity and market breadth, with a tentative association also observed for export intensity. Managerial and organizational characteristics likewise exhibit heterogeneous associations, with idea-driven change initiation, English-speaking capacity, and university education emerging across different export outcomes.

These patterns indicate that the characteristics associated with participation in international markets do not necessarily coincide with those associated with export intensity or geographical breadth. Nevertheless, differences in statistical significance across specifications do not establish statistically significant differences between coefficients. Furthermore, the results should not be interpreted as evidence of successive stages of internationalization, since current exporter status does not identify the historical decision to enter foreign markets and the cross-sectional data do not establish temporal progression between export participation, intensity, and market breadth.

6. Conclusion

This study examines the associations between firm characteristics, business strategies, value chain configuration, and three dimensions of export engagement among 256 German wineries: export propensity, export intensity, and export market breadth. The most consistent findings concern business model characteristics, particularly premium price positioning, organic production, and luxury/icon positioning, which are positively associated with all three export dimensions. Concerning value chain configuration, differentiation between base and premium production practices is also positively associated with export participation and market breadth, while evidence for export intensity is weaker. Other associations, including quality orientation and value chain stability, are more tentative and should be interpreted cautiously. Finally, managerial and organizational characteristics exhibit outcome-specific associations, with idea-driven change initiation positively associated with export propensity and market breadth, English-speaking capacity with export intensity, and university education with market breadth.

6.1 Implications

This study contributes to the literature on wine export engagement by highlighting the distinct associations of business models, value chain configurations, and managerial characteristics with

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different dimensions of internationalization. First, value chain configuration exhibits outcome-specific associations. Quality orientation and stability are tentatively associated with export participation, while differentiation between base and premium production practices is positively associated with export propensity and market breadth, with weaker evidence for export intensity. Furthermore, the negative association between value chain stability and conditional export intensity suggests that the relationship between established production practices and international engagement may differ between the full sample and wineries already operating in foreign markets. These findings support examining value chain configuration through its individual dimensions rather than assuming uniform associations with export outcomes. Second, business model characteristics exhibit consistent positive associations with export propensity, intensity, and market breadth. Premium price positioning, organic production, limited diversification into non-wine revenues, and luxury/icon positioning are positively associated with all three outcomes in the full sample. This highlights the relevance of strategic positioning across different dimensions of international engagement, while the conditional estimates indicate that not all associations persist among current exporters. Third, managerial and organizational characteristics exhibit more heterogeneous associations. Idea-driven change initiation is associated with export participation and market breadth, English-speaking capacity with export intensity, and university education with market breadth. These findings suggest that different managerial characteristics may be relevant to different dimensions of export engagement, while also highlighting the need to distinguish observable managerial approaches from the underlying organizational and dynamic capabilities they may reflect.

For winery managers, the findings highlight the importance of evaluating internationalization decisions in relation to the firm's overall strategic positioning and production organization. Premium positioning, organic certification, and luxury/icon strategies are consistently associated with export engagement, suggesting that clearly defined market positioning may be relevant when developing international strategies. However, these approaches involve different investment requirements, certification costs, and commercial commitments, and should be assessed against each winery's resources and target markets. The findings also draw attention to the coordination of value chain activities. Wineries producing both base and premium wines may benefit from evaluating how production practices, product differentiation, and marketing strategies are aligned across their portfolios. At the same time, the different associations observed for value chain orientation and stability suggest that maintaining established practices and adapting production configurations should be considered in relation to specific international objectives rather than as universally preferable strategies. Finally, the associations involving English-speaking capacity, university education, and approaches to initiating change highlight the potential relevance of managerial competencies

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alongside production and commercial strategies. Wineries seeking to expand internationally may therefore consider investments in international communication, managerial training, and organizational coordination. Nevertheless, export expansion is not necessarily the optimal objective for every winery, and specialization in domestic markets may represent an equally viable strategic choice.

For policymakers, the findings suggest that territorial promotion could be complemented by initiatives addressing wineries' strategic positioning, value chain organization, and international competencies. Although regional differences emerge across the export outcomes, geographical origin alone does not capture the full range of firm-level characteristics associated with international engagement. In this context, Germany's labeling system and the ongoing shift toward origin-based communication highlight the importance of clear and consistent information for international buyers. Regulatory changes could therefore be accompanied by coordinated communication initiatives aimed at improving the recognition and understanding of German wine regions and quality designations in foreign markets. Beyond territorial communication, potential policy initiatives include support for quality-oriented production, product differentiation, and the development of export-related managerial competencies, particularly language skills and international market knowledge. Such measures could complement existing regional promotion programs rather than replace them. However, their effectiveness, costs, and suitability for different winery profiles should be assessed through targeted pilot initiatives and subsequent evaluation.

6.2 Limitations

This study has several limitations. First, winery location is classified into five geographical categories, which may not fully capture the diversity of Germany's 13 wine-producing regions. Second, the relatively extensive model specification, given the available sample size, may affect the precision and stability of the estimates. Although the explanatory variables are theoretically motivated, including additional controls would need to be balanced against the risk of overparameterization. An additional methodological limitation concerns the common-slope assumption underlying the ordered probit models. We attempted to assess this assumption through generalized ordered logit specifications using the gologit2 command with the autofit option in Stata. However, the estimation procedures failed to converge for both export intensity and market breadth, preventing a conclusive assessment of the assumption. Consequently, the possibility of heterogeneous effects across outcome thresholds cannot be ruled out and should be considered when interpreting the results.

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Third, the cross-sectional design does not allow causal relationships or temporal ordering to be established. Reverse causality is possible, as export engagement may itself encourage changes in wineries' strategic positioning, organic certification, recruitment of English-speaking staff, and value chain practices. Although value chain stability is measured retrospectively over ten years, the data do not establish whether operational changes preceded or followed wineries' entry into foreign markets. Moreover, unobserved characteristics, including ownership structure, managerial experience, financial resources, reputation, access to distribution networks, grape varieties, and appellations, may be associated with both winery strategies and export engagement. Several explanatory variables also serve as proxies for broader strategic and organizational constructs rather than direct measures of underlying capabilities.

Fourth, the ordered probit models for export intensity and market breadth include non-exporting wineries in the lowest outcome category. Consequently, their estimates capture associations with overall export engagement, combining differences in export participation with differences in engagement levels among exporters. Although additional models restricted to exporting wineries are provided as robustness checks, the two approaches address distinct aspects of internationalization. Furthermore, marginal effects for the highest export intensity and market breadth categories should be interpreted cautiously, given the limited number of observations in these categories.

An additional limitation concerns the small number of balanced wineries in the exporter-only models, where this category serves as the reference group for Value Chain Orientation. With only three observations, comparisons involving this category may be imprecisely estimated. A sensitivity analysis excluding balanced wineries (Annex 7) indicates that the principal associations remain broadly stable, while no statistically significant differences emerge between cost- and quality-oriented wineries. Nevertheless, the limited size of the balanced group warrants caution when interpreting the original Value Chain Orientation coefficients.

Finally, despite the geographical coverage of the survey and the comparability of the sample with available population benchmarks for regional grape composition and average winery size, the response rate of 12.06% implies a potential risk of nonresponse bias. The available benchmarks also do not establish whether different types of wine-producing firms, including small independent wineries, cooperatives, and larger producers, are proportionately represented in the sample. The findings should therefore not be generalized to all operators involved in German wine trade, particularly non-producing bottlers and merchant firms, which fall outside the survey's target population.

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6.3 Future Research

Future research should focus on longitudinal approaches to examine changes in wineries' international engagement over time, particularly export entry and exit, and to establish the timing of operational changes relative to export activities. Future studies should collect information on export destinations and destination-specific export volumes to allow a more detailed assessment of international market diversification and concentration. Moreover, incorporating measures of export profitability and economic performance would help distinguish export engagement from the actual economic benefits of internationalization. Further studies could also examine individual value chain activities and regional heterogeneity within Germany, while cross-country comparisons could assess whether the observed associations extend to other wine-producing contexts.

Data Availability Statement

The firm-level data used in this study are not publicly available due to data-protection restrictions associated with the survey.

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Annex 1: Variable Description and Collinearity Check (VIF)

	Variable Type	Number of Observation	Mean	SD	Min	Max	VIF
Export Propensity	Dummy	256	0.570	0.496			
Export Intensity	Ordinal	256	1.253	1.447	0	6	
Export Market Breadth	Ordinal	256	0.910	1.068	0	4	
Winery Age (years)	Continuous	256	113.113	111.848	3	446	1.06
Production Volume (ln)	Continuous	256	11.369	1.286	7.090	15.607	1.35
Region	Categorical	256					1.12
Baden-W			0.156	0.363			
Bayern			0.101	0.302			
East Germany			0.043	0.203			
Hessen			0.063	0.242			
Rheinland-Pfalz			0.637	0.481			
Price Range	Categorical	256					1.39
Commercial = 0			0.742	0.438			
Premium = 1			0.258	0.438			
Organic	Dummy	256	0.214	0.411			1.10
Other Revenues (≤10%)	Dummy	256	0.640	0.489			1.13
Luxury & Icon Segment	Dummy	256	0.183	0.387			1.44
Value Chain Orientation Score	Categorical	256					1.10
Balanced			0.035	0.184			
Cost			0.214	0.411			
Quality			0.750	0.433			
Base/Premium Differentiation	Dummy	256	0.660	0.474			1.13
Value Chain Stability Score	Continuous	256	0.812	0.243	0	1	1.05
University Degrees (n)	Continuous	256	1.656	2.415	0	25	1.40
English Speaker	Dummy	256	0.777	0.416			1.07
Planning	Dummy	256	0.480	0.500			1.06
Starting	Dummy	256	0.378	0.486			1.11
Principles	Dummy	256	0.378	0.486			1.09
Ending	Dummy	256	0.137	0.344			1.13
In Retrospective	Dummy	256	0.957	0.202			1.07

Note: *Value Chain Stability Score* is expressed as the proportion of operational practices in the vineyard and cellar stages that remained unchanged over the preceding ten years, calculated as the number of unchanged practices divided by 21. The indicator ranges from 0 (all 21 practices changed) to 1 (none of the 21 practices changed), with higher values indicating greater value chain stability.

Annex 2: Detailed Econometric Results (p ≤ 0.10; ** p ≤ 0.05; *** p ≤ 0.01).*

	Model 1			Model 2			Model 3		
	Export Propensity			Export Intensity			Export Market Breadth		
Firm Characteristics	Coef.	Robust-SE	p-value	Coef.	Robust-SE	p-value	Coef.	Robust-SE	p-value
Winery Age (years)	0.0034**	0.0015	0.019	0.0016**	0.0006	0.011	0.0022***	0.0006	0.001

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Production Volume (ln)	0.1632	0.1705	0.339	0.0344	0.0637	0.590	0.1140*	0.0697	0.100
Region									
Bayern	-0.5711	0.7153	0.425	-0.1672	0.3037	0.582	-0.0883	0.3050	0.772
EG	-2.5360**	1.2014	0.035	-1.3274**	0.5485	0.016	-1.7496***	0.6453	0.007
Hessen	0.8561	0.6905	0.215	0.7495**	0.3093	0.015	0.7605**	0.3398	0.025
RP	0.6615	0.4672	0.157	0.6438***	0.2136	0.003	0.4611**	0.2120	0.030
Business Model and Strategic Orientation									
Premium Price Range	1.4762***	0.5740	0.010	0.8089***	0.2050	<0.001	0.9557***	0.2189	<0.001
Organic	1.3047***	0.4296	0.002	0.6070***	0.1709	<0.001	0.4478**	0.1786	0.012
Other Revenues (≤10%)	0.8393**	0.3406	0.014	0.3572**	0.1593	0.025	0.4190**	0.1694	0.013
Luxury & Icon Segment	1.3716**	0.5694	0.016	0.7648***	0.2148	<0.001	0.9024***	0.2372	<0.001
Value Chain Configuration									
Value Chain Orientation									
Cost	1.0938	0.7536	0.147	0.0375	0.4920	0.939	0.0572	0.4668	0.902
Quality	1.1393*	0.6760	0.092	0.1221	0.4781	0.798	0.1491	0.4532	0.742
Base/Premium Differentiation	0.8872**	0.3651	0.015	0.3065*	0.1727	0.076	0.3650**	0.1779	0.040
Value Chain Stability Score	1.0391*	0.6250	0.096	-0.1111	0.3073	0.718	0.3654	0.2930	0.212
Managerial and Organizational									
University Degrees (n)	0.1870*	0.1037	0.071	0.0391	0.0263	0.137	0.0824***	0.0313	0.008
English Speaker	0.5291	0.3960	0.181	0.4202**	0.1820	0.021	0.3042	0.1961	0.121
Planning	-0.0048	0.3383	0.989	0.0074	0.1477	0.960	-0.0770	0.1557	0.621
Starting	0.8572**	0.3464	0.013	0.1552	0.1486	0.296	0.3736**	0.1578	0.018
Principles	0.0348	0.3333	0.917	-0.1515	0.1513	0.317	-0.0514	0.1590	0.747
Ending	-0.0163	0.4445	0.971	-0.0514	0.2333	0.826	0.0602	0.2389	0.801
In Retrospective	-1.0514*	0.6001	0.080	-0.6512*	0.3765	0.084	-0.4467	0.3292	0.175
Intercept (Logit)	-4.9607	2.2430	0.027	—	—	—	—	—	—
Cutpoint 1	—	—	—	0.5208	1.2465	—	2.4505	1.1781	—
Cutpoint 2	—	—	—	1.2304	1.2502	—	4.0076	1.1905	—
Cutpoint 3	—	—	—	2.1491	1.2537	—	4.7625	1.2065	—
Cutpoint 4	—	—	—	2.7491	1.2469	—	5.3556	1.1864	—
Cutpoint 5	—	—	—	3.3110	1.2619	—			
Cutpoint 6	—	—	—	3.8152	1.2558	—			
Pseudo-R^2	0.3175			0.1839			0.2526		
n	256			256			256		

Note: Robust standard errors are reported. * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$. Significance stars refer to the coefficients of the explanatory variables; intercepts and cutpoints are excluded.

Annex 3: Average Marginal Effects

	Export Propensity		Export Intensity		Export Market Breadth	
Firm Characteristics	pp	Significance	pp	Significance	pp	Significance
Winery Age (years)	0.0522	0.015**	0.0049	0.067*	0.0132	0.003***
Production Volume (ln)	2.5077	0.333	0.1021	0.596	0.6951	0.116
Region						
Bayern	−9.0327	0.417	−0.1999	0.597	−0.3628	0.771
EG	−33.4552	0.006***	−0.6400	0.131	−2.9871	0.004***
Hessen	13.8012	0.209	2.0165	0.078*	4.9205	0.086*

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RP	10.7146	0.155	1.5813	0.026**	2.5501	0.025**
Business Model and Strategic Orientation						
Premium Price Range	22.8381	0.003***	2.4263	0.024**	6.3395	0.002***
Organic	20.0289	0.001***	2.0698	0.039**	3.0167	0.025**
Other Revenues (≤10%)	13.4346	0.014**	0.9076	0.051*	2.2857	0.009***
Luxury & Icon Segment	20.7135	0.009***	2.4649	0.068*	6.5153	0.012**
Value Chain Configuration						
Value Chain Orientation						
Cost	16.6742	0.131	0.0971	0.938	0.3137	0.900
Quality	17.3818	0.078*	0.3374	0.778	0.8579	0.725
Base/Premium Differentiation	13.9962	0.014**	0.8290	0.120	2.0387	0.038**
Value Chain Stability Score	15.9707	0.094*	−0.3300	0.720	2.2269	0.237
Managerial and Organizational						
University Degrees (n)	2.8744	0.064*	0.1163	0.175	0.5025	0.008***
English Speaker	8.3339	0.185	0.9633	0.047**	1.6352	0.095*
Planning	−0.0735	0.989	0.0219	0.960	−0.4705	0.619
Starting	13.2372	0.012**	0.4684	0.335	2.3465	0.025**
Principles	0.5354	0.917	−0.4398	0.334	−0.3115	0.748
Ending	−0.2501	0.971	−0.1479	0.818	0.3759	0.807
In Retrospective	−15.3984	0.051*	−3.0108	0.248	−3.3561	0.258

Notes: Average marginal effects (AMEs) are expressed in percentage points (pp). Export Propensity refers to the predicted probability of exporting (outcome = 1); Export Intensity refers to the probability of exporting more than 70% of production (outcome = 6); and Export Market Breadth refers to the probability of exporting to more than 15 countries (outcome = 4). AMEs are averaged across the 256 observations in the estimation sample. For binary and categorical variables, marginal effects represent discrete changes from the reference category; for continuous variables, they represent derivatives. Models were estimated using logit and ordered probit regressions with robust standard errors, followed by Stata's margins, dydx(*) command with the corresponding prediction options. The reported significance values are p-values. * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

Annex 4 Conditional Models among Exporting Wineries

Just Accepted

Variables	Model 4 – Export Intensity (Exporters only)	Model 5 – Export Market Breadth (Exporters only)
Winery Profile		
Winery Age (years)	0.001 (0.001)	0.002** (0.001)
Production Volume (ln)	-0.094 (0.083)	0.130 (0.097)
Business Model / Strategic Orientation		
Premium Price Range	0.219 (0.246)	0.670** (0.269)
Organic	0.431** (0.213)	0.141 (0.260)
Other Revenues (≤10%)	0.145 (0.214)	0.363 (0.264)
Luxury & Icon Segment	0.870*** (0.253)	1.047*** (0.272)
Value Chain Configuration		
Value Chain Orientation – Cost	-1.783** (0.835)	-1.527** (0.666)
Value Chain Orientation – Quality	-1.501* (0.791)	-1.175** (0.592)
Value Chain Stability Score	-0.851*** (0.330)	-0.077 (0.390)
Base/Premium Differentiation	-0.219 (0.214)	-0.109 (0.253)
Managerial & Organizational		
University Degrees (n)	-0.017 (0.041)	0.020 (0.053)
English Speaker	0.629** (0.321)	0.366 (0.347)
Planning	0.086 (0.199)	-0.063 (0.220)
Starting	-0.261 (0.194)	0.156 (0.227)
Principles	-0.329 (0.209)	-0.147 (0.234)
Ending	-0.234 (0.391)	0.132 (0.379)
In Retrospective	-0.792 (0.516)	-0.320 (0.604)
Observations	146	146
Wald χ^2	62.83	70.54
Pseudo R^2	0.1295	0.2000

Notes: Ordered probit estimates with robust standard errors in parentheses. The sample is restricted to wineries reporting positive exports (N = 146). Regional controls are excluded because some regional categories contain very few exporting wineries. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Annex 5. Sensitivity analysis of export propensity to influential observations

Variables	Baseline model (N = 256)	Excluding top 5 DBETA (N = 251)
Firm Profile		
Winery Age (years)	0.003 (0.019)	0.004 (0.020)
Production Volume (ln)	0.163 (0.339)	0.262 (0.153)
Region		
Bayern	−0.571 (0.425)	−1.066 (0.144)
EG	−2.536 (0.035)	−6.046 (<0.001)

Just Accepted

Variables	Baseline model (N = 256)	Excluding top 5 DBETA (N = 251)
Hessen	0.856 (0.215)	0.540 (0.424)
RP	0.661 (0.157)	0.368 (0.432)
Business Model / Strategic Orientation		
Premium Price Range	1.476 (0.010)	2.131 (0.004)
Organic	1.305 (0.002)	1.487 (0.001)
Other Revenues (≤10%)	0.839 (0.014)	0.747 (0.036)
Luxury & Icon Segment	1.372 (0.016)	1.551 (0.022)
Value Chain Configuration		
Value Chain Orientation – Cost	1.094 (0.147)	1.014 (0.199)
Value Chain Orientation – Quality	1.139 (0.092)	1.024 (0.161)
Base/Premium Differentiation	0.887 (0.015)	0.814 (0.044)
Value Chain Stability Score	1.039 (0.096)	0.878 (0.176)
Managerial & Organizational		
University Degrees (n)	0.187 (0.071)	0.241 (0.009)
English Speaker	0.529 (0.181)	0.490 (0.256)
Planning	−0.005 (0.989)	0.097 (0.787)
Starting	0.857 (0.013)	1.124 (0.003)
Principles	0.035 (0.917)	0.124 (0.731)
Ending	−0.016 (0.971)	−0.083 (0.857)
In Retrospective	−1.051 (0.080)	−1.357 (0.034)
Constant	−4.961 (0.027)	−5.289 (0.024)
Observations	256	251
Pseudo R^2	0.3175	0.3713

Notes: Binary logistic regression estimated using robust standard errors. Coefficients are reported with their corresponding p-values in parentheses. The sensitivity model excludes the five observations with the highest Pregibon's DBETA values (2.002, 0.796, 0.728, 0.678, and 0.661).

Annex 6. Robustness Check Using the Natural Logarithm of Winery Age

	Model 1		Model 2		Model 3	
	Export Propensity		Export Intensity		Export Market Breadth	
Winery Profile						
Winery Age (ln)	0.363	0.013**	0.149	0.029**	0.196	0.007***
Production Volume (ln)	0.134	0.435	0.023	0.710	0.099	0.155
Region						
Bayern	−0.632	0.372	−0.156	0.604	−0.072	0.812
EG	−2.591	0.032**	−1.342	0.014**	−1.766	0.006***
Hessen	0.846	0.212	0.743	0.014**	0.764	0.020**
RP	0.639	0.182	0.658	0.002***	0.483	0.024**
Business Model						
Premium Price Range	1.461	0.012**	0.803	<0.001***	0.942	<0.001***

Just Accepted

Organic	1.275	0.002***	0.587	0.001***	0.424	0.016**
Other Revenues (≤10%)	0.831	0.014**	0.355	0.026**	0.413	0.014**
Luxury & Icon Segment	1.441	0.011**	0.768	<0.001***	0.901	<0.001***
Value Chain Configuration						
Value Chain Orientation						
Value Chain Orientation – Cost	1.093	0.142	0.033	0.947	0.049	0.916
Value Chain Orientation – Quality	1.186	0.077*	0.133	0.783	0.162	0.722
Base/Premium Differentiation	0.870	0.016**	0.314	0.068*	0.372	0.034**
Value Chain Stability Score	0.998	0.097*	−0.145	0.639	0.311	0.284
Managerial and Organizational						
University Degrees (n)	0.192*	0.077	0.040	0.129	0.083	0.008***
English Speaker	0.530	0.178	0.424	0.019**	0.308	0.110
Planning	0.022	0.949	0.016	0.912	−0.064	0.679
Starting	0.869**	0.012	0.152	0.307	0.367	0.020**
Principles	0.117	0.725	−0.123	0.417	−0.014	0.931
Ending	−0.103	0.820	−0.077	0.740	0.023	0.922
In Retrospective	−1.060*	0.074	−0.653	0.095*	−0.454	0.200
n	256		256		256	
Pseudo-R^2	0.3197		0.1817		0.2484	

Annex 7. Sensitivity Analysis Excluding the Balanced Value Chain Orientation Category

	Model 2		Model 3	
	Export Intensity Sensitivity		Export Market Breadth Sensitivity	
Winery Profile				
Winery Age (years)	0.0010	0.208	0.0021**	0.019
Production Volume (ln)	-0.0923	0.269	0.1314	0.172
Business Model				
Premium Price Range	0.1717	0.490	0.6263**	0.022
Organic	0.4356**	0.040	0.1397	0.587
Other Revenues (≤10%)	0.1969	0.361	0.4102	0.129
Luxury & Icon Segment	0.8557***	0.001	1.0349***	<0.001
Value Chain Configuration				
VC Cost-Quality	0.2913	0.277	0.3585	0.361
Value Chain Stability Score	-0.8509**	0.011	-0.0835	0.830

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Base/Premium Differentiation	-0.2390	0.265	-0.1279	0.607
Managerial and Organizational				
University Degrees (n)	-0.0160	0.705	0.0200	0.711
English Speaker	0.5289*	0.094	0.2658	0.432
Planning	0.1061	0.598	-0.0462	0.835
Starting	-0.2780	0.155	0.1399	0.545
Principles	-0.3346	0.111	-0.1477	0.523
Ending	-0.2671	0.515	0.0950	0.814
In Retrospective	-0.7785	0.127	-0.2841	0.628
Pseudo-R^2	0.1213		0.1881	
n	143		143	

Notes: Ordered probit estimates with robust standard errors; coefficients and p-values are reported in separate columns. The specifications replicate the exporter-only models in Annex 4, excluding the balanced Value Chain Orientation category (3 of 146 exporting wineries, 2.05%), leaving 143 observations in the sensitivity analysis. Cost orientation is the reference category. Regional controls are excluded, consistently with Annex 4.

Just Accepted