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Competitive factors of the agro-food e-commerce

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Abstract. In the new economy Small and Medium Enterprises face new challenges in their Business-to-Consumers transactions, such as the use of new Information and Communication Technologies. Electronic commerce may represent a competitive strategy to make enterprises of the agro-food sector more visible to consumers, if usability is adequately taken into account. The main barrier to the development of successful e-commerce business is represented by websites not meeting basic accessibility and usability features. To tackle this issue, heuristic evaluation and the gap analysis approach has been adopted. The parameters taken into account stemmed from World Wide Web Consortium recommendations. Website usability issues have been measured by a panel of consumers assessing a selected website each. Potential e-consumers simulated an online purchase, thereby allowing them to acquire insights on the importance and satisfaction on each of the usability issues taken into consideration. The success factors for e-commerce mainly involve efficiency of navigations (useful navigation tools or sequence of navigation), accuracy in content and supplied information. Consumers are more conduced to purchase by easy structure of websites than design and style. Additional information underlining the connection of producers to its territory enhances end-consumers' feel in supply chain identification. The adoption of e-commerce, as innovative communication challenge, in rural development and in regional identity is a crucial issues of dynamic food chains.

Keywords: agro-food e-commerce, usability testing, gap analysis, customer satisfaction analysis, on line wine market.

1. Introduction

The Internet represents a global revolution that is affecting communication, thinking and economic activities. The revolution in Information and Communication Technology (ICT) changed the way people conduct business today. Consumers have a lot of information at their disposal on anything they wish to purchase. As a market place, it represents a place where people can purchase items, order online and pay online, e-commerce finds its common definition.

The electronic commerce represents the main mechanism to implementing the New Economy itself, as it evolves and assumes a substantial role within and for the *digital market*, as well as for the traditional market. If "New Economy" means economic exchange based on ICT's, then the electronic commerce best represents the new commercial networks, which is based on the Internet as a means of communication and on the IT as a means of global dissemination.

The spatial and temporal concept of commercial interchanges is evolving: the place is assuming a worthless value, due to interconnection on the network making geographical distances disappear, and where time itself is transformed in a changing object according to its uses. Since the New Economy is based on the fruition concept rather that ownership as in the 'old' economy, accessibility and usability features of e-commerce websites represent necessary features to access websites. In fact, given the capital, e-businesses find it necessary to exploit fruition skills (information collection) and 'intellectual capital' to be competitive and cost effective.

According to the Italian e-commerce Consortium Netcomm [1] the Italian e-commerce has grown at a fast rate in the last 6 years. The Italian grocery sector online, even if at a small growth rate, is increasing. The growth is mainly due to the increase of the average amount of money spent per purchase, since orders are stable.

In this paper, the quality of wine e-commerce websites will be analysed, using a case-study approach and both a computer-science and marketing perspective.

2. Identification of success factors in e-commerce websites

When dealing with e-commerce, either definition you choose [2] [3] [4], you have to take into account the way websites are built, how easily they can be browsed and how usable they are. A web page, as an information set, can contain many kinds of information, which is able to be seen, heard or interacted with the end user. The perceived (rendered) information can be textual or non-textual or interactive (i.e. buttons which are forms providing alternative interface), whereas the internal (hidden) information is meant as metadata or visual specifications to the website's content. All these issues and additional objective metrics are taken into consideration not only to describe websites of e-commerce, but also to detect potential customers' perception on their usability and accessibility.

The e-commerce may offer solutions for a large and fragmented market. The agricultural market is large (213 billion euros) fragmented (ca. 7 million farm holdings, 10's of suppliers, 100's of distributors, 1000's of dealers) and spatially dispersed. E-Commerce may offer solutions by integrating individual actors to improve organisational structures. Many aspects of business, even at the farm level, may be managed through the Internet [5].

Overall, some thinking has been done on whether the aspects of web design truly make a difference in an online store that tries to either increase the number of visitors or increase sales [6]. First attempts were conducted in 1998 by Lohse and Spiller [7] which tried to determine the relationship between website screen design and e-commerce and to predict store traffic (visits per month) and sales (dollar sales per month) as a function of interface design features.

Agro-food firms have started to develop a tendency towards the use of IT, especially the Internet, in order to achieve capabilities for B2B and international transactions. The work of Baourakis and collegues [8] gained valuable information on motivations and barriers to IT adoption by agricultural cooperatives, as well as on consumers' opinions and perspectives on e-commerce and agro-food. However, their research uncovered the slow rate of adoption of this technology and the current weak relation between e-commerce and the agro-food sector.

The visibility of many websites is limited to listings on the major web search engines with rare use of the web as a promotional tool. To this extent websites maintain a strong linkage of marketing strategies to the traditional means of communication. Volpentesta and collegues [9] showed that some websites do not comply with European directives and national laws governing remote sales, privacy protection, and the minimum information details that websites have to provide. Moreover, interaction with users is limited to traditional means (e-mail, telephone) without utilization of typical Internet and Web interactions (FAQ, mailing list, forums, etc). Few sites facilitate online transactions by providing detailed price information, few specify delivery times and methods, and generally, do not provide sufficient guarantees on product quality.The most utilized payment methods (postal order and cash on delivery) indicate poor awareness of use of online transaction systems [7].

Published research on e-commerce websites in the agro-food sector are mainly descriptive of the structural features, product portfolio, usability (meant as visibility and speed of browsing), logistics and payment options [10] [11]. However, few researchers linked description of websites to sales performance. Cannavari and Spadoni [11] identified in logistics and management bottlenecks to ICT adoption for foodstuff firm, showing that the Internet marketing and its tools (i.e. e-commerce website) is often used as means of firm presentation rather than an active means of achieving sales

Fratocchi and collegues analysed the actors of the websites and the use of the Internet as a virtual retailing means for wine producers [12], concluded that wine traders cannot compete without penetrating virtual mall or wine shops online.

2.1. Website quality assessment

Assessing the "quality" of websites has often been done in order to assess their usability [13], in some cases specifically on e-learning websites. Usability is a prerequisite for e-commerce success. If people cannot shop, then the site will not sell a thing. It does not matter how cheap the products are, if people cannot find them or if they get stuck on a step in the checkout process. Accessibility ensures that users with inabilities may have access to the website.

Usability have been defined in different ways [14] [15] [16] [17]; however all researchers underlined the advantages that usability is a business-oriented view which focuses on the real objectives of design and it is relatively easy to measure. Usability, as the measure of how a user perceives and interacts with a website, does not guarantee success for an e-commerce site, but it is one of the most important determinants for the success of an e-commerce site, especially considering how cheap it is to include basic usability methods in a web project.

Most studies focus on website quality and usability evaluation. There are a number of ways of evaluating the usability attributes of a product introduced by Bevan [18], IBM [19] [20] and by Microsoft [21].

We argue that, although the importance of the perceived product quality is recognised worldwide, there does not exist a rigorous method for measuring customer perception of product quality. Xenos' paper [22] present an extended method to measure end-user perception for software quality by means of user satisfaction measurement.

There have been several attempts to use checklists as a basis for evaluating usability (e.g. [23] [24] [25]). Usability guidelines and checklists are useful aids for design, and can be used to make quick expert assessments of user interface design, but they cannot provide a reliable means of assessing whether a product is usable.

The usability attributes which contribute to quality of use will include the style and properties of the user interface, the dialogue structure, and the nature of the functionality. Measures of quality of use provide the criteria which determine whether the design of the attributes is successful in achieving usability.

Visciola [26] took into account the multidimensionality of usability and developed a grid of items for web usability assessment from the *user experience* point of view. They tested usability by means of a Likert-type scale, choosing 21 items according to those features that describe website navigation experience. According to Visciola's studies [26] there are six items that need to be considered. They are independent and do not overlap one another. The items are: i) navigability: dealing with the hypertext structure, relations to links, search tools that make navigation easy; ii) expected utility: dealing with economic behaviours of users; iii) graphical appeal: graphical quality and visual appeal of a website; iv) communication effectiveness: dealing with reliability of user interaction to the website; v) information understandability: dealing with quality and content organization; vi) content comprehensiveness: dealing with how detailed the information is on the website according to the user's decision making.

2.2. Heuristic evaluation to usability assessment

The methods used for assessing the quality of a website are based on similar methods for software user interface usability evaluation. As proposed by Nielsen [16] inpsection methods includes the heuristic evaluation [27], which requires only the participation of expert evaluators, who inspect the website features according to predefined heuristics.

Heuristic evaluation [27] [28] is a usability engineering method for finding the usability problems in a user interface (UI) design so that they can be attended to as part of an iterative design process. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics"). This method best suited the objectives of the survey.

Some contributions to the development of instruments to measure the quality of various websites are from Klm and Lee [17], Barnes and Vidgen [29] [30] [31] and Ranganathan and Ganapathy [32]. Their instruments include three quality dimensions: information quality, interaction quality and site-design quality, but also information content, design, security and privacy. Not all surveys have identified a specific website for evaluation. Rather, they asked the respondents to indicate their overall experiences with B2C websites. It should be noted that several other researchers have suggested their dimensions of website quality may differ according to the type of product sold [33][34].

In 2000, another researcher designed a survey instrument specifically for evaluation of retail websites. Developed on the basis of an extensive literature review, as well as interviews with web designers and web visitors, Loiacono's WebQual^{TM} scale [35] included 36 items measuring 12 dimensions of website quality.

2.3. Gap analysis to success factors identification

Once macro-categories to assess websites were chosen (Figure 1), in order to identify weaknesses and strength of websites under investigation, a gap analysis research instrument called Servqual was used. Servqual, created by the marketing research team of Parasuraman, Zeithamel, and Berry [36], is a formal means of identifying and correcting gaps between desired levels and actual levels of performance. It is largely used by organizations to analyze a company's need for improvements.

By considering a product attribute at the time, the model allows the identification of the strengths and weaknesses of each element. Whenever the customer perception of a product attribute is good and the importance laid on it is high, we will identify a strength; whenever the importance is assessed as low we can either identify indifference points, if customer perception is poor, or points of perfection when the customer perceives the attribute as good. Also relevant to this survey is the detection of areas for improvement for e-commerce wine businesses, where customers are poorly satisfied on behalf of certain attributes and at the same time, attribute much importance to those attributes (high expectations).

3. The analysis of wine e-commerce websites

Three case studies have been taken into account to analyze competitive factors of website strategy. The first website selected, Wineshop, is Italy's leading online wine retailer, since 1999 and offers a wine catalogue from all the Italian regions with attention paid to small wine producers. The second case, Peck, is a Milanese food and gastronomy gourmet including wine and spirits, vinegar and oils, meats and cheeses, pasta and sauces, and gift baskets. The third case, Spacewine, presents a selection of Italian wines and tasting accessories, accompanied by practical advice.

3.1 Websites characterization

According to the preliminary feature inspections, all three are merchant-type virtual wine shops, selling white, red and sparkling wines, as well as wine with denomination of origin (PDO/PGI/TSG wine), whereas only Wineshop sells organic wine (certification of production). All three include in their product portfolio, other on wine products, such as wine accessories in Spacewine (i.e. bottle opener and similar), but also food specialties and food related items. Only Wineshop does not include an English version of the websites.

On product price, as component of the marketing mix, Wineshop only constraints order to a minimum amount. The three case studies were selected according to similar potential consumers willingness to pay; in fact the maximum price per 0,75-bottle of two representative Italian red wines (namely from Tuscany and Piedmont) were at most 80 to 110 euro.

On selling strategy some common issues can be underlined. In fact all three firms sell directly online, so they are not just a window shop, but the purchase can be fully accomplished online by means of a shopping chart, however with different payment options. To purchase registration is needed in Peck and Wineshop, whereas Spacewine does not require it. Peck only has not included mailing list to send newsletters, whereas Wineshop only has not included a toll-free telephone number to sales care.

On types of payment, some differences can be observed. All three cases have included online payment (by credit card), whereas only Wineshop included payment by PayPal. Unlike Peck and Wineshop, Spacewine has included off-line payments, both cash-on-.delivery (COD) and bank transfer. All of them have excluded the order form via email.

Regarding interface design features, three different layouts are adopted. In fact, Wineshop website has a liquid, Spacewine a semi-liquid and Peck a fixed one. As for the combination of icon and/or text Wineshop only implemented it; none of them have structured the website in frames, nor include toll-free number for web assistance nor FAQ.

The depth of navigation was assessed in terms of number of clicks necessary to choose and add at least one product from the homepage to the shopping list. Wineshop scored the least, thus the fastest, if compared to the other two. So in Wineshop e-consumers can shop within 4 to 6 mouse clicks, whereas in the other tow it needs more than six.

By means of Fasterfox, a Firefox browser tool, web deployment was assessed in time (seconds) necessary to deploy the homepage. To deploy Wineshop and Peck's homepage it took on average less than 3 seconds, whereas for Spacewine it took more than 10 seconds.

According to a brief performance interviews, the average purchase value is 170 euro at Wineshop and 125 euro at Spacewine, with a yearly sales volume of 650.000 and 110.000 euros respectively. For Peck those information were not disposable. The number of visitors per month at Peck's website is much higher than the other two websites, however the average order processed per week is quite close one other.

Table 1. E-consumers characterization of e-commerce websites case studies

	Number of visits per month	Number of orders per week	Average price per order (euro)	Yearly sales volume (euro)
Wineshop	150	75	170	650.000
Spacewine	900	30	125	110.000
Peck	12000	20	n.d.	n.d.

Regarding the e-consumers of the three websites analysed, the interviews to the webmasters confirmed the demographic characterization of ISTAT (2008) [37]. In fact, the average age is between 35 and 45. At Wineshop and Spacewine e-shoppers are 80% Italian and 20% European, whereas at Peck only 40% are Italian, 35% European and 10% American. In general more than 70% of their e-customers are male and 60% of the Italian are from the northern regions, as ISTAT detects [37].

3.1 Measures of prospect customer satisfaction

To test website usability of the three websites described, a Customer Satisfaction Analysis (CSA) was conducted, similarly to Sandalidou *et al.* [38] and Lai and Pomarici [39] which proposed a methodology on customers' global satisfaction for agricultural products taking into account five main criteria.

During the evaluation session, the participants briefly explored the web page indicated and had to simulate a purchase and/or wine choice online. Consumers testing usability were asked to evaluate the importance and satisfaction with respect to 17 usability principles, the so-called *heuristics*, represented by website features/attributes on usability issues. The heuristics are general rules chosen to describe common properties of usable interfaces, which for this survey rely on the W3C recommendations and previous researches. To assess their satisfaction and degree of importance of each indicators they were asked to indicate the level according to a 1-to-5 Likert scale.

Respondents of the consumers' panel differed from one another in wine expertise (generic and expert) and were selected in order to be representative for potential electornic customers and interacting with representative scenarios (existing e-commerce business) (table 2).

Table 2. Respondents' overview

Case study (e-shop)	**Wine experts**	**Generic consumers**	**IT experts**	**Respondents per e-shop**	**Female respondents**
Spacewine	4	7	1	12	33%
Peck	1	9	1	11	45%
Wineshop	6	8	3	17	12%
Total	11	24	5	40	

Respondents were asked to share insights for about 10-20 minutes to acquire a little navigation experience on the website and to fill in the questionnaire regarding importance and satisfaction. This amount of time is much shorter than what a typical heuristic evaluation session would involve. However, dealing with just online respondents time limit is a constraint. However, since the evaluators were not *using* the system as such (they were asked only to simulate a navigation experience), a first barrier emerged along this data

collection phase. Some respondents failed to fill in the questionnaire either because they felt they were not able to accomplish the task, or because they expressed difficulties in answering questions without having really purchased online from the specific website they were asked to give insights on.

The Customer Satisfaction Analysis (CSA) involved 17 indicators (micro-categories), grouped in 7 macro-categories, as follows:

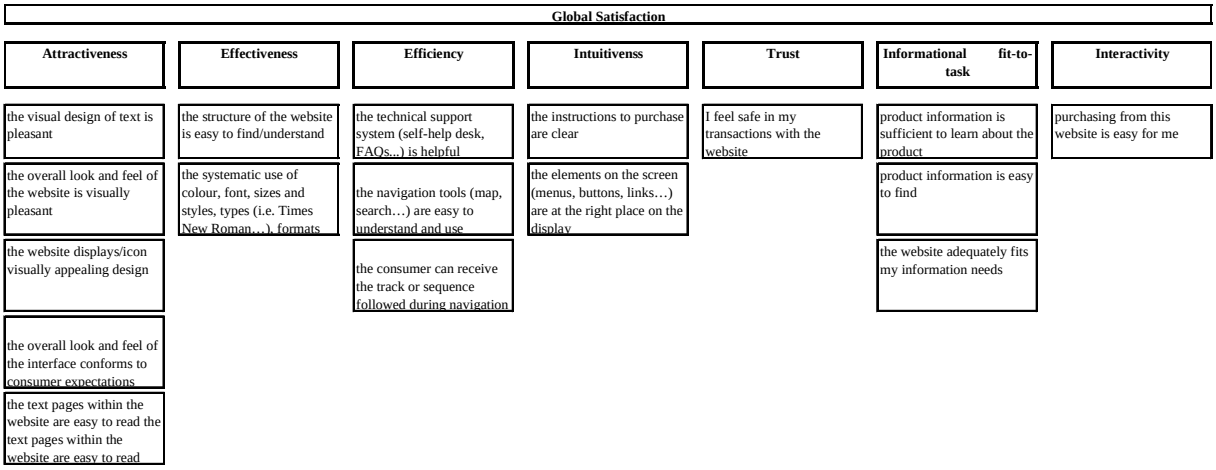

Figure 1. Total satisfaction scheme on usability

In order to optimize the procedure (i.e. to contact the respondents, to invite the respondent to fill in the questionnaire, to thank him/her and to give access to the questionnaire), an open source web application, *Surveylet*, was used.

A measure of customer-based usability is proposed, based on answers to individual items in the survey.

The scale was tested for reliability. Cronbach's Alpha[40][1] scored 0,79. The mean value of the importance for each attribute is summarized in table 3.

Table 3. Average value of overall usability attributes

Overall Usability (attributes)	**Mean value**
1. pleasant overall	4,17
2. pleasant text	4,08
3. appeal design	4,17
4. easy read text	4,5
5. consumer expectation and needs are satisfied	3,83
6. easy structure	4,69
7. conducive to purchase	3,75

[1] Cronbach's α (Alpha) has an important use as a measure of the reliability of a psychometric instrument. Cronbach's α is defined as: $[N/(N-1)]^* (\sigma_x^2 - \sum_1^N \sigma_{yi}^2 / \sigma_x^2)$, where N is the number of components (items or testlets), σ^2_x is the variance of the observed total test scores, and σ^2_y is the variance of component i. Cronbach's α generally increase, when the correlations between the items increase. A commonly-accepted rule of thumb is that an α of 0.6-0.7 indicates acceptable reliability and 0.8 or higher indicates good reliability.

8. technical support	4,14
9. navigation tool	4,22
10. navigation track	3,39
11. easy purchase	4,44
12. right place on the display	4,14
13. c1ear instructions	4,53
14. information need	3,97
15. easy product information	4,28
16. sufficient product information	4
17. safe transaction	4,72

3.3. Results of usability testing

Once data are collected, the information is analysed through the gap model. The gap indicates weak features, because if significant it represents the distance of satisfaction from the importance placed on the usability feature.

The heuristic evaluation often tends to generate large numbers of potential usability 'problems' that often are not actual usability problems. For this reason, the Wilcoxon test[2] [41] helps to focus only on those that are statistically significant. The test consisted of summing up the ranks of two variables (attributes), which represent respectively importance and satisfaction on behalf of one micro-category (attribute).

Table 4 summarizes the results of the test for the 17 attributes. A significant negative rank stands for Importance greater than Satisfaction.

Table 4. Results of Wilcoxon test on significant ranks

Macro-category	**Micro-category**	***Spacewine***	***Peck***	***Wineshop***
1. **Attractiveness**	1. pleasant overall	-	-	significant negative ranks
	2. pleasant text	-	-	-
	3. appeal design	significant negative ranks	-	significant negative ranks
	4. easy read text	-	-	significant negative ranks
	5.consumer expectation and needs are satisfied	-	-	significant negative ranks
2. **Effectiveness**	6. easy structure	-	significant negative ranks	significant negative ranks

[2] The Wilcoxon signed rank statistic W+ is computed by ordering the absolute values |Z1|, ..., |Zn|, the rank of each ordered |Zi| is given a rank of Ri. Denote φi = I(Zi>0) where I(.) is an indicator function. The Wilcoxon signed ranked statistic W+ is defined as follows: $W+ = \sum \varphi_i R_i$. It is often used to test difference scores of data collected before and after (respectively, importance and satisfaction in this survey) an experimental manipulation, in which case the central point would be expected to be zero.

	7. conducive to purchase	-	-	-
3. **Efficiency**	8. technical support	-	-	significant negative ranks
	9. navigation tool	-	-	significant negative ranks
	10. navigation track	-	-	-
4. **Interactivity**	11. easy purchase	-	-	-
5. **Intuitiveness**	12. right place on the display	-	significant negative ranks	-
	13. c1ear instructions	significant negative ranks	-	significant negative ranks
6. **Informational-fit-task**	14. information need are adequately satisfied	-	-	significant negative ranks
	15. easy product information	-	significant negative ranks	significant negative ranks
	16. sufficient product information	-	-	significant negative ranks
7. **Trust**	17. safe transaction	-	significant negative ranks	significant negative ranks

When taking into account the overall satisfaction and importance, we can note that e-shop 1 (Spacewine) performs generally better than the other two (Figure 2), as the gap between satisfaction and importance is in most of the cases positive, as the Wilcoxon test itself reports.

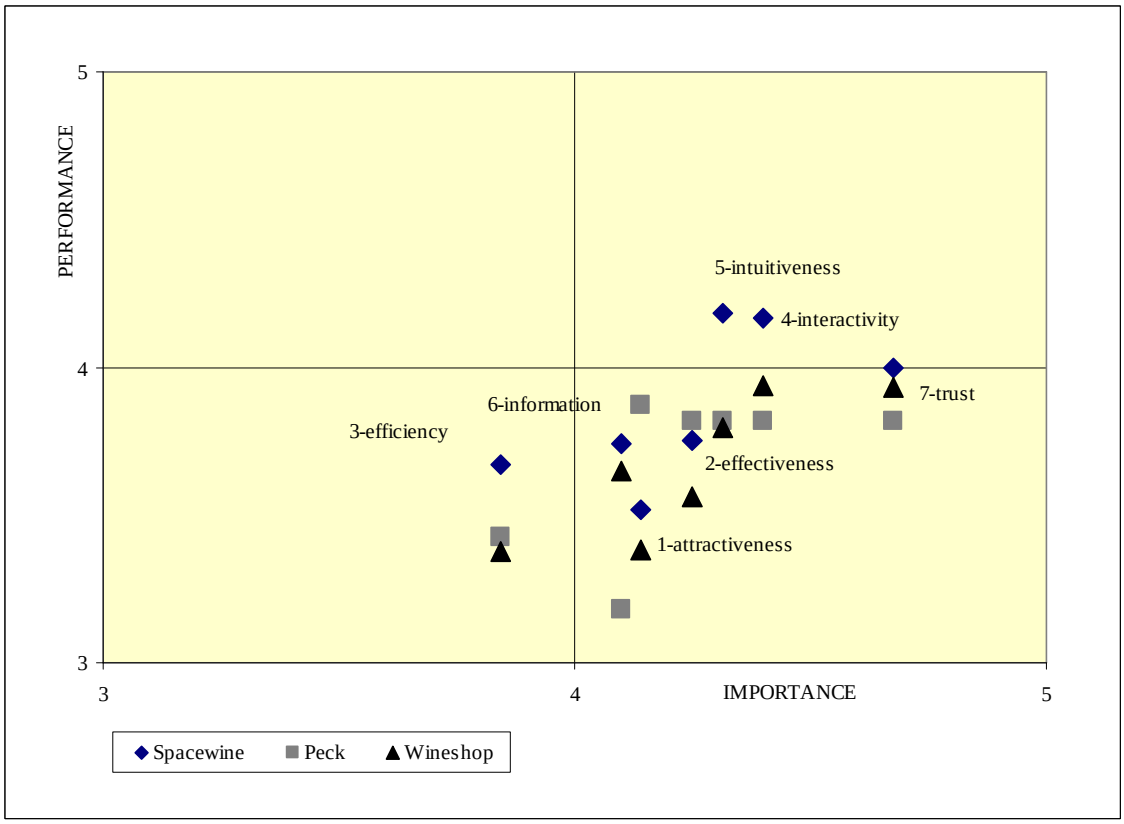

Figure 2. Focus on overall importance and performance per macro-attribute

Taking attractiveness into account, Spacewine scores are significant. Peck, however, did not show any significant weaknesses with respect to this category of attributes. Wineshop indicated significant gaps (to a 5% level of confidence) for four attributes. The website displays and icons of Spacewine and Wineshop are not visually appealing enough, since the satisfaction is significantly lower than the importance placed on this attribute. The text in the Spacewine web pages is assessed as easy to understand, but the size of the text is quite small, as a female generic consumer stressed. The text pages of Wineshop are not easy to read, nor is the overall look and feel of the interface which does not conform to consumers expectations. As a matter of fact, when navigating into the different pages the size of the page does not adapt to the screen and the text remains the same size. This does not make it easy to read. A female generic consumer mentioned that the background of the web pages of Peck is not inviting to food product purchase (it is pale yellow and the side menu is pink).

Spacewine does not show any significant gaps With respect to effectiveness. This website is perceived and experienced by prospect e-consumers as easy and conducive constructed. As for Peck and Wineshop, the structure is not perceived as easy, thus the importance placed on this issue is not greater than the satisfaction. Respondents assessing Wineshop website commented that the extreme simplicity of the structure does not necessarily lead to a structure easy to find and understand. In fact, some complained about the lack of navigation track, as well as about a misleading purchase procedure (i.e. whenever they had not easily found icons).

Efficiency features are not significantly different for Spacewine and Peck. Nevertheless, Wineshop does not fulfil prospective customer satisfaction on ease of use and understanding of navigation tools (map, search). As a matter of fact, a male generic consumer noted that this website has a very simple structure, with a main horizontal bar at the bottom from where to navigate. Even though simplicity is appreciated, some navigation track seems to be lacking, because the consumers do not know exactly how to go back and forth within the pages. A respondent suggested, with respect to this website, that a vertical left-side menu would help the navigation. With respect to Wineshop, one IT expert noted the fact that a help tool is not available and the search engine does not function intuitively. He mentioned the difficulty in understanding whether the 4-search criteria (wine type, region, denomination of origin, producer) shown in the homepage were to be chosen by all or only one.

With respect to Interactivity, thus to the ease of purchase, no significance has been detected in all three cases, which have apparently depicted easy interactions among consumer and website. However, to some extent, they lack in intuitiveness.

In fact, gaps are significantly different for all three e-shops when considering intuitiveness. In particular, Peck shows improvement need in placing information (menus, buttons, links, etc.) in the right part of the display. Peck supplies information not only for wine products; therefore it looks quite complex. Wineshop and Spacewine do not supply clear instructions for purchase. The intuitiveness does not represent a strength in these two cases. Indeed, once the customer chooses the products and adds them to the cart, then he feels puzzled as to how to continue and accomplish the purchase, because there is no button for purchasing (such as "buy"), but only one to empty the cart. For the latter, the respondents complain in general about the unclear instructions.

With respect to informational fit-to-task, gaps between importance and satisfaction are significantly different for Peck and Wineshop. In particular, both do not fulfil consumers' expectations in the ease to find product information. Peck sells not only wine, but other food products as well. For this reason, some consumers may find information on wine somehow hidden. Furthermore, a female respondent (generic consumer) noted how the information is unbalanced throughout the products, since in some cases the level of description enters into too many details and in other cases it does not. This imbalance seems to discriminate products from one another. Wineshop does show a need for improvement in the information provided, which is considered significantly as being insufficient to inform consumers about the product. The product information is organized into the overall description, the producer, the coupling of food and wine, product preservation and suggestions on how to serve it. It can be inferred that, for instance, the information on the producer itself should not go into as many details on the cultivation as this website supplies, whereas the website should supply only the essential information on the product. With respect to the producer a male generic respondent mentioned this interest to know the name of the producer to identify the supply chain. While browsing Peck's website on a 16/9 PC monitor, a female generic consumer noted that the right column of the webpage remained empty along the navigation and this gave the impression that the website is not accurate. In contrast, the rest of the structure seems quite accurate.

With respect to trust, from customers' perspective, Peck and Wineshop do not seem to assure safe transactions. In Peck web pages users need to scroll down the page to see logos certifying safe transactions. On the contrary, Wineshop pages did not show any logos or signs with respect to safety. However, consumers may not be aware of and/or do not recognize certifications with this respect. To support this consideration, a male respondent (generic consumer) mentioned not to have found any sign of safety in the transactions for Peck. For the purpose of this survey we did not explicitly ask whether the presence of certain signs enhanced trust, even though some respondents raised the issue on their own. As Netcomm [1] observed, trustworthy attitudes can be observed if we examine that the average expense per Italian web shopper (in euro) has increased. Nevertheless, there are still a lot of Italians who have never purchased online. The cultural distrust towards online transactions seems to be the main barrier to gaining new e-customer segments.

4. Discussion

The quantitative assessment (by Likert-type scale) of potential e-consumers allowed measuring the usability of the three websites, whereas the qualitative one (open question) supplied us with comments on perception and behavioural perspective of potential e-customers.

The analysis reported above embeds qualitative relevance, whereas it has smaller significance when tested quantitatively due to the small number of observations per e-shop. If we compare, using the Kruskall-Wallis test (non-parametric test), the means of gaps (gap = importance – satisfaction) for each of the attributes considered, we notice that the three e-shops are not statistically different, with the exception of indicator 6 (the structure of the website is easy to find/understand). For all the other indicators, the means are not statistically different from one another.

The usability issues - assessed by the Wilcoxon test on the heuristic evaluation -seemed to mainly involve efficiency of navigation (useful navigation tools or sequence of navigation), accuracy in content and information supplied. Additional information underlining the link between wine production and its territory enhances the consumers' feel for supply chain identification. Consumers are more induced to purchase by easy structure than design and style.

The assessment of the usability of agro-food e-commerce has uncovered how much attention should be paid to intuitiveness, information provided, and navigation, rather than mere visual and design attractiveness. Decomposing usability to measurable attributes - assessed with scalar values – has allowed us to explore accurately the quality and defects of the web interface. Potential e-customers have assessed not only the aesthetics, but also the technical and structural features, detecting the quality of the websites.

The findings confirm the importance of a rational website design and structure, as well as how relevant the communication is when dealing with high value food products. Respondents have expressed their concern for additional information on the websites selling wine, such as knowing the context of production (i.e. wine producer) to justify the purchase online rather than at an offline winery.

As Jahn's work [42] suggested the description of agricultural products requires a lot of parameters. Most of them are "Look and Feel" goods, involving mainly credence attributes. According to the theory of Information Economy, these characteristics reveal products which are not suitable for Internet sales.

It should be noted that physical obstacles remain for physical goods. In fact, the physical operation involved in delivering products of an acceptable standard to their destination remains. This is a particularly important consideration given the dynamic nature of agricultural products, many of which are perishable and susceptible to spoilage. In addition, producers and retailers are also faced with new challenges including: food safety, traceability and quality standards; year around supply programs; certification and guarantee programs; price regulations and stability; sustainable agriculture and environmental issues. E-commerce would facilitate the development of new supply chains for differentiated products involving data rich decision making processes. As Jahn's suggested, for example, a delivery service of agricultural products enhances the success of e-commerce.

9. Conclusions

Marketing in the New Economy SMEs face new challenges in their B2C transactions, such as the use of new Information and Communication Technologies (ICT). The electronic commerce may represent a competitive advantage to make enterprises of the agro-food sector more visible to consumers.

Whenever a website for e-commerce supplies added value to the consumers is well perceived. Added value is related to additional information (advice and suggestions on coupling wine and food or mere wine tasting and flavour characteristics) and relation to the territory (producer), enhancing the feeling of being part of a community.

To go beyond the barrier of not tasting the wine before buying it online, websites need to be *created* as much as possible as convenient and consistent environment for e-consumers to purchase with the same level of trust and effectiveness as possible.

Although agricultural products do not have the same opportunities as digital products, agro-food firms should adopt e-commerce practices in order to benefit from the advantages that the new technology offers.

The Italian enterprises can be part of the main actors of the digital economy based on the Internet. Thanks to a broad diffusion of the Internet among households and enterprises worldwide, e-commerce has developed rapidly and brought enthusiasm and initiatives. Today, e-commerce has settled in the market and it will lead to market segmentation in response to specific demands.

However, some SMEs may not be that open-minded to big changes. In fact, the New Economy not only includes a new sector, but also a new way of organizing the production, distribution, and relationship to the market and consumers.

The development of e-commerce is related to the efficiency and effectiveness of the two channels, the traditional and the innovative one. The challenge in terms of efficiency lies in the fact that e-commerce can distribute physically one-to-one at reasonably low costs, whereas the challenge in terms of effectiveness will depend on the attractiveness of the two channels of purchase (virtual versus physical purchase experience).

The survey has shown that one company (Spacewine) definitely outperform others in terms of standard usability metrics and customer-oriented usability scale. According to theory, usability is a good indicator

of the potential success of a e-commerce initiative. Unfortunately, Spacewine, which has been for some years considered an example of innovation in wine marketing in Italy, has now closed down.

It is quite clear that the case-study presented here can only serve as an occasion for reflecting on the current tools for accessing the quality and success of e-commerce website. The actual predictivity of the proposed usability scale, which is statistically reliable and theoretically consistent, is difficult to assess with the limited evidence presented here. However, more research is needed to fully assess the proposed scale and, eventually, to find indicators with higher predictivity.

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