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The relationship between unstructured information and marketing knowledge: an experiment in the US wine market

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Abstract: The aim of this paper is to assess, with a view to marketing strategies, the potential of a marketing intelligence software application designed to extract information from non-structured web sources (typically websites and social media). The paper also proposes a conceptual model that SMEs can use to transform simple qualitative and quantitative data into knowledge that is useful for supporting the decision-making process in the context of international marketing. The presentation of the proposed interpretative model is followed by the application to the wine market in the USA. Comparison of the themes typical of online discourse in the worlds of supply and demand highlights a certain communicative misalignment that SMEs can resolve by adopting suitable communicative strategies.

Keywords: marketing intelligence; information extraction; wine; consumer behaviour; text mining; website; social network.

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Amedeo Maizza is Full Professor of Economics and Business Management affiliated to the Department of Management, Economics, Mathematics and Statistics, University of Salento (Lecce). He is Dean at the Faculty of Economics and Rector's Delegate for Territorial Relationship. His research interests include marketing, management for tourism, wine and agrifood business.

1   Introduction

For SMEs, the commercial opportunities offered by the global context, as well as the growing abundance of information sources and the relations that derive from these, can enable to create value only if they adopt suitable *market-oriented* managerial approaches. In this framework, the strategic focus shifts from tangible goods to *knowledge*, which thus becomes the most important asset a company can make use of to acquire competitive advantage (Lang, 2001; Marinova, 2004; Rossi et al., 2012, 2014).

In this sense it is clear that the considerable spread of social networks on the web enables – among other things – access to an extraordinary wealth of information (Chiarvesio and Di Maria, 2008; Kotler et al., 2012), which for SMEs in particular has considerable potential value. Indeed, the speed and flexibility with which technological networks transmit information, symbols and narratives make these resources easily accessible and exploitable, provided that companies are able to create an efficient system for extrapolation and subsequent learning (Rullani, 2006). The dynamic nature of information thus acquires further value from the various forms of inter- and intra-organisational social interaction (Rullani, 1994; Nonaka 1994; Dagnino, 2000), which enable its enrichment, selection and dissemination, facilitating the evolution of knowledge.

The objective of this study is thus to assess, with a view to marketing strategies, the potential value derived from the extrapolation of information from "non-structured" web sources, understood as those typically found in blogs, forums, social networks, websites etc. (Costantinides and Fountain, 2008). To this end, a special marketing intelligence software application was designed and implemented by a team of researchers including the authors of this paper (Scorrano et al., 2013). This paper also puts forward a conceptual model that can act as a driver of interpretation and learning. Using this model, information can be extrapolated and transformed into knowledge that is useful for managerial decisions.

2   Theoretical context

In the current competitive context, characterised by rapid change, globalisation and the intensification of competition in all sectors, analysis of consumer behaviour and consumer relations with the brand and the product are fundamental for the acquisition of competitive advantage (Crescimanno and Galati, 2014; Galati et al., 2014). Knowledge of the cognitive and behavioural elements that characterise the purchasing process (Mowen, 1995; Peter and Olson, 1996; East, 1997; Dalli and Romano, 2003; Solomon, 2004) is becoming increasingly important to the creation of value for the client and hence the creation of economic value for the company.

The spread of social networks further enhances this situation and the role of the consumer in marketing processes (Schmitt, 1999), making it necessary to carefully monitor the content of the web. It has also become necessary to interpret conversations and to create one's own 'conversational relations' (Stokes, 2000) founded on the application of marketing techniques and tools that exploit the potential of bi-directional communications (Brioschi, 2005).

Based on these considerations, this paper belongs to the category of *Integrated Marketing Communication studies* (Kitchen and Burgmann, 2004; Groom and Frei, 2008; Yeshin, 2012), according to which relational architecture redefines the content co-created via social interactions, reconfigures the adopted channels, and brings together various forms and flows based on *one-to-many*, *one-to-one* and *many-to-many* communication. These new communicative forms, derived from *Web 2.0* (O'Reilly, 2005) and its subsequent evolution, are characterised by their horizontal and bi-directional nature, and entail the active participation of the client and the auto-generation of content (Solima, 2010; Riva, 2010). The opportunities in knowledge terms of these forms are considerable, especially for SMEs, which, with relatively low costs, can operate in a web marketing environment. Today, thanks to the development of the Web and information technology, only a small part of the information contained in digital sources is in structured form, most of it being either semi-structured or non-structured (typically websites and social media). While extraction from structured sources is facilitated by the presence of consolidated languages and retrieval techniques, the legibility of non-structured documents is made more complex by the ambiguity of the natural language. This in turn makes it more difficult to process them using software. In the last few years, the development of Information Extraction techniques (IE) has produced text mining models (Rajman and Besançon, 1998) for acquiring significant concepts from non-structured sources (Wu, 2002). These tools use Natural Language Processing (NLP), a type of semantic analysis which, by seeking to mimic the mechanism of human learning, yields results containing semantically linked concepts (Chowdhury, 2003). The semantic approach of these models is often enhanced by recourse to "ontologies" (Embley, 2004; Wimalasuriya and Dou, 2009), i.e. formal and explicit descriptions of domains of interest which are necessary for structuring knowledge by means of common language (comprehensible and usable by people, applications, databases, etc.) and concepts.

3 Main research question

In agreement with the managerial literature that acknowledge the importance of extracting non-structured content in order to: (a) confer value on business processes (Costantinides and Fountain, 2008); (b) monitor consumers' intentions and behaviours; (c) offer interactive experiences; (d) generate content that is suitable for the context of reference (Biloslvao and Trnavcecic, 2009; Chen and Chiu, 2009; Barrutia et al., 2009; Lim et al., 2011), the paper proposes an application to answer the following qualitative-explorative research question:

- How can information extracted from non structured sources be useful for supporting the decision-making process in the context of international marketing?

The empirical application of the theoretical model was conducted by the case study technique, centred on the wine sector in order to observe the communicative processes of wine producers and distributors, the perceptive processes of consumers and the degree of convergence of previous processes.

4 Research methodology

The proposed theoretical model was conceived in view of the software's architecture and functions (Semantic Marketing Intelligence, Paiano et al., 2013), borrowing from the question-answering approach and adapting it to marketing-oriented purposes (Voorhees, 1999; Cooper and Ruger, 2000; Kwok et al., 2001).

Two key aspects of the theoretical model described below (Figure 1) are:

- the *operational framework*, including the preliminary phase before extraction of the data and the processing and visualisation phases;

- the *interpretative framework*, regarding the interpretation of the data in order to obtain knowledge useful for decision-making.

Figure 1 The model framework
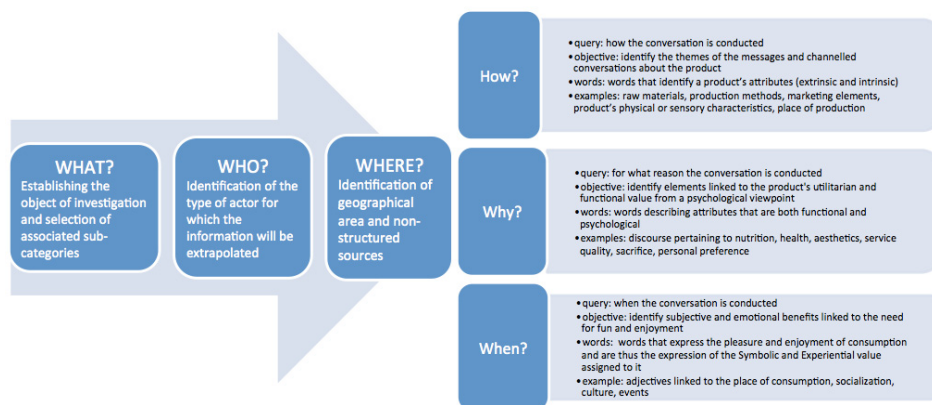
4.1   The operational framework

The operational framework envisages three dimensions of operational analysis:

4.1.1   Pre-identification of the variables

The software function flow is characterised by a preliminary phase involving identification of the sources from which the information is to be extracted. This enables the creation of a database that can be personalised by classifying the sources by type (e.g. blogs, buyer sites, restaurant sites, etc.) and the geographical area of reference (e.g. Germany, the USA, Australia). Specifically, the variables were identified on the basis of painstaking analyses designed to answer the following questions:

- *What?*: identification of the object of investigation and, where necessary, selection of associated sub-categories that can better describe it in semantic terms;

- *Who?*: identification of the type of actor from which the information will be extrapolated. This variable depends heavily on the type of source being analysed (see Table 1);

- *Where?*: identification of two spatial dimensions: 1) geographical (e.g. the USA), which may be based on information of a mainly macroeconomic nature derived from existing analyses of "structured sources" (reports already available in paper or electronic form). In the section dedicated to this specific type of source, based on suitable managerial models, the software is able to process information from structured web sources already inserted in the database and to signal the attractiveness of the foreign market being analysed; 2) virtual, which involves the identification of the non-structured sources on which to conduct the research. Following a bottom-up logic, it activates a crawling process based on a set of search queries that enable detection of the textual content that is most closely associated with the relationship between *research term* and *information source* (e.g. wine buyer/wine blog). This phase is closely linked to the type of actor for which the information will be extrapolated (i.e. the *Who?* above). To this end, we propose here a taxonomy of sources based on the relationship between the nature of the source and the specialisation of the retrievable information (Lombardo et al., 2007; Metzger and Flanagin, 2008).

The sources identified are first inserted into a database module which memorises the sources from which to extract the data and key words, as well as the searches and processing carried out by the user and the system, with the relative results. This information can be shared with other users of the software or restricted to the user's personal profile.

4.1.2   Processing of information content

This phase starts with the selection of one or more sources from those previously inserted in the database, or others inserted manually by the user, followed by an indication of the degree of depth for navigation (in terms of the number of pages) inside each selected

source. An advanced version of the software introduces a further level of analysis, making it possible to specify for each source the most interesting sections from which to start the search. Extraction of the sources from the database can be filtered by recourse to "key words" (derived from international glossaries or using a specific ontology), which makes the selection more effective.

Table 1   Non-structured sources and specialisation of information

Macro categories of sources (Where?)	Micro categories of sources (Where?)	Actors (Who?)	Specialisation of information
Social sources	Generic/thematic blogs	Bloggers and users	Low/high
	Forums and communities	Discussants and members	High
	Twitter	Users	Medium/high
General information sources	Reviews/magazines	Writers	Medium/high
	Newsletters	Editors	Medium/high
Events	Fairs/exhibitions	Organisers/exhibitors	Medium
Distribution	Buyers	Distributors/sales agents	High
	Restaurant	Owners/consumers	Medium/low
Production	Player's websites	Producers	High

4.1.3 Visualisation of the output

The *Knowledge Presentation* module makes it possible to:

- manage a tag cloud, which is a visual representation of the most frequently recurring concepts associated with the pre-selected key words and the content of the analysed sources. In order to obtain the representation in tag cloud format, the system (designed to be multilingual): (1) extracts the number of pages specified by the user for each source, (2) queries an ontology in order to verify whether it is possible to add other semantically correlated words to those already indicated, (3) selects the most frequently recurring concepts and words for each source and calculates the number of occurrences in the text, representing their importance graphically by varying the dimension of the character.

- extract, by analysing YouTube, IMDB, Amazon.com, Crunchbase, Flickr, Twitter, etc., images and articles related to the search performed (on the basis of the pre-selected sources and key words), as well as a list of authors of posts, where present.

4.2 The interpretative framework

The construction of the *interpretative framework* of the tag cloud followed the quantitative content analysis approach (Berelson, 1952; Krippendorff, 1980; Weber, 1990). The textual analysis makes it possible to detect the differences and similarities between the messages being channelled and – since these are also social tools – the process of co-creation of themes by consumers.

Adopting the logic of text mining (Bolasco, 1997; Feldman and Sanger, 2007), which underpins the content analysis method, the object under investigation and any sub-categories identified are considered *context units*, while the words or groups of words highlighted by the tag cloud are considered *analysis units*. In accordance with relevance theory, according to which "an input is relevant to an individual when its processing in a context of available assumptions yields a positive cognitive effect. A positive cognitive effect is a worthwhile difference to the individual's representation of the world" (Sperber and Wilson, 1995), only that part of the analysis units that prove to be consistent with the objective of the study and the investigation will be taken into account.

The *bag of words* (i.e. the mass of analysis units) will be interpreted by filtering the words (see Figure 2) that appear most relevant in that they answer the following questions:

1   *How?*: i.e. how the conversation is conducted in the pre-identified non-structured sources. This serves to identify the themes of the messages and the channelled conversations about the product itself. This dimension includes words that identify a product's attributes, often classified by the managerial literature into extrinsic and intrinsic attributes (Olson and Jacoby, 1972; Zeithaml, 1988; Teas and Agarwal, 2000). Extrinsic attributes are "external" to the product – raw materials, production methods, marketing elements (packaging-labelling, price, reputation, brand name), with respect to which consumers do not play an active role since their perception is generally shaped by the company by means of communication. Intrinsic factors are the product's physical or sensory characteristics, its place of production and its uniqueness. Regarding these elements, the consumer is able to express a personal assessment based on his/her direct experience of consumption. In the assessment process, intrinsic elements generally prevail over extrinsic factors, assuming greater overall importance in the consumer's perception and assessment of the product, reducing the information asymmetries between seller and purchaser. Indeed, thanks to the intrinsic attributes, consumers can strengthen or modify the perception of the product that they had previously formed in response to the effect of the extrinsic elements. However, extrinsic product factors become important in situations where the intrinsic ones are hard to discern or not available.

2   *Why?*: i.e. for *what reason the conversation is conducted*. This takes account of elements linked to the utilitarian and functional value seen from a psychological viewpoint (Kempf, 1999). This category thus includes words describing attributes that are both functional and psychological – pertaining to nutrition, health, aesthetics, service quality, sacrifice, personal preference, etc. (Blackwell et al., 1999; Cronin et al., 2000; Gallarza and Gil, 2006).

3   *When?*: i.e. *when the conversation is conducted*. This includes searches for subjective and emotional benefits linked to the need for fun and enjoyment. This makes it possible to gauge the hedonic value assigned to the product, which is not necessarily linked exclusively to the moment of its consumption, but can also make itself felt during the search for information. These categories include words that express the pleasure and enjoyment of consumption and are thus the expression of the Symbolic and Experiential value assigned to it (Holbrook and Hirschman, 1982; Babin et al., 1994; Sheth et al., 1991; Sweeney et al., 1996).

Figure 2 Dynamic analysis of non-structured web sources; USA wine market – producers/ distributors (see online version for colours)
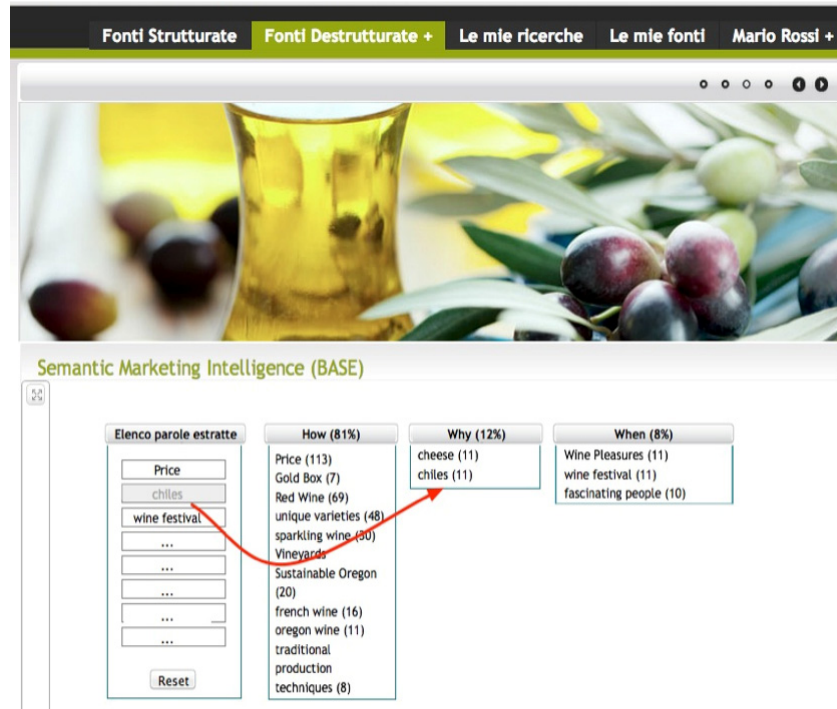
The proposed interpretative dimensions and the process of assigning words to each category (see Figure 2) meet the current need to engage the consumer. To this end, the proposed method starts with the product's extrinsic and intrinsic attributes cited above in sub-point (1), passing through psychological abstraction (sub-point 2) and finally reaching its hedonic attributes (sub-point 3), which represent the end-point of the process of product perception by the consumer.

5 Empirical applications in the wine sector

5.1 Pre-identification of variables relevant to the proposed model of analysis

In order to start the experimentation phase of the software it was necessary to pre-identify the variables linked to the specific case under consideration:

- *What?* Attention was focused on the wine sector, since it represents an important pillar of the Made in Italy brand. Italian and other operators in the sector are facing new market challenges as a result of an increasingly competitive environment characterised by an extensive range of production and consumption contexts;

- *Where?* Two spatial dimensions of analysis were considered:

  - the geographical area being studied: the wine market in the USA was chosen. In 2013 the USA became the world's biggest consumer of wine by volume: 29.1 million hl (OIV, 2014);

- the virtual environment in which to conduct the research: the non-structured sources were identified by performing a search on *google.com* on 13 December 2013 using the following search terms: wine blog, wine blog US, wine blogger, wine review, wine magazine, wine magazine US, wine forum, wine fair, wine fair US, wine exhibition, wine buyer US, wine producer US, Italian wine US. The results on the first two Google pages were selected and their URLs (223 in total) were archived in the software's database in the section dedicated to the USA.

The investigation was then conducted on all the above web sources since, taken together, they can channel information on both demand and supply. Specifically:

- analysing sites linked to supply (*Who?* producers, buyers, fairs/exhibitions), it was possible to confirm that discussion and commercialisation of "wine" as a product in the narrow sense in the USA is characterised by certain macro-themes (*How?*); the next step was to explore the *When* and *Why* dimensions in order to understand whether and how these aspects are expressed by those parties responsible for supply;

- analysing blogs, forums reviews and magazines (*Who?*) made it possible to observe *How*, *When* and *Why* consumers speak about wine in the US market, identifying words that can be considered markers of their perception of the product's attributes as highlighted by producers and distributors.

5.2   Extraction of information on players and consumers: findings

Hypothetical answers to the questions How, Why and When in the US wine market lead to the following considerations, based on careful observation of the tag clouds (see Figures 3 and 4), as well as on the sub-classification of the attributes of the product described above. The clear usefulness of these results seems to answer the research question widely.

5.2.1   Analysis of supply

In the process of communication on the web, wine producers and distributors assign greater importance to the "*How*" interpretative dimension, and thus frequently use terms that refer to elements that are extrinsic (accounting for 75% of the total) and intrinsic (10%) to the product itself. Specifically, these operators focus on one of the traditional levers of the marketing mix, i.e. price, but also on the raw materials and production methods used to make the product. In this regard, consider that the USA (especially California) belongs to the so-called "New World" of wine (together with Australia, Argentina, Chile, South Africa and New Zealand). This category is usually understood to include countries characterised by a business model oriented to obtaining broadly homogeneous products based on the grape variety, unconnected to the region of origin and therefore easily obtainable in a variety of contexts. This is confirmed by the data. Indeed, the discussion refers to "red wine", "pinot noir" and "international wine" in a general sense, without referring to autochthonous grape varieties, and no importance is assigned to the place of production. Concerning intrinsic attributes, only terms that recall the characteristics of the product ("natural", "sustainable") are used.

In the communication process, considerably less importance is assigned to Psychological *attributes* (which answer the question *Why?*). Clearly the producers-distributors do not believe that psychological needs represent a particularly important factor guiding the consumers' choice of purchase. The same may be said of the *Pleasure* aspects linked to the moment of consumption (*When?*), to which producers-distributors do not assign particular weight in their communication.

Figure 3 Tag cloud for producers/distributors (see online version for colours)

Source: Authors' presentation of data

5.2.2   Analysis of demand

Analysis of the content of communication among US consumers regarding wine as a product indicates a near-perfect balance in the use of terms referring to the product's extrinsic and intrinsic attributes, both of which answer the question *How*.

Specifically regarding extrinsic attributes, there is a prevalence of words that refer to the raw materials used and the types of product (especially "Pinot noir", "Benoît Lahaye", "Sauvignon Blanc", "Cabernet Sauvignon"). This shows good knowledge on the part of the US consumer of international grape varieties. This circumstance may represent the true consequence of the product and communication strategy that has been applied for years in the USA, based precisely on the homogenisation of the product and thus on the international uniformity of the materials used. For this reason, presenting wine from Old World countries (Italy, France, Spain, Germany) to consumers in the USA today means finding a new communication strategy which, given the incorrect perception of the characteristics and uniqueness of these products, must aim to have a cultural and educational impact on US consumers.

The analysis showed that unlike producers-distributors, consumers do not assign particular importance to price. Of the marketing aspects they attribute value only to the bottle, which they often cite in their online conversations. Clearly, for the US wine consumer, the "traditional" bottle still has a recognised value in terms of marketing, and any attempt to enter this market using other types of packaging may not lead to positive results.

Of the intrinsic attributes, consumers assign high importance to the product's characteristics, particularly "*flavors*" and "*prestige cuveè*", which they assess personally and subjectively at the moment of consumption. This assessment is probably also influenced by their knowledge of the wine's place of production and by aspects linked to

its uniqueness. Indeed, unlike the producers, consumers assign great weight to this variable, which they cite using terms such as "Bordeaux", "Champagne", "Napa Valley", "good cellars".

The answer to the question *Why* (i.e. why consumers talk about wine) lies in the use in online conversations of terms that recall nutritional aspects of wine consumption, such as "food", "cooking" and specific cooking methods. Consumers assign greater importance to these aspects than producers.

Concerning the question of *When*, the analysis highlights the considerable importance assigned to enjoyment and pleasure at the moment of consumption. This was predictable, given that consumers tend to share the psychological and subjective aspects of consumption, which are based on direct personal assessment. Consider terms such as "people", "wine lovers", "wine world", which are all linked to moments of socialisation in which the consumer is directly involved thanks to the consumption of wine.

Figure 4   Tag cloud for consumers (see online version for colours)

Source: Authors' presentation of data

5.2.3   *Comparison of supply and demand*

Comparison of the themes characterising the online discourse of the worlds of supply and demand highlights a certain communicative misalignment, since the producers-distributors focus their attention above all on extrinsic elements, which they are able to manage directly and unilaterally. Consumers form an initial verdict on the quality of the product precisely in response to these elements, which they perceive passively since they do not yet possess the elements to express their own assessment.

Observation of the themes tackled by the demand side demonstrates a substantial balance between the three macro-elements of product perception (extrinsic, intrinsic and functional-psychological), with a slight prevalence of themes linked to the third of these categories.

This indicates the capacity of consumers to initiate their own process of assessment of the wine product, starting from the extrinsic attributes proposed by the company and subsequently revising their view by means of subjective evaluation. The latter is based on

a search for information and comparison with other consumers, taking account of the *Psychological and Hedonistic attributes* that make the perception of the product more complete and complex.

6 Conclusions and managerial implications

Today, verifying the tendencies and needs of the market by means of a careful analysis of web sources represents a significant opportunity for companies (Feldman and Sanger, 2007). However, the dynamic and complex nature of the wealth of information made available by these sources obliges companies to equip themselves with the technical tools necessary for an efficient extrapolation of the data, and to adopt managerial models that can facilitate the transformation of data into useful knowledge.

Implementation of the marketing intelligence software illustrated here represents an innovative and technologically advanced approach to supporting SMEs in the process of extracting information from non-structured web sources. Despite the presence of certain problems linked mainly to the interpretation phase, the proposed model possesses an important element of originality in that it can be adopted by any interested party in any context. The sequential conceptual model developed was conceived as a set of guidelines that facilitate the retrieval of useful information regarding competitors, markets and the financial system, via a process that enables companies to:

- identify the sources most suitable for their specific knowledge purposes;

- personalise the database (by type of source and geographical area of reference). This enables analyses to be replicated in time and space, broadening the spectrum of the research or studying the same sources in greater depth;

- convert the data into knowledge that is useful for decision-making purposes. This study demonstrates that the text mining logic adopted meets the need for enhanced knowledge in terms of:

    - competitive scenarios: highlighting the homogeneity (or lack of it) among markets, players, products and communication models, as well as any communicational gaps between players and consumers;

    - consumer behaviour, via: a) analysis of the shared characteristics of customers buying the company's products or those of competitors; b) monitoring of the behaviour of their customers in a given geographical area or with reference to a specific product; c) choice of which elements to include in their communication policy in order to obtain the highest response rate; d) observation of organised events for specific categories (buyers, consumers, tourists etc.) in order to assess perceptions and hence construct them for their own products.

The testing of the theoretical model conducted in the US wine industry has allowed us to obtain information for the purposes of marketing decisions in the international arena.

By way of example in terms of managerial implications and marketing insight, it can be seen that the analysis conducted enables Old World wine producers to define their value proposition by channelling it above all through the Psychological and Hedonic attributes, since it is these that are most closely associated with the distinct features and hence uniqueness of autochthonous wines. Indeed, the latter are the expression of a

region, its agricultural traditions and the experience of its wine growers, typically being made in strict adherence to the territorial and wine-making norms that the denominations require.

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