ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 29 (2), 2020

Gergana Dimitrova[1]
Donka Keskinova[2]

COMPOSITE INDICATORS FOR THE EVALUATION OF THE COMPETITIVENESS OF AN INDUSTRIAL ENTERPRISE (The Case of the Wine Industry)

Competitiveness management is both a subject, a goal and a challenge in the research and expertise of many scientists, analysts, researchers and managers. With its multidimensional and multilevel structure defining it, the category is regarded as a foundation for the functioning of both individual economic units and entire sectors and economies of countries. Recognizing that competitive enterprises are a major drive of the nation's competitiveness (Garelli, 2002), the focus is on the microeconomic aspects of the category, with a reasoned focus on industrial enterprises. All this determines the evaluation of the company's competitiveness as particularly significant, both theoretically and practically. In this regard, the present study presents an algorithm for the construction of composite indicators for its evaluation, as well as the results of its testing in micro and small enterprises from the wine-producing industry in the Plovdiv region.
JEL: L10; M21; L66; C01

Introduction

The issue of competitiveness evaluation is of particular importance and relevance for the development of the Bulgarian economy and specifically for the wine industry. The typical growing competition in the wine market, generated both by the entry of new competitors and the imposition of new consumer tastes and preferences, implies the necessity for its research with regard to Bulgarian wine producers (who are mostly SMEs). Although "a large part of structural funds are aimed at supporting SMEs innovations" (Stoyanova, Madjurova, Raichev, 2019), the problems related to the competitiveness of the enterprises from wine industry are among the priorities, as it is a traditional and significant sub-sector for the Bulgarian economy.

[1] *Gergana Dimitrova, PhD, Department of Management and Quantitative Methods in Economics, Faculty of Economic and Social Sciences, University of Plovdiv Paisii Hilendarski, e-mail: gergana.gu@gmail.com.*
[2] *Donka Keskinova, PhD, Department of Applied and Institutional Sociology, Faculty of History and Philosophy, University of Plovdiv Paisii Hilendarski, e-mail: donka.keskinova@gmail.com.*

In this regard, this publication presents the results of a study, whose **subject** is the development a methodology for the construction of composite indicators for the evaluation of the competitiveness of industrial enterprises, as well as the potential for its enhancement (see more in Dimitrova, 2019).

The object of the study is the micro and small enterprises of the wine industry in the Plovdiv region.

The main objective is to propose a model (algorithm) for the evaluation of the competitiveness of the industrial enterprise (competitive status) and the opportunities for its enhancement (competitive potential) and to present the results of its testing in micro and small enterprises from the wine-producing industry in the Plovdiv region.

As a multidimensional and multi-aspect concept, the measurement of company competitiveness is realized through the utilization of a system of factors and indicators, which is not uniform and unified. For the purposes of this research, the indicators that are considered to be key in the study of the competitiveness of wine enterprises are used.

The proposed methodology is developed through the selection, systematization, (re)structuring and complementation of existing methodologies and indicators, adapted to the characteristics and specifics of the research object and the assigned research tasks. She is builds on the views and models of Porter (Diamond Model for Competitive Advantage, Model of Five Competitive Forces, Value Chain model) and McCarthy (Model Marketing Mix (4P)), trying to integrate them so as to cover as far as possible the leading aspects of the activity of the industrial enterprise and the environment in which it operates.

Its substantial contribution is the methodology for construction of aggregate composite indicators (incl. the statistical method) for assessing the competitiveness of an industrial enterprise and the attractiveness of the industry, such as:

- By constructing an aggregate composite indicator for evaluation of the competitiveness of an industrial enterprise, it is possible to comprehensively evaluate its competitive status. It is generated by the competitiveness advantages through the tools of management and the marketing mix.
- At the same time, by drawing up an aggregate composite indicator for assessing the attractiveness of the environment, the potential of the sector is identified as an opportunity to increase the company's competitiveness. It is derived from the integration processes in the sector and the implementation of joint and related activities between organizations.

In this sense, the proposed methodology further develops and refines existing methodologies for assessing the competitiveness of an industrial enterprise.

1. Study methodology

An empirical study was carried out among micro and small enterprises from the wine industry in the Plovdiv region to accomplish the above objective. An online survey

(structured interview) was conducted through the fisn.uni-plovdiv/survey platform of the Faculty of Economics and Social Sciences at the Paisii Hilendarski University of Plovdiv. An evaluation of expert opinion is used, since the respondents are persons holding managerial positions (owner, manager, marketing manager).

Applied evaluation methods are: marketing, comparative, situational, sectoral, diagnostic, expert, graphic and nomographic (Veleva, Ruseva, 2016).

For the purpose of examining the competitiveness of an industrial enterprise, a factor analysis is used as a statistical method.

Target group – According to information provided by the NSI, in the territory of the Plovdiv region as of 2016 (reference as of December 2017)[3], there are 34 wine-producing enterprises with code 11.02 – Production of wine from grapes from NACE 2008. Of these, 33 meet the criteria: for micro- (21 enterprises) and for small- (12 enterprises). Presented in percentage: of all wine-producing enterprises in the Plovdiv region, 97% are micro- and small enterprises, of which 64% micro- and 36% small.

According to the EAVW Report (EAVW, 2016) for 2016, there are 251 functioning wine producers in Bulgaria. Based on this, wine-producing enterprises in the Plovdiv region occupy 13.5% of all such enterprises in the country.

Micro and small wine producers are observed as a strategic group with the following general characteristics: enterprises of the same type[4], operating in the same area, sell similar products, follow similar strategies, satisfy the needs of the same consumers (markets), use the same suppliers, intermediaries and other partner organizations, with regard to the similar activities they pursue.

The thus formed strategic group defines the choice of the target group for the study. Out of it, 25 enterprises were identified (due to a lack of information and a connection to the others). It is assumed that 25 wine-producing enterprises, which meet the criteria for a micro and small enterprise, form the statistical population for the survey and their number is sufficient to obtain information regarding the specifics and characteristics of the studied object and to guarantee the significance of the obtained results.

2. Stages in the construction of a research model

The model of the study involves several stages in which the process of studying the competitiveness of an industrial enterprise goes through, incl. determining the competitive status and identifying its competitive potential.

Based on the understanding that the competitiveness of an enterprise:

- Defines its capabilities;

[3] The information from the NSI is presented for the purposes of the current study and is accurate as of (12.2017).
[4] They meet the criteria for micro and small enterprises.

- Unlocks its potential;
- Visualizes (illustrates) the results of its activity,

in this study, the category is simultaneously observed as an *economic* (in view of the results of the successful functioning of the industrial enterprise as measured by a set of quantifiable economic indicators) and *management tool* (as a set of management decisions related to the choice of development strategy, structure, value chain management, etc.). Thus, competition, and thus its ability to compete[5], manifests itself simultaneously as a factor and a consequence of enterprise activity (Shmelev, Vaganov, Danchenok, 2004).

1. An analysis of the external environment in which enterprises operate in order to diagnose the opportunities and threats that exist and to reveal the attractiveness of the industry in which enterprises operate. This brings out the competitive potential existing in the environment, including**:**

1.1. Analysis of the Macroeconomic Environment – through the **Porter's Diamond Model for Competitive Advantage** (Porter, 1998, 2004) – one of the leading tools for assessing competitiveness.

The choice of the model is dictated by the following essential motives:

- the established concept of terroir[6] in wine making, which is fundamental for the creation of comparative advantages – **the determinant 'Factor conditions**';
- a focus on consumers and the formation of an **internal demand** aimed at meeting their needs;
- **Company Strategy, Structure and Competition,** i.e. structure in which the enterprises of the industry operate and manage their activities, incl. the development and implementation of appropriate strategies for competitive positioning and development as a condition for enhancing their competitiveness;
- **Related and Supportive Industries –** with a focus on emerging new types of competitive relationships – cooperating between competitors and pursuing joint activities.

1.2. An Analysis of the Microeconomic Environment where, through **Porter's Model of Five Competitive Forces** (Porter, 1980, 2010) (current competitors, potential competitors, consumers, suppliers, substitute products), an industry analysis is made to verify the degree of attractiveness of the industry in terms of competitiveness of the enterprises (in regard to their ability to counteract the competitive forces) and their positioning in a competitive environment.

[5] Author's addition.

[6] „terroir" is a combination of all those characteristics that define the character of a wine – the location, climate, soil, exposure (on a hill, in the plain), water, including peculiarities such as the character and mentality of people living in the area, cultural features, land cultivation and wine production, etc. – Vinoblog site, https://www.vinoblog.eu/osnovni-polozheniya/what-is-terroir/, 15.11.2019.

2. An Analysis of the Internal Environment that brings out its strengths and weaknesses, from which significant advantages over competitors can be identified. To this end, the emphasis is placed on the managing activities under the **Value Chain model** (Porter, 1998, 2004), with a marketing focus – on the **Marketing Mix (4P) Model** (McCarthy, 1960), focusing on the marketing concept to deliver value to consumers in order to receive value back from them. The competitive advantages thus formed are considered as fundamental for the determination of the competitive status of micro and small wine-producing enterprises.

Table 1

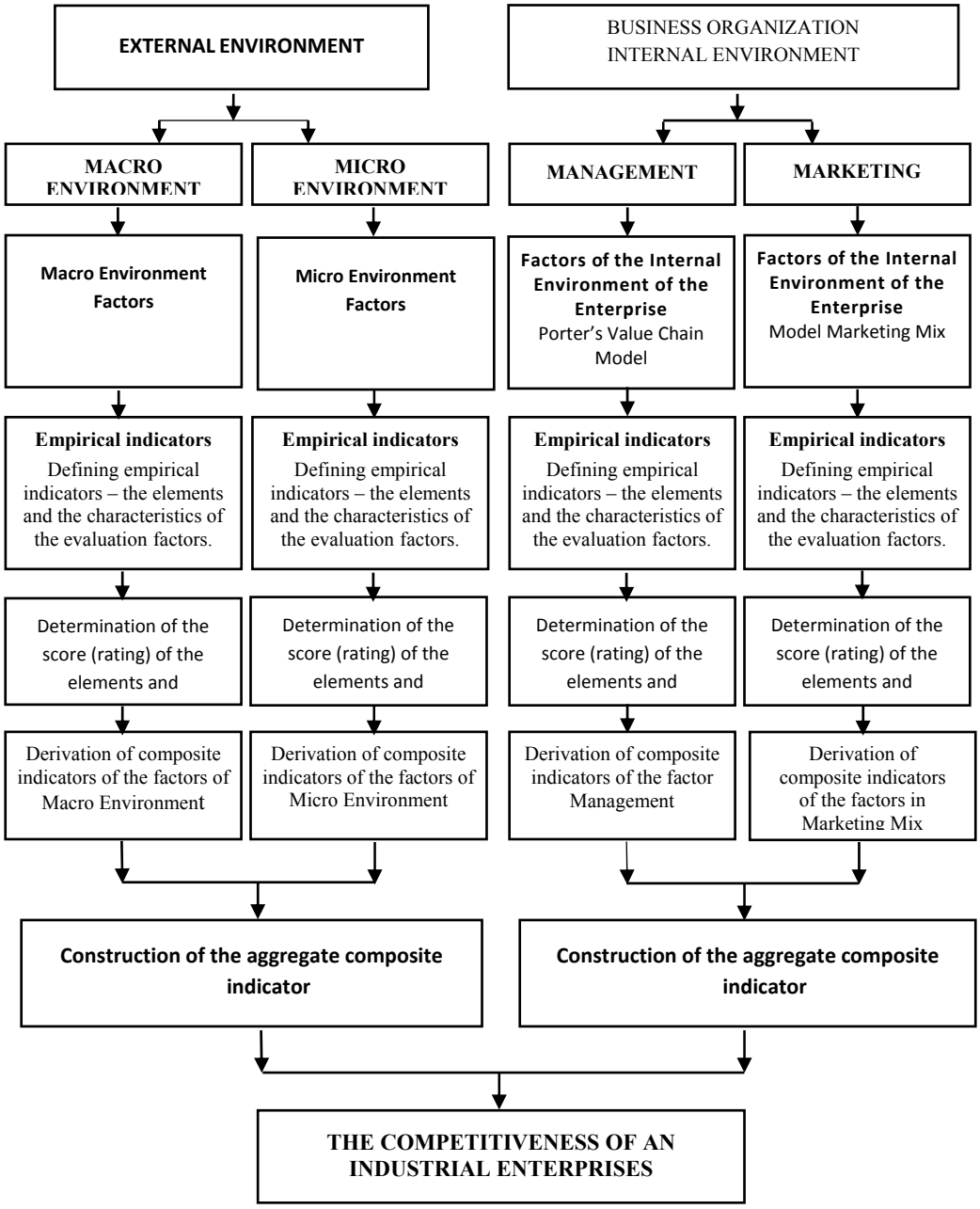
Toolkit for the construction of aggregate composite indicators for the evaluation of the competitiveness of an industrial enterprise

Factors	Aggregate composite indicators	Composite indicators	Empirical indicators (elements, characteristics)
Factors of the External Environment	Macro Environment	Factor conditions	terroir (climate, soil, varieties, accessibility, limited, price); supplies and raw materials (access to raw materials and supplies, quantity required, quality, price, timely deliveries); intellectual resources (know-how, research, R&D, patents, licenses, databases); human resources (qualification, education, experience, skills, cost of labour); infrastructure (location, communication, information and logistics systems); capital resources (size and cost of capital available for financing)
	Competitive Forces – Micro Environment Porter's Model Five Forces for the identification and analysis of the five competitive forces that shape the wine-producing industry	Barriers to entry into the industry/Threat of new entrants	capital requirements; product differentiation; image and imposed trademark; access to technology; access to raw material and material suppliers; access to intermediaries and distribution channels; economies of scale; access to finance
		Competitive rivalry	number of equal competitors; diversity of competitors; operating costs; image of competitors; industry growth; differentiation of competitors
		Power of buyer	number of significant users; brand loyalty; consumer tastes and preferences; proximity to users
		Power of supplier	number of significant suppliers; the threat of forward integration; transfer costs to other suppliers; the contribution of suppliers to quality
		Threat of substitution	threat of substitute products; availability of products with similar characteristics (substitutes)
Factors of the Internal Environment of the Enterprise	Management	Management	manufacturing experience and efficiency, technological, skills, company strategy, personnel, supply, finance (financial strength)
	Marketing Mix	Product	product characteristics (range, modifications); quality (taste, aroma, color); trademark; packaging (bottle, stopper); packing; labeling
		Price	base price, price discounts, price reductions, payment terms
		Place	built own delivery channels; speed, rhythm, continuity of delivery; maintaining stocks
		Promotion	company and product image; advertising; PR activities; participation in wine forums and exhibitions; organizing tastings; supply of wine tourism; participation in wine promotion and development projects

Source: Author's research work.

Figure 1

Model (algorithm) for the research of the competitiveness of an industrial enterprise



Source: Author's research work

Based on the analysis of the external and internal factors, the enterprise determines its competitive status and the opportunities for its enhancement – its competitive potential.

Result indicators based on expert opinion regarding the performance of the enterprise are used to determine the *competitive status*. Factor indicators are used to identify and reveal existing reserves and unused opportunities in the environment in which the businesses operate. They are taken as a basis in shaping the *competitive potential* of the wine-producing enterprises, and their utilization would increase their competitiveness.

Using the described analysis models, the factors that are considered key to the object of the study are identified. Table 1 presents the tools for the construction of aggregate composite indicators for the evaluation of the competitiveness of an industrial enterprise (competitive status) and the attractiveness of the industry (competitive potential) in view of enhancing its competitiveness.

Figure 1 presents the enterprise competitiveness research model, with clearly defined stages of the research process, including:

1. Selection of key evaluation factors.
2. Defining empirical indicators – the elements and the characteristics of the evaluation factors.
3. Determination of the score (rating) of the elements and characteristics of the factors.
4. Derivation of composite indicators of the factors.
5. Construction of the aggregate composite indicators for the determination of the attractiveness of the industry (competitive potential) and the competitive status of micro and small wine-producing enterprises.

The proposed research model includes the evaluation of the factors of the external and internal environment. It shows the logical sequence in the two main stages of its implementation:

- determination of *the competitive status*, which is revealed by the strengths and weaknesses of the enterprise and identifies the main sources for the construction of competitive advantages;
- the opportunities (attractiveness) of the environment in which it operates – to identify its *competitive potential*.

3. Methodology for the construction of an aggregate composite indicator for the evaluation of the competitiveness of an industrial enterprise

The aggregate composite indicator for the evaluation of the competitiveness of an industrial enterprise (competitive status) and the attractiveness of the industry (in order to verify its competitive potential) is formed on the basis of 'composite indicators' (Keskinova, 2018) for each of the set factors, which in turn, aggregate the estimates of their elements and characteristics derived in the model.

The composite indicators of the factors can be constructed at equal or different weights of the empirical indicators, called the elements (and characteristics) of the factors. Equal weights are used when all output indicators are equally 'valuable' for the composite indicator or there is no empirical or statistical basis for their differentiation (OECD, 2008). In the conceptual model of the present study, such an approach (for equal weights) is excluded because:

First: the use of equal weights when aggregating indicators between which there is a high correlation would result in duplicate reporting and they would be given an unreasonably high weight in the composite indicator.

Secondly: the aim is to differentiate those elements and characteristics of the factor that are leading in the formation of competitive advantages for micro and small wine-producing enterprises.

One option, in this case, is to reduce the empirical indicators to an independent (uncorrelated) subset, i.e. only low-dependency indicators should be selected. The other is to introduce weights that give less weight to the dependent indicators.

The limited number of empirical indicators and the presence of collinearity (high correlation between many of them), in most cases, makes the first option inapplicable and requires the use of weights. These weights are obtained via factor analysis that extracts latent variables – intermediate composite indicators, based on the correlation between the initial empirical indicators.

There are various methods for the extraction of factors. In this study, Principal component analysis (PCA) is used in which the resulting factors, called components, are considered as a linear combination of the associated variables.

The first stage in the construction of an aggregate composite indicator is to determine the applicability of PCA in deriving the weights, which are to be used to weigh the estimates of the elements and the characteristics of the factor.

The first step includes:

- Checking for dependence between the variables – the empirical indicators (elements, characteristics) of the factor defining the composite indicator. The check is carried out via Bartlett's Test. The hypothesis tested (Ho) states that the variables in the correlation matrix are independent. For PCA to be applicable, (Ho) must be rejected at a significance level of less than 0.05 (Sig. <0.05). Another way to a relationship between variables is to use Cronbach's Alpha coefficient to measure their internal consistency. A high Alpha value is an indicator that the initial indicators measure the same latent variable sufficiently well. The coefficient is not a measure of one-dimensionality, i.e. at high Alpha value, there can be multidimensionality.
- Kaiser-Meyer-Olkin measure calculation – a statistical indicator of the adequacy of the sample with respect to the private correlation between the variables, and specifically whether it is small. The sample is considered adequate if the KMO value is greater than 0.50.

The second stage is to determine the number of latent components – intermediate composite indicators. The standard procedure is to select components that have Eigenvalue ≥ 1 and contribute commutatively to explain over 60% of the total variance.

The third stage is to determine the weights of the empirical indicators (variables) that will be used to construct the estimate of the composite indicator.

The weight for each empirical indicator is obtained by multiplying the following two weights:

- The weight of the empirical indicator in the intermediate composite indicator. It is calculated by the ratio l_i^2/L_j ', where l_i is the Component Loadings from Rotated[7] component matrix, and L_j' is the sum of l_i^2 only for the variable defining components[8];
- Weight of the intermediate composite indicator calculated with the ratio $L_j^{'}/\sum L_j^{'}$.

The fourth stage is to calculate the estimate of the composite indicator by weighting the arithmetic mean of the estimates for the empirical indicators and their weights.

The fifth step is to define the aggregate composite indicator as the arithmetic mean of the estimates for the composite indicators.

The algorithm is used to define composite indicators for each of the environmental factors. As a result, these factors are identified, and they are key both to the formation of competitive advantages and the competitive status of the enterprise and to the attractiveness of the environment, in view of the opportunities it provides for enhancing competitiveness (competitive potential). For these, the factors with a higher average score are determined. Conversely, lower scores, and therefore lower factor values, is an indicator of weakness or the existence of a problem.

4. Application of the methodology for the construction of an aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises from the wine-producing industry in the Plovdiv region

The questionnaire for conducting a structured interview with the owners/managers of the wine-producing enterprises of the studied population (see Dimitrova, 2019) is defined based on the presented research model, which includes the factors, their elements and characteristics (accepted as empirical indicators for assessing the competitiveness of the industrial enterprise). Each empirical indicator involved in constructing a composite

[7] The rotation, in the current case – Varimax, aims to associate each variable with as few components as possible, and if possible with only one.

[8] OECD (2008, p. 90) uses Li – the sum of li2 for all variables, whether or not related to the component. In this case, the sum of the final weights of the variables will not be 1 and will depend on the relative proportion of Li' in Li. This is not a problem when constructing a single composite indicator, but it is a problem when they are more numerous and are compared. For this purpose, Li' is used in the present study. The other option is to use Li, but the coefficients obtained will be recalculated so that their sum results in 1. The results will be identical.

indicator is evaluated on a five-point (score) scale, e.g. from 1-weak to 5-excellent, from 1-very small to 5-very large; from 1 highly unattractive to 5 highly attractive, etc.

As a result of the collected empirical information, 11 composite indicators and 2 aggregate composite indicators are formed, which participate in the evaluation of the factors of the external and internal environment at a higher level

In this section, the methodology for the calculation a composite and aggregate composite indicator will first be outlined with an example, after which the main results of the aggregate composite indicators will be presented.

4.1. Construction of an aggregate composite indicator for the evaluation of the attractiveness of the industrial environment

The attractiveness of the industrial (external) environment is evaluated on the basis of a composite indicator of "Factor conditions" and an aggregate composite indicator of competitive forces. We will focus on building the latter as an example of applying the methodology for building aggregate composite indicators.

Before the example, we will repeat the introduced concepts. A composite indicator (CI) is one that is built on the basis of empirical indicators and as such, it is a composite indicator of the first degree (the lowest degree of generalization). The aggregate composite indicator (ACI) is built on the basis of already constructed composite indicators or of lower aggregate composite indicators.

The Aggregate Composite Indicator Competitive Forces (ACI_{CF}) is based on five composite indicators – threat of new entrants (CI_{TNE}), competitive rivalry (CI_{CR}), power of buyer (CI_{PB}), power of supplier (CI_{PS}), threat of substitution (CI_{TS}).

Table 2 contains the empirical indicators, on the basis of which each of the five composite indicators is constructed; scores – the arithmetic mean values of the estimates of the units in the sample, measured on a scale of 1-low to 5-excellent for the 'Power of buyer' indicators, while the rest are on the scale of 1-strongly unattractive to 5-strongly attractive; the weights calculated by PCA, with which the scores are weighted when calculating the composite indicator.

The adequacy of the application of PCA to determine the weights of the empirical indicators is revealed by the values of the statistical characteristics in Table 3 (see section 3, first stage).

Out of the five composite indicators, we will present the construction of the composite indicator for the evaluation of the 'Competitive rivalry' factor. The result of the PCA, applied to the empirical indicators for this factor with an extraction method based on eigenvalue greater than 1 is one factor (component) that explains a very small proportion of the variance – 56%. The desire to explain the largest possible percentage of variance leads to the choice of a two-component solution. The second component will add another 34% to the variance explained, i.e. a total of 90% for both factors, despite its lower initial eigenvalue value (0.838).

Table 2

Factor 'Competitive forces' – empirical indicators (elements and characteristics), score and weight

Barriers to entry into the industry/Threat of new entrants			Competitive rivalry			Power of buyer			Power of supplier			Threat of substitution		
Empirical indicator	Score x_i	Weight w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i
Capital requirement	2,65	0,102	Number of equal competitors	3.10	0.136	Number of significant users	3.05	0.268	Number of significant suppliers	3.20	0.226	Threat of substitute products	2.50	0.500
Product differentiation	3.25	0.165	Diversity of competitors	3.55	0.149	Brand loyalty	3.90	0.266	Threat of forward integration	2.80	0.263	Availability of products with similar characteristics (substitutes)	2.45	0.500
Image and imposed trademark	3.75	0.131	Operating costs	3.20	0.177	Consumer tastes and preferences	3.90	0.229	Transfer costs to other suppliers	2.85	0.276			
Access to technology	3.80	0.081	Image of competitors	3.10	0.196	Proximity to users	3.20	0.238	Contribution of suppliers to quality	2.95	0.235			
Access to raw material and material suppliers	3.65			3.30	0.196									
Access to intermediaries and distribution channels	3,25	0,135	Differentiation of competitors	3.10	0.146									
Economies of scale	2.85	0.081												
Access to finance	3.00	0.138												
$\sum x_i w_i$	3.30		$\sum x_i w_i$	3.22		$\sum x_i w_i$	3.51		$\sum x_i w_i$	2.94		$\sum x_i w_i$	2.48	

Source: Author's research work

Table 3

PCA and Cronbach's Alpha coefficient results applied to the elements of each of the five competitive forces

Statistical characteristic	Theoretical limits	Barriers to entry into the industry	Competitive rivalry	Power of buyer	Power of supplier	Threat of substitution
Bartlett's Test	Sig.<0.05	0.000	0.000	0.050	0.000	0.000
Kaiser-Meyer-Olkin measure	KMO > 0.5	0.501	0.808	0.544	0.784	0.500
Min Eigenvalue	1.0	1.043	0.838	1.229	3.405	1.752
Extraction Sums of Squared Loadings – Cumulative %	Min 60	81.253	89.817	76.806	85.113	87.613
Components	-	3	2	2	1	1
Cronbach's Alpha coefficient	$\alpha > 0.6$	0.783	0.931	0.584	0.931	0.858

Source: Author's research work.

The source information for calculating weights is loadings (l_i) from the rotated[9] component matrix Varimax, in which the coefficients are sorted by size (an automatic option in IBM SPSS Statistics 25). For each empirical indicator of the two components, a proportion of the variance explained by it is calculated out of the total variance explained with the component. For this purpose, the following are calculated: 1) Squared loadings (l_i^2); 2) Sum of squared loadings (L_i)[10] for the component-related empirical indicators; 3) % of Variance (l_i^2/L_i). All these calculations are made only for the component-related empirical indicators.

The first of the two intermediate composite indicators (components in PCA) includes 'industry growth' (X5) with weight 0.293=0.901/3.070, 'operating costs' (X3) with weight 0.266=0.816/3.070 and 'differentiation of competitors' (X2) and 'diversity of competitors' (X6) respectively with weights 0.223=0.684/3.070 and 0.218=0.670/3.070. The second intermediate composite indicator includes 'Image of competitors' (X4) with weight 0.590=0.901/1.527 and 'number of equal competitors' (X1) with weight 0.410=0.625/1.527.

The two intermediate indicators are aggregated with weights equal to the relative proportion of the variance explained by them: 0.668 = 3.070 / (3.070 + 1.527) for the first and 0.332 = 1.527 / (3.070 + 1.527) for the second.

Table 4

Defining a composite indicator for the 'Competitive rivalry' factor

Empirical indicators (factor elements)	Code	Loadings (l_i)		Squared loadings (l_i^2)		% of Variance (l_i^2/L_i)	
		1	2	1	2	1	2
Industry growth	X5	**0.949**	0.178	0.901		0.293	
Operating costs	X3	**0.903**	0.296	0.815		0.266	
Differentiation of competitors	X2	**0.827**	0.398	0.684		0.223	
Diversity of competitors	X6	**0.818**	0.483	0.670		0.218	
Image of competitors	X4	0.196	**0.949**		0.901		0.590
Number of equal competitors	X1	0.493	**0.791**		0.625		0.410
Sum of squared loadings *(L_i)*				3.070	1.526		
% of variance explained by component						0.668	0.332

Source: Author's research work; i – component number.

The thus composite indicator 'Competitive rivalry' has the following linear expression:

$$CI_{CR} = (X5*0.293 + X3*0.266 + X2*0.223 + X6*0.218)*0.668 + (X4*0.590 + X1*0.410)*0.332$$

$$= 0.196*X5 + 0.177*X3 + 0.149*X2 + 0.146*X6 + 0.196*X4 + 0.136*X1 = 3.22$$

[9] Rotation Method: Varimax with Kaiser Normalization.

[10] In the case of more than one component, this sum is smaller than 'rotation sums of squared loadings' from table 'Total Variance Explained' from SPSS output.

The weights[11] of the empirical indicators are the coefficients in the transformed equation after the parentheses are opened.

The value for the composite 'Competitive Rivalry' indicator can be obtained in two ways. The first is to calculate it for each sample unit and then calculate their arithmetic mean. The second is to calculate it from the sum of the products of the scores and their respective weights - $\sum xi * wi$.

After calculating the other four composite indicators, the aggregate composite indicator 'Competitive forces' is obtained as an arithmetic mean of their values:

$$ACI_{CF} = (CI_{TNE} + CI_{CR} + CI_{PB} + CI_{PS} + CI_{TS})/5 = (3.30 + 3.22 + 3.51 + 2.94 + 2.48)/5 = 3.09$$

The higher value for both the composite indicator as well as the aggregate composite indicator attests to the higher attractiveness of the environment with respect to the given factor. This identifies those factors that are identified as key to shaping the competitiveness of the enterprise as they identify the capabilities of the environment in which it operates.

4.2. Results of the applied model for the evaluation of the competitiveness of a micro and small enterprises from the wine-producing industry

To evaluate the competitiveness of micro and small enterprises in the wine-producing industry, an aggregate composite indicator is calculated that summarizes the values of the aggregate composite indicators of the internal and external environmental factors.

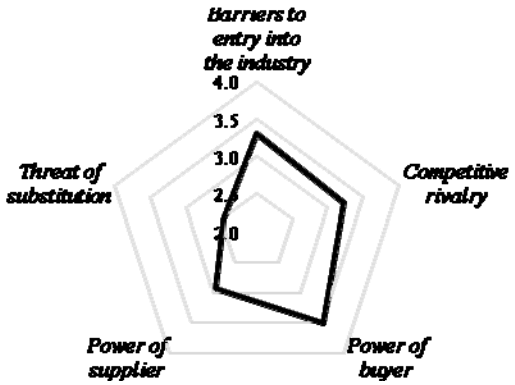
The aggregate composite indicator of environmental factors determines the attractiveness of the industry for the competitiveness of micro and small wine-producing enterprises and represents a mean of the composite indicator 'Factor conditions' and the aggregate composite indicator for 'Competitive forces'. The value of CI 'Factor Security' is 3.46 and the ACI 'Competitive Forces', whose construction we presented in section 4.1, is 3.09. Thus, ACI 'External Environment' has a value of 3.27. On the given scale: from highly attractive (5) to highly unattractive (1), **a score of 3.27 defines the industry as neutral** in terms of its attractiveness for the operation of micro and small wine-producing enterprises and the shaping of their competitiveness.

The Competitiveness Polygon (Figure 2), depicting the values of the composite indicators included in the ACI 'Competitive forces' modelled on the competitive forces operating in the industry, reveals that the leading factor (with the highest score) in shaping the competitiveness of the micro and small wine-producing enterprises, is the factor 'Power of buyer' – 3.51. Given a scale of 1 to 5, the industry is attractive in terms of that factor. The lowest is the factor 'Threat of substitution' – 2.48, which makes the industry unattractive relative to it. This confirms the importance of using the marketing concept to deliver value to consumers in order to gain value from them.

[11] Once again, we note that the weighting is only used to correct the overlapping information between two or more correlating indicators and is not a measure of theoretical significance.

Figure 2

Polygon of the Competitive Forces operating in the industry



Source: Author's research work.

In order to test the explanatory power of the composite indicators constructed in the study, a link between them and other variables should be sought (OECD, 2008, p. 39). In this case, these are the variables that differentiate the leaders[12] from the other wine-producers in the studied population.

Leaders in sales revenue and profit (Figure 3) rely heavily on analysis and comparison with competitors, while other wine producers place emphasis on the benefits generated by the barriers to entry into the industry. The leaders' evaluation is also higher in terms of the strength of the suppliers and substitute products, which testifies to the strategic direction they have set for imposing a competitive product and diversification and integration strategies.

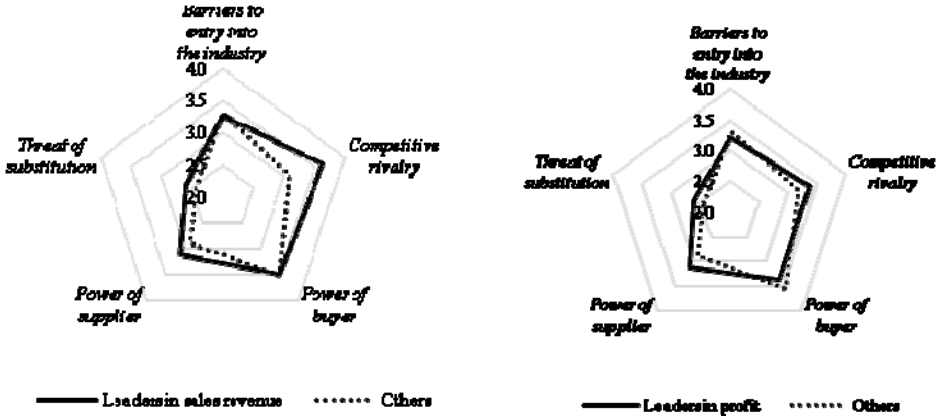
There is a tangible difference in the power of evaluation of the factors of the industrial environment by the leaders in fixed assets in comparison with the other wine producers. The reasons can be found in their investment opportunities (on the basis of available assets), in absorbing the opportunities of the business environment and in counteracting competitors – current and potential.

The in-house analysis part of the study aims to identify the main sources for the generation of competitive advantages and the determination of the competitive status of micro and small wine-producing enterprises (their competitiveness at the time of the survey).

[12] In terms of sales revenues, profits and fixed assets, according to information provided by the NSI for the purposes of the study.

Figure 3

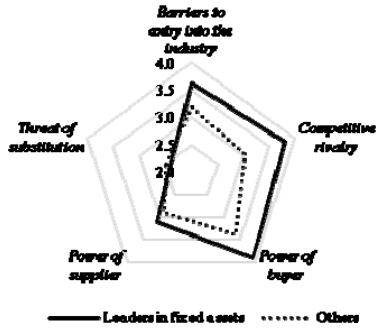
Polygon of the competitive forces, comparative analysis by sales revenue and profit



Source: Author's research work.

Figure 4

Polygon of the competitive forces, comparative analysis by fixed assets.



Source: Author's research work

For this purpose, an aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises in the wine-producing industry is derived, which is defined as the arithmetic mean of the composite indicators of the internal environment factors: a composite indicator of the management factor and an aggregate composite indicator of the marketing mix.

The value of the composite indicator of the factor 'Management' is 4.06,[13] which in the accepted scale for the evaluation of the degree of utilization of this factor for the generation

[13] 1 (to a very small degree) to 5 (to a very large degree).

of competitive advantages, certifies that micro and small wine-producing enterprises rely heavily on the management tools in the formation of its competitive advantages.

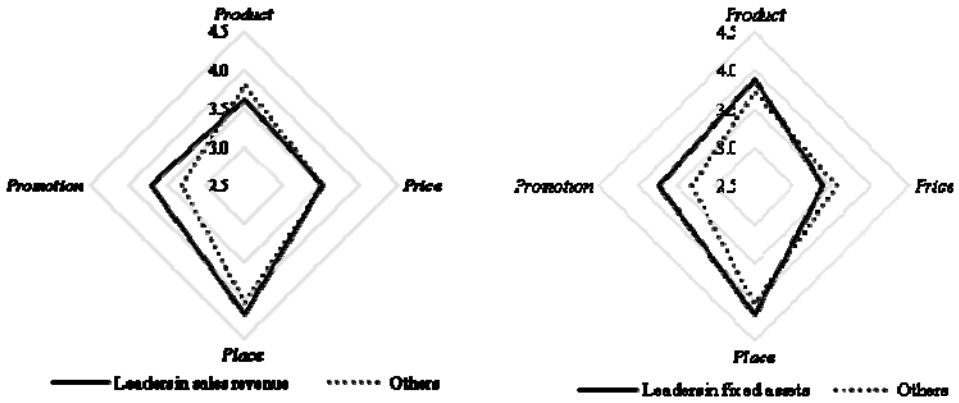
To define the aggregate composite indicator of the marketing mix, the constituent indicators of its elements – product, price, place (distribution) and promotion – are successively defined.

The composite indicator of the Marketing mix factors (4P) is calculated as the arithmetic mean of the composite indicators of its elements – Product (3.76), Price (3.51), Place (4.07) and Promotion (3.41), and has a value of 3.69. In the adopted scale, the evaluation of approximately 4 certifies that micro and small wine-producing enterprises rely heavily on the tools of the marketing mix in the formation of competitive advantage.

Of all the instruments (factors) of the mix, the highest rating is given to the 'Place' sub-mix, covering product sales activities. Emphasis on the distribution strategy is also observed in the leaders in the industry as well as in the other wine producers, but with some specifics (see figures 5 and 6).

Figure 5

Factors for the generation of competitive advantage, comparative analysis by sales revenue and fixed assets



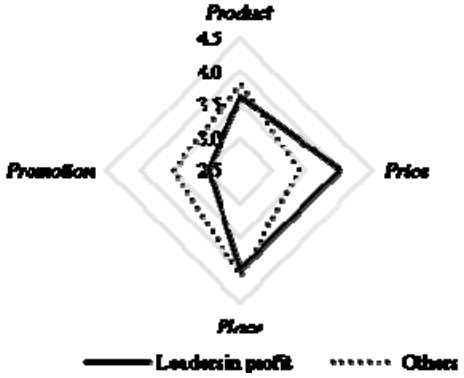
Source: Author's research work.

In shaping their competitive advantages (or their competitiveness), leaders in sales and fixed assets rely primarily on value-added activities, with the highest average being given to the 'Promotion' and 'Place' factors. There are differences in the valuation given to the factor 'Product' for the generation of competitive advantages, which is higher among fixed assets leaders.

Profit leaders rely on the factor 'Price' and, to a lesser extent, on 'Place' than other wine-producing enterprises. This explains their strategic focus of achieving the highest profitability among their competitors through price.

Figure 6

Factors for the generation of competitive advantage, comparative analysis by profit



Source: Author's research work.

The value of the aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises in the wine-producing industry is (4.06 + 3.69) / 2 = 3.88 and shows that micro and small wine-producing enterprises rely heavily on the factors of the internal environment in the formation of competitive advantages and increasing their competitiveness.

Conclusion

The proposed model (algorithm) for the evaluation of the competitiveness and derivation and simultaneous monitoring of the values of the aggregate composite indicators, allows for an in-depth study and analysis of the competitiveness of industrial enterprises (competitive status) and the possibilities for its enhancement (competitive potential).

The results of the study prove that competitiveness is an ability of differentiation for the micro and small wine-producing enterprises – both a goal, a means, a challenge, and a direction for development and result of their activity, which substantiates its importance for the industry as a whole. Differentiation is aimed at creating and maintaining competitive advantages derived through corporate management, with a focus on the marketing mix toolkit, relying on the marketing concept of value creation. This is fundamental in the formation of the competitive status of wine-producing enterprises.

There is a competitive potential in the wine-producing industry, whose proper establishment and successful development would assist in increasing its competitiveness on a global scale. Such a potential was identified in the implementation of existing and 'gaining momentum' good practices in the sub-sector, in the tendencies formed in the development of the sector, in the opportunities for promotion and sale of Bulgarian wine on the international markets, in carrying out joint (related) activities in the development of wine tourism and the imposition of regional wines and the region's identity on the global wine market.

Applicability

This model could also be approbated in other sectors of the economy when examining the competitiveness of the industrial enterprises operating therein.

References

Dimitrova, G. (2019). Competitiveness of micro- and small enterprises from wine industry (the example of Plovdiv region). University Publishing House 'P. Hilendarski', 260 p., ISBN 978-619-202-512-0 (print), ISBN 978-619-202-512-5 (online). (Publication in Bulgarian: Конкурентоспособност на микро- и малките предприятия от винарската индустрия (на примера на област Пловдив), П. УИ „Пловдивски университет").

Garelli, S. (2002). The Competitiveness of Nations in a Global Knowledge-Based Economy. WCY, p. 3, http://www.caps.am/data.php/881.pdf.

Keskinova, D. (2018). Construction of composite indicators with cluster analysis. University Publishing House 'P. Hilendarski', 134 pages, ISBN 978-619-202-369-0 (Print), 978-619-202-370-6 (Online). (Publication in Bulgarian: Изграждане на съставни индикатори с клъстерен анализ, П. УИ „Пловдивски университет").

McCarthy, E. (1960). Basic Marketing: A Managerial Approach. Richard D. Irwin, Homewood (II).

OECD. (2008). Handbook on Constructing Composite Indicators: Methodology and User Guide. pp. 31.

Porter, M. (1980). Competitive Strategy: Techniques for analyzing industries and competitors. New York: The Free Press.

Porter, M. (2010). Competitive Strategy. Techniques for Analyzing Industries and Competitors. S., 'Classic and Style', ISBN: 9789543270668. (Publication in Bulgarian: Конкурентна стратегия. Техники за анализ на индустрии и конкуренти. С. "Класика и стил").

Porter, M. (1998). The Competitive Advantage of Nations. 2nd ed. New York: Free Press (1st ed. New York: Free Press, 1990).

Porter, M. (2004). The Competitive Advantage of Nations, S.'Classiks and Style', ISBN: 9789543270934. (Publication in Bulgarian: Конкурентното предимство на нациите. С. "Класика и стил").

Shmelev, N., Vaganov, N., Danchenok, L. (2004). Strategic Analysis. Textbook, Moscow Finance and Industry Academy, M, MFPA, p. 4.

Stoyanova, D., Madjurova, B., Raichev, S. (2019) Social Cohesion (Bulgaria – EU – Western Balkans). – Economic Studies, Vol. 28, N 3, 2019, pp 96-124, ISSN: 0205-3292.

Veleva, A., Ruseva, M. (2016). Combinative Approach in Statistics. University Publishing House 'P. Hilendarski', ISBN: 978-619-202-199-3. (Publication in Bulgarian: Съвкупностният подход в статистиката, П. УИ „Пловдивски университет").

EAVW, Report, 2016, http://www.eavw.com/updocs/2017021487593072_Godishen%20Doklad%20EAVW%202016.pdf.

Vinoblog, https://www.vinoblog.eu/osnovni-polozheniya/what-is-terroir/.