Introduction

The current context of French wine production is one facing many challenges when considering the world economic crisis as well as the globalisation of the wine market. This globalisation of the wine sector means that there is increased competition with New World wines which make up 21.4% of world exports, compared with the 18% share that France represents (ONIVIN, 2007). This is exacerbated by the decrease in French consumption over the past several years (Montaigne, 2006). Therefore, French wine producers have had to excel and produce extremely high quality products as well as adapting to new marketing strategies. Methods of marketing have had to consider the expectations and desires of consumers and to integrate the evolution of consumer behaviour. This includes an increase in occasional consumers and some new requirements from connoisseurs. With this in mind, we focussed closely on consumer expectations in the particular case of the Syrah grape variety.

There are four key stages of this study. Firstly, an overview of the research that has been done on Syrah and the consumer behaviour associated with it as well as the wider context of purchase behaviour for other food, and especially wine products. The second part consists of the construction of a methodology for the survey. This includes some proposed hypotheses for the behaviour of consumers based on the questionnaire responses from a convenience sample group, used to create a database. In the third section, the data collected through the survey is analysed, allowing us to propose a consumer behaviour model for Syrah wine which can then be used in order to confirm or disprove the ventured hypotheses. Finally, the main results are presented and some managerial recommendations are put forward, nevertheless taking the limits of the study and potential future research into consideration.

Previous studies

There are 8,000 varieties of grape worldwide (Rabinneau, 2009). Approximately fifty are widely used for the production of wines which include the Syrah grape (Garrer, 2002). There has been a five-fold increase in surfaces planted with syrah during the last two decades due to international demand. Simultaneously, vine technicians from IFV1 are reporting decay of syrah vines (Spilmon, Claverie, 2011). Confronted with a significant increase in wine alcohol content, there is interest in the technology of reverse osmosis, used to minimise this. In her thesis, Sophie Meillon (2009) studies the impact of this process and the reduction of alcohol content on the sensory perception of wines (Meillon et al, 2010). De Roany (2009) from the CNCCF2 touches on "the issues of the 21th century market". He envisages the extension of Syrah territory in France up to the north of France, replacing pinot noir in Burgundy and champagne due to the new climatic configuration. Some years ago, Dominique Depeil (2001) had proposed an optimization of the red wine making process according to the intended aromatic and gustative profiles of the particular wine being produced. Since then, very few articles on the subject can be found. "The majority of the information available is the personal experience of producers, merchants or market influencers. Evidently, this information is often confidential within companies" (Depeil, 2001). Some expert authors in the field, however, have proposed chapters on the subject (d’Hauteville, Serieys, 2008; Saulle, 2008). More recently, Parr et al. (2011) studied the representation of complexity in wine and the influence of expertise (Parr, 2008; Parr et al., 2002) as did Hughson and Boakes (2002) in analyzing the role of the knowledge in wine expertise. Information on wine and the differences in behaviour between wine professionals and wine consumers can help us to formulate our hypothesis. Charters and Pettigrew (2007) worked on the dimensions of wine quality. Other authors measured the perception of quality in food products and especially for red wine (Jover et al., 2004). In addition, we need to know what the consumer expectations are and which wine characteristics would appeal during the purchase and subsequent consumption of the product (Derbaix, Brée, 2000; d’Hauteville, Serieys, 2007).

In order to elaborate our questionnaire some of these researchers can help us with the semantics of the wine. Brochet and Durbourdieu (2001) have supplied descriptive wine language working to support the cognitive specificity of the chemical senses. Equally, Dubois and Giboreau (2006) work with descriptors such as attributes, labels, terms and names. The social representations, the consumer practice and the

Key words: Consumer behaviour, commitment/involvement, expertise, wine, Syrah vine, structural equations modelling.
knowledge level (Lo Monaco, Guimelli, 2008) are also important parameters in the case of wine. It seems that taste memory is affected by verbal aspects and perceptual expertise in the case of “misremembering” of wines (Melcher, Schoolder, 1996). During this same period, Solomon (1997) had studied conceptual change and wine expertise when Thorngate (1997) was working on the physiology of human sensory response to wine.

Finally, we must not forget to take into account the general trends of consumption of food products (Serieys, 2012).

Methods of research

An initial focus group was organised with wine professionals and apprentices, followed by the development of a questionnaire drawn up using Churchill’s paradigm (1979). This questionnaire was pre-tested on a group of 10 wine consumers but the second pre-test normally used in Churchill’s paradigm was not carried out. The consumers were asked if they drank wine and if they knew of Syrah. This introductory alternative question was used in order to determine if the questionnaire could be continued productively. We initially wanted to know if the consumer drank wine how regularly due to the large-scale changes in the consumption patterns of wine (Montaigne, 2006). In addressing our problematic, we have used the basis of consumer models (Derbaix, Brée, 2000; Engel et al., 1968; Aurier, 2007) and several other scales that already exist in order to evaluate perceived quality (Parasuraman et al., 1988), commitment or implication (Laurent, Kapferer, 1985a, 1985b) and expertise (Alba, Hutchinson, 1987). The final questionnaire (annexe 1) was then administered by the apprentices, face to face with individuals who buy and drink wine.

Of the 288 questionnaires collected only 268 were validated. This convenience sample was constituted of 49.3 % men and 50.7 % women. The male-female parity is maintained although the purchase of wine in hypermarkets is mainly made by women and therefore, their preferences are more significant (Unknown, 2008). This is the case for 70 % of purchases in Germany, 80 % the United States and 78 % of purchases in hypermarkets in France (Unknown, 2008). However, for occasional consumption in the case of syrah, males are more often the decision-makers, taking into account their implication in this particular vine variety (d’Hauteville, Sirieix, 2007). The proportions in the various age groups were 58.2 % 18 – 35 year olds, 32.1 % 36 – 55 and 10.7 % in the category of 56 and over. The most significant proportion of the sample was composed of young consumers also defined as single students. The next largest group was made up of Executives. This group are the category which consumes the largest amount of this kind of wine. There is no need to determine the interest of young consumers and future prospects. The marital statuses of consumers were 48.9 % single, 38.8 % married, 11.6 % cohabiting and 0.7 % widower or widow. The socio-professional groups were composed of 25.7 % students, 19.8 % employees, 16 % managers, 8.2 % farmers, 11 % retired, 7% intermediary professional and less than 5% for other groups. Finally, in terms of household income per month, 32.1 % receive less than 1,000 Euros, 29.1 % between 1,001 and 2,000 Euros, 18.7 % between 2,001 and 3,000 Euros, 14.9 % between 3,001 and 4,000 Euros, and 5.2 % earn over 4,001 Euros per month. The component of income is consistent with a high proportion of young people generally with low purchasing power. This is not necessarily a problem for the study due to the price level of wines concerned (3 to 15 €). A previous survey had been conducted for the International Symposium on Syrah and the results, first presented in Lyon are publicly available. (Sérieys, 2008).

These 268 validated questionnaires allowed us to build a database with 39 measured variables. These are represented by the 5 sets of questions in which 4 were considered as exogenous variables and one as an endogenous or dependent variable. The work on the database included the re-codification of some questions such as A2, CQ5, 6, 7, 9, DQ13-4, 8, 9, 11, 12, Gender and PSC and the modification of questions such as COB. This was in order to remain consistent with the topic of consumer behaviour and wine / syrah on one hand, on the other hand, to adapt to the modelling technique. Modelling by Structural Equations henceforth referred to as SEM needs continuous variables and cannot run with nominal or ordinal variables. All of these treatments are detailed in annexe 2.

Using data processing statistics, validation of the proposed scales and the indication of stability, it was possible to determine the validity of our database (annexe 2). This was in turn useful for the development of 4 hypotheses along the parameters that influence consumers’ behaviour towards syrah wine. After all these treatments were carried out, we obtained a new database that we used to test our four main hypotheses with SEM.

The latent concepts table can again show the significance of the model labels. Step by step we built the elementary models and the reader can follow all the elements of this construction from SE theory to the parameters influencing consumer behaviour for syrah in annexe 3.
Summary of elementary model for French consumer behaviour regarding Syrah wine

First we establish the relationship between the characteristics of the consumer and the wine as well as the interactions with the consumer behaviour.

Building the general model of consumer behaviour for Syrah

We drew and calculated the models progressively by adding latent concepts, finally arriving at the most complete model which takes into account all of the data.

The matrix below summarizes the relationships between the two latent concepts and French consumer behaviour.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Comments</th>
<th>Standardized Value and(*)</th>
<th>Validation</th>
<th>SE</th>
<th>CR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Consumer characteristics positively influence consumer behaviour</td>
<td>0.051 (0.052)</td>
<td>No because the value is not at the correct level of significance</td>
<td>0.349</td>
<td>0.946</td>
<td>0.344</td>
</tr>
<tr>
<td>H2</td>
<td>The characteristics of the wine positively influence consumer behaviour</td>
<td>0.107 (0.330)</td>
<td>No because the value is not at the correct level of significance</td>
<td>0.546</td>
<td>0.560</td>
<td>0.575</td>
</tr>
</tbody>
</table>

(*) = the unstandardized estimate

(***) Level of significance for regression weight or 0.344

We note at this level that consumer characteristics do not influence consumer behaviour. The relationship between the characteristics of the wine and consumer behaviour is a little stronger but remains weak.

All the regression weights are significant (p < 0.000) with the exception of gender (p = 0.437), the qualification vine (p = 0.066), the aroma (p = 0.012), DQ134 expertise (p = 0.047) and colour intensity is fairly significant (p = 0.002), DQ1312 implication (p = 0.002) and of course the relations to consumer behaviour from consumer characteristics (p = 0.404), wine characteristics (p = 0.575) and consumer expertise (p = 0.514).
The matrix of results testing these hypotheses is presented below. The hypotheses were tested in accordance with the general model (the outputs of AMOS 16 can be supplied if asked).

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Comments</th>
<th>Standardized Value and(*)</th>
<th>Validation</th>
<th>SE</th>
<th>CR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Consumer characteristics positively influence consumer behaviour</td>
<td>0.000 (0.057)</td>
<td>No because the value is not at the correct level of significance</td>
<td>0.068</td>
<td>0.835</td>
<td>0.404</td>
</tr>
<tr>
<td>H2</td>
<td>The characteristics of the wine positively influence consumer behaviour</td>
<td>0.096 (0.306)</td>
<td>No because the value is not at the correct level of significance</td>
<td>0.546</td>
<td>0.560</td>
<td>0.575</td>
</tr>
<tr>
<td>H3</td>
<td>The implication or involvement positively influence consumer behaviour</td>
<td>0.654 (0.966)</td>
<td>Yes with acceptable level of probability at 0.3%</td>
<td>0.320</td>
<td>3.014</td>
<td>0.003</td>
</tr>
<tr>
<td>H4</td>
<td>The wine expertise positively influence consumer behaviour</td>
<td>-0.172 (-0.259)</td>
<td>No because the value is not at the correct level of significance and it is in the reverse sense</td>
<td>0.397</td>
<td>-0.652</td>
<td>0.514</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Hypothesis</th>
<th>Correlations between the exogenous variables</th>
<th>Standardized Value and(**)</th>
<th>Validation</th>
<th>SE</th>
<th>CR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5</td>
<td>Consumer characteristics and wine characteristics are correlated</td>
<td>-0.067 (-0.050)</td>
<td>No because the value is not at the correct level of significance and it is in the reverse sense</td>
<td>0.082</td>
<td>-0.609</td>
<td>0.542</td>
</tr>
<tr>
<td>H6</td>
<td>Consumer characteristics and consumer implication are correlated</td>
<td>-0.019 (-0.030)</td>
<td>No because the value is not at the correct level of significance and it is in the reverse sense</td>
<td>0.118</td>
<td>-0.258</td>
<td>0.798</td>
</tr>
<tr>
<td>H7</td>
<td>Consumer characteristics and consumer expertise are correlated</td>
<td>-0.043 (-0.069)</td>
<td>No because the value is not at the correct level of significance and it is in the reverse sense</td>
<td>0.122</td>
<td>-0.564</td>
<td>0.573</td>
</tr>
<tr>
<td>H8</td>
<td>Wine characteristics and consumer implication are correlated</td>
<td>0.225 (0.108)</td>
<td>Yes because it is positively correlated but near the correct level of significance</td>
<td>0.054</td>
<td>2.012</td>
<td>0.054</td>
</tr>
<tr>
<td>H9</td>
<td>Wine characteristics and consumer expertise are correlated</td>
<td>0.531 (0.249)</td>
<td>Yes</td>
<td>Positively correlated</td>
<td>0.075</td>
<td>3.341</td>
</tr>
<tr>
<td>H10</td>
<td>Consumer implication and consumer expertise are correlated</td>
<td>0.818 (0.852)</td>
<td>Yes</td>
<td>Positively correlated</td>
<td>0.066</td>
<td>12.697</td>
</tr>
</tbody>
</table>

(*) is the unstandardized constant
(**) Level of significance for regression weight
The probability of getting a critical ratio as large as 3.341 in absolute value is less than 0.001 or $p < 0.001$.

One of the four main hypotheses is verified. Using SME, we can enlarge our results to confirm that three of the six secondary hypotheses are valid.

Analysis of results

Firstly, the characteristics of the consumer do not influence their behaviour when they purchase wine. In each category of age, gender, income, marital status and socio professional group there are connoisseurs, occasional consumers and neophytes. Similarly, the characteristics of the wine only minimally influence the purchase behaviour of the consumer.

Secondly, the level of expertise naturally influences the consumer when they buy and drink wine. The most influential factor is the involvement of the consumer when they consider purchasing a wine to drink or for their cellar.

Thirdly, we have observed that the expertise and the involvement are more strongly correlated with a slightly weaker correlation in relation to the characteristics of the wine. This indicates that the variety of the grape is important information for the consumer to have.

Conclusion

The purpose of this study is to shed light on the behaviour of the consumer when faced with a purchase decision for wine, particularly, syrah wine.

Having analyzed various parameters such as characteristics of the consumer, characteristics of the wine and involvement and expertise of the consumer, we studied the relationships and effects of these parameters with consumer behaviour.

In order to achieve this, we adopted a progression from the elementary parameters up to increased association incorporated in a general model of all the moderate parameters. Considering the multitude of models obtained, we limited this paper to the presentation of the most significant and generalised results, setting aside smaller details and some other possible configurations.

It was of paramount importance to maintain the simplicity of this article. However, all of the supplementary results and computing output are available and can be supplied upon request.

During this study, we have highlighted the behaviour of French consumers towards the syrah, a grape that is currently in fashion. What emerges, is that wine growers who cultivate (or may cultivate) this vine, through their geographical location and their know-how, have to highlight this on their labels. This acts as a means of communication, promotion and packaging. The word "syrah" is especially well perceived by occasional wine consumers. Therefore the focus on this aspect of the wine corresponds to the expectations of those occasional consumers, whom are an important and growing sector of the clientele for this product.

This approach should be positive for syrah wine producers but these results still need to be validated through a study of foreign consumers in order to establish that it is useful for resisting the tightening pressure of wines from the New World. Our advice to those developing their corporate strategies would be to incorporate this marketing approach. This will allow for the reinvention of a fruity yet traditional wine with a recognized typicity. This ensures that the wine can maintain its position in the French wine sector as a high quality product without imitating the competitors from the southern hemisphere or California. The interest and involvement of the consumer in this type of wine is a very favourable factor which helps the producers to promote this type of wine without relying on the expertise of the consumers and without having to appeal with too technical a communication.

We have however observed some other differences in the ideas that emerged from our focus group. For example, contrary to all expectations, the appearance and the price of products do not appear to influence consumer behaviour, of course the taste and the aroma are acting in purchase act.

Limits and future or additional research

The use of a convenience sample is the primary limit of the study. Therefore we cannot extrapolate the results of this survey to represent all French consumers. Some of the regression weights of the models are not significant and we think that this is because the observation numbers are weak in relation to a large-scale French survey. On the same subject, our sample does not use the appropriate quota method that should be used for a survey that can be extrapolated for representative results. The other limits of the study include the possibility that there are numerous factors that influence consumer behaviour and this study is not exhaustive.

Future or additional research may be carried out using the same database, modelling consumer behaviour for syrah for each group of consumers using cluster analysis. This may be used to establish more specific recommendations which are relevant for individual producers and wine vendors if significant differences are found.

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Annex 1
Questionnaire for consumers who purchase wine, particularly Syrah
Questionnaire sur la perception du consommateur sur la Syrah / Shiraz

A 1 Habitude de consommation de vin :
☐ non buveur, ☐ buveur occasionnel, ☐ consommateur d’habitude, ☐ grand consommateur.
Si « non consommateur », dans ce cas ne pas mener l’enquête.

A 2 Quelle est votre fréquence de consommation de vin ?
☐ Tous les jours ou presque
☐ Plus rarement
☐ 1 à 2 fois par semaine
☐ Jamais
☐ 1 à 2 fois par mois

B Questions ouvertes :
B 1 Qu’évoque pour vous le mot Syrah / Shiraz ?
Si pas de réponse en rapport avec le vin passez à un autre candidat.
Si réponse noter le contenu :
……………………………………………………………………………………..
Cochez l’élément majeur contenu dans la réponse :
☐ Marque, ☐ Cépage, ☐ Vin, ☐ Appellation, ☐ Région viticole, ☐ Domaine ou Château, autre :
……………………………………………………………………………………..

B 2 Comment avez-vous connu la Syrah / Shiraz ?
…………………………………………………………………………………………;

C Questions fermées si l’interviewé connaît la syrah.
Si la réponse a été relative au vin / cépage
C Q 1 : Quel(s) pays est (sont) associé(s) à la syrah /shiraz ?
C Q 2 : Quelle région de cel(s) pays est plus particulièrement productrice de syrah / shiraz ?
C Q 3 : Quelle appellation est plus particulièrement productrice de Syrah / shiraz en France ?
C Q 4 : Avez-vous déjà acheté ce type de vin ? ☐ Oui, ☐ Non.
C Q 5 : Sous quelle dénomination ?
☐ Cépage, ☐ Appellation, ☐ Marque, ☐ Autre : précisez ……………………………..
C Q 6: A quelle occasion avez-vous acheté ce vin ?
☐ Repas de famille, ☐ Apéritif, ☐ Consommation courante, ☐ Dégustation, ☐ Cadeau, ☐ Réception d’amis, ☐ Repas professionnel.

C Q 7: Où avez-vous acheté ce vin ?
☐ GMS, ☐ Caviste, ☐ Hard discount, ☐ Café Hôtel Restaurant, ☐ Propriété (domaine, château), ☐ Cave coopérative, ☐ e-Commerce, ☐ VPC, ☐ Salons,
C Q 8: A quel type de vin vous fait penser la syrah / shiraz ?
☐ léger, ☐ tannique, ☐ puissant, ☐ structuré, ☐ alcoolisé, ☐ gouleyants, autre : précisez ………………………………………
C Q 9: La syrah / shiraz vous fait penser à quels arômes ?
☐ épicé (poivre, cannelle, cuir, safran, girofle), ☐ fruité (fruits rouges, noirs, confits, noyaux),
☐ floral (violette, rose, fleur d’oranger), ☐ minéral (silex, grés, pétrole), ☐ végétal (poivron vert, foin, herbe coupée), ☐ animal (cuir, sueur de cheval, renard), ☐ empyreumatique (brûlé, café, torréfié), ☐ Autre : précisez ………………………………………
C Q 10: A quelle intensité de couleur vous fait penser la syrah / shiraz ?
☐ faible, ☐ moyenne, ☐ soutenue, ☐ très soutenue.
C Q 11: Selon vous la syrah / shiraz est un cépage qualitatif ?
Entourez le chiffre correspondant à votre réponse :

<table>
<thead>
<tr>
<th></th>
<th>moderne</th>
<th>traditionnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2  3  4  5</td>
<td></td>
</tr>
</tbody>
</table>
C Q 12: A quels plats / mets vous associeriez la syrah / shiraz ?
☐ entrées, ☐ charcuterie, ☐ viande rouge, ☐ viande blanche, ☐ poisson, ☐ salades, ☐ fromages, ☐ desserts, ☐ Autre : précisez ……………………………………………………..
Implication / vin et degré d’expertise perçu / vin :

Entourez le chiffre correspondant à votre réponse :

<table>
<thead>
<tr>
<th>Pas du tout</th>
<th>Tout à fait d’accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>

- On peut dire que le vin est un produit qui m’intéresse. 1 2 3 4 5
- J’aime essayer de nouveaux vins avant tout le monde. 1 2 3 4 5
- Le vin, c’est un sujet sur lequel je me sens compétent. 1 2 3 4 5
- Je n’achète pas un nouveau vin si je n’en ai pas déjà entendu parler. 1 2 3 4 5
- Réfléchir à l’avance à l’achat de vins du vin est un plaisir. 1 2 3 4 5
- En général, je suis parmi les premiers de mes amis à acheter un vin qui vient d’être lancé. 1 2 3 4 5
- J’aime particulièrement parler du vin. 1 2 3 4 5
- Comparé aux autres, j’en connais peu au sujet du vin. 1 2 3 4 5
- Je suis en général parmi les derniers de mes amis à connaître le nom des nouveaux vins. 1 2 3 4 5
- Je me sens particulièrement attiré(e) par le vin. 1 2 3 4 5
- Le vin, c’est un sujet auquel je ne comprends pas grand chose. 1 2 3 4 5
- Par rapport à mes amis, je consomme peu de nouveaux vins. 1 2 3 4 5
- Le vin est un produit qui compte vraiment beaucoup pour moi. 1 2 3 4 5
- Si je vois un nouveau vin dans mon magasin, ça m’intéresse de l’acheter. 1 2 3 4 5
- Parmi mes amis, je suis plutôt perçu comme un expert en vin. 1 2 3 4 5
- Le vin est un produit auquel j’accorde une importance particulière. 1 2 3 4 5

Questions sociodémographiques :

Age :
Sexe :
- □ F, □ H.
Statut civil :
- □ Célibataire, □ marié(e), □ vie maritale, □ veuf /veuve.
Composition du ménage :
- □ 1p, □ 2 p, □ 3 p, □ 4 p, □ 5 p et plus.
CSP :
- □ agriculteurs exploitants, □ artisans commerçants , □ chefs d’entreprises, □ cadres, □ professions intellectuelles supérieures, □ professions libérales, □ professions intermédiaires, □ employés, □ ouvriers,
- □ étudiants, □ retraités, □ sans activité professionnelle.
Revenu mensuel du ménage :
- □ moins de 1 000 €, □ de 1 001 à 1 500 €, □ de 1 501 à 2 000 €, □ de 2 001 à 2 500 €,
- □ de 2 501 à 3 000 €, □ de 3 001 à 3 500 €, □ de 3 501 à 4 000 €, □ de 4 001 € et plus.

Code postal du lieu de résidence :

Data treatments

As the Modelling by Structural Equations, henceforth referred to as SEM, needs continuous variables and cannot run with nominal or ordinal variables, we must carry out several treatments on the database. We did not use non-continuous variables such as nominal variables. Therefore, answers from open question as B1 & B2, CQ1, CQ2 & CQ3 cannot be used.

Missing values:

Indeed for SEM Missing values for SEM are not allowed to run in the database inlet. For all the questionnaires and all the measures concerned, we have eliminated the entire questionnaire. This totals 20 questionnaires out of the 288 carried out.

Re codification for CQ8.

We have reorganised the qualities according to which are more often cited by the consumer for Syrah so that we have 6 for alcoholised, 5 for structured, 4 for the powerful, 3 for tannic, 2 for very drinkable, 2 for light wine, 0 for other or missing value.

Inverting codification for A2, CQ5, CQ6, CQ7, CQ9, DQ13-4, DQ13-8, DQ13-9, DQ13-11, DQ13-12, Gender and Socio professional groups.

We have inverted the first codification to obtain positive loadings in all modelling estimates. Evidently, these results indicate where the variable works in the model.

Reliability of scales by SPSS software

Alpha of Cronbach index

Before modeling we must test the reliability of the scales created. We use the Alpha of Cronbach and the KMO which are the two main indices of scales reliability testing. A good fir of the scale for the Cronbach Alpha is when the value is > 0,7 (Nunnally and Bernstein, 1994) but > 0,6 can be acceptable.

KMO index and PCA

The second step in this process is to calculate the KMO (Kaiser-Meyer-Olkin) index and the PCA (Principal Component Analysis) to verify how many dimensions make up the scale is. In the same way as Cronbach Alpha the good value of KMO is > 0,7 (Lance and Vandenberg, 2002).

The results

The following matrix proposes the main results in this calculation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wine Characteristics</th>
<th>Consumer Characteristics</th>
<th>Consumer Implication</th>
<th>Consumer Expertise</th>
<th>Consumer Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach Alpha</td>
<td>0.293</td>
<td>0.666</td>
<td>0.854</td>
<td>0.681</td>
<td>0.642</td>
</tr>
<tr>
<td>KMO</td>
<td>0.520</td>
<td>0.801</td>
<td>0.881</td>
<td>0.667</td>
<td>0.594</td>
</tr>
<tr>
<td>PCA Dimension</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>% Explained variance</td>
<td>61.485</td>
<td>60.018</td>
<td>69.051</td>
<td>58.952</td>
<td>66.961</td>
</tr>
</tbody>
</table>

For Wine characteristics the indices aren’t good. This can be explained by the fact that we don’t measure one phenomenon but we take in account four different kinds of qualifying wine that are most frequently used. Alternatively, the PCA gives two dimensions as aroma & color and the type of wine & traditionalist perceived.

For consumer characteristics, the implication and the expertise, the indexes are acceptable at good.
Consumer behaviour, is not a scale because there is only one measure for each option, therefore the indices are not relevant but it represents two dimensions as information about wine consumer consumption in one hand and place to purchase the wine in other hand.

After all these treatments we obtain the new database that we use to test all our hypotheses with SEM.

Annex 3

Basis of Structural Equations Modelling

Generalities
SEM (or covariance structure analyses) is the second generation of multiple-varied analyses (Arbuckle, 1996; Fornell, Larcker, 1981, Fornell, 1982, Valette-Florence, 1988). They introduce the latent variable or non-observable variable. They allow the nature of the relationships between these variables and their measures to be specified. They offer the possibility of clarifying the type of relationships envisaged between the latent variables. They are capable of analyzing the causal inferences between several sets of explanatory and explained variables. They may be used for confirmatory purposes as we did (Lance and Vandenberg, 2002).

Construction of model
The latent variable is the first part of the construction of the model. Each latent variable is measured by three or more measures as the values given by the respondent, depending on the scale.

Validity of the model and robustness
We must obtain three confirmed validations to ensure that the model works correctly (Didellon, Valette-Florence, 1996):
• Convergent validity: the sum of communities for every construct (or latent concept) must be superior at random or 50%. Σλ2 >50% with λ as community or the loading for each measure.
• Discriminate validity: variance shared by a construct and its measures must be superior to the variance shared between the constructs.
• Nomo logical validity: is the validity of the model. Concerns the endogenous variables confirming that the studied theoretical field is provided with sense. R2 = 0. This value must be as high as possible, for example 0.15 is a good value for a social field, and 0.2 is excellent.
• Some goodness fit indexes are available. With AMOS 16, the software calculate GFI (goodness of fit index), AGFI (adjusted goodness of fit index), PGFI (parsimony goodness of fit index) followed by RMSEA (root mean square error of approximation) and RMR (root mean square residual). The GFI, AGFI, PGFI is less than or equal to 1, the higher the better. A value of 1 indicates a perfect fit, > 0.85 is good fit. The smaller the RMR, the better the RMSEA is. An RMR and RMSEA of zero indicate a perfect fit.

We made Bootstrap (Efron, 1979, 1982, 1987; Efron, Tibshirani, 1993) to free us from constraints of normality or of homocedasticity dependent variables imposed by the second generation methods of analysis, the generalization of the linear regressions, as the structural equations.

Basic elements of the model before building it
Before modelling the relationships between all the variables surveyed and measured, we built it up element by element and we can analyse each of them separately. For this part, we worked with all the measurements obtained by the questionnaires (268 data).

Characteristics of the consumer
All the communities or regression weights are significant and higher except for the gender. It is understandable because the measure is one or two.
All regression weights are statistically significant, p < 0.000 and p = 0.433 or at 43.3 % for the gender.

Characteristics of wine
For the characteristics of wine only the regression weight of the colour intensity is significant, p < 0.000. For the other parameters as we noted in annex 2 it is not scale. The qualitatively vine (p = 0.307), the aroma (p = 0.270) and the typicity (p = 0.256) are not significant.

Consumer implication (or commitment)
All regression weights are significant at p < 0.000 except for DQ13_12, p = 0.002 but indicate that it is very near the significant probability for this measure and can be accepted.

Consumer expertise
All regression weights are significant at p < 0.000 except for DQ13_4, p = 0.039 but indicate that it is near the significant probability for this measure and can be accepted too.
Consumer behaviour

All the regression weights are significant at p < 0.000.

Simple Model for consumer behaviour and the characteristics of consumers themselves as well as the wine
Throughout the following section, we have chosen to represent the most relevant model amongst a huge potential number of models. We don’t provide all data results for each model in order to simplify the reading but we can supply them upon demand. The objective of this part is to verify the hypothesis that each of the latent concepts could be influencing (or related to) consumer behaviour or not.

Consumer behavior for the syrah

Some regression weights aren’t significant at p < 0.000 and it is the case of the both relations of characteristics of wine and of consumer that indicate these parameters are not influencing the consumer behaviour although the model fit indexes are good as GFI and RMSEA are.