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Analyzing E-Commerce Websites: A Quali-Quantitive Approach for the User Perceived Web Quality (UPWQ)

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Abstract

The electronic commerce (e-commerce) is an increasingly important phenomenon and this research deals with perceived quality from the users-customers point of view. The aim of this paper is to shed light on the critical factors determining the User Perceived Web Quality (UPWQ) for e-commerce.

We use the Pareto Chart as qualitative methodology able to identify the UPWQ considering not only technical features (ease of use, design, smart phone and tablet responsivity, information), but also emotional features such as trust, empathy, free shipping and discount. The Pareto chart main has the advantage to classify the selected features by their relevance.

We found that emotional features are more relevant than technical ones. Among the features we took into account, three alone (discount, free shipping and ease of use) determine about 70% of the user perceived web quality for e-commerce.

Our results have significant practical implication for managers involved in online business in order to better allocate resources to the most critical factors.

Keywords: e-commerce, Pareto Chart, user-perceived web quality

1. Introduction

Nowadays, the widespread diffusion of personal computers, smart phones and tablets combined with the ease of Internet access, multiplies smart shopping (Dominici et al., 2016) and online purchase opportunities (Palumbo & Dominici, 2015). E-commerce is a valuable opportunity to quickly reach users from all over the world through the internet also for small and medium enterprises (Poon et al., 1999; Gregory et al., 2014), indeed many traditional retail firms evolved into digital world (Hart et al., 2000; Di Fatta et al., 2016).

This study aims to shed light of the concept of web quality and specifically to quality of e-commerce. A paradigm shift is required in order to analyze the specific needs of web customer (or user) and, generally speaking, the online market trends (Kaufmann et al., 2013).

From traditional theories on quality, we switch to the concept of user perceived web quality (UPWQ). The starting point for the understanding of traditional theories is Parasuraman et al. (1988): they introduced the SERVQUAL model in order to study the quality of a service. This model is based on five factors: reliability, responsiveness, security, empathy, appearance. More in depth: reliability is the ability to deliver the promised service with accuracy; responsiveness: is the willingness to help customers with active and prompt service, security is the ability to convey trust and confidence to the customer; empathy is the ability to provide customers with personalized attention and consideration; appearance relies on physical facilities, equipment, personnel and communication materials. However there is a need to consider the new requirements related to the service quality of the internet. In order to fill this gap, Aladwany and Palvia (2002) identified three dimensions for UPWQ of a website: (1) technical adequacy, (2) web content and (3) web appearance.

Ahn et al. (2007) categorized these dimensions into: (1) system, (2) information and (3) service quality; they also found that web quality had a significant impact on the perceived ease of use, playfulness, and usefulness, and

consequently, they also discovered that it encouraged website use in the context of online retailing. However there is still much to be studied with reference to the factors that determine the quality perceived by users in online sales. Indeed, it is important to note that, from the firms point of view, it is pivotal to know and to manage the concept of UPWQ in order to effectively implement an e-commerce strategy (Tencati & Poguts, 2015; Turban et al., 2015).

Even though in the literature we can find some studies dealing with the factors determining the attractiveness of a generic website (e.g., Huizingh, 2000; Loiacono et al., 2002), this stream still needs further research to investigate specific aspects characterizing user perceived quality for e-commerce websites. Indeed, e-commerce must meet the customers' needs in a different way, for example, from educational sites, from social networks or from a web-community (Kuo, 2004).

The concept of quality must be re-defined for the characteristics of the World Wide Web in order to coin new paradigms able to capture the perceived quality about online sales. For these reasons, our analysis aims to answer the following research question:

"Which are the key factors determining user perceived web quality for e-commerce websites?"

The original contribution of this study is in its focus on the e-commerce phenomenon, also translating our findings into concrete and practical implications for managers and practitioners.

To identify the factors affecting the UPWQ of an e-commerce we used a quali-quantitative approach. As will be explained more in detail in the methodology section, in the first step we conduct a focus group; then, in the second phase, after collecting the data on the consumer preferences, we used a Pareto chart to summarize our results. Through this methodology, we were able to identify the drivers that determine a phenomenon (in our case the UPWQ for e-commerce), and to classify them according to a preferential order.

The paper is structured as follows: in the next section we will go through a literature review on the concept "quality" on the web. In section 3, we will explain the methodology we adopted and the sample; in section 4 we will show the result and discussion them, showing the Pareto Chart about user perceived web quality for e-commerce; in the conclusions we show the practical implications of our findings, as well as the limitation of this study and suggest proposal for further research on this topic.

2. Literature Review

Since the 2000s, the Internet has made possible a previously unimaginable sharing of resources, in a very effectively and efficiently way (Peterson, Balasubramanian, & Bronnenberg, 1997; Otto & Chung, 2000; Kogut, 2004; Dominici et al., 2015a; Dominici, 2009a , 2009b, 2012; Di Fatta et al., 2016).

The result was an increased empowerment of both firm and users to get quickly access to information through their digital devices (Zettelmeyer, 2000; Dominici et al., 2015b). The interaction between business and the consumer becomes more direct, immediate and rapid. These radical changes in the relationship between supply and demand imply that firms are forced to intercept the needs of customers in the shortest possible time in order to create and maintain a long term relationship.

The traditional 4P paradigm (McCarthy, 1960) is a cornerstone of marketing theory, but traditional retailing (Rosembloom, 1976) need changes as Porter (2001) suggested, already more than 15 years ago, the need arose for a review of firms' strategies to take into account the Internet.

The evolution of the business environments and the development of the Internet created the need to review the factors that make up the marketing mix (Dominici, 2009a).

On the light of these changes, there are two main approaches in the research on this field: the "conservative" and "revisionist" (Dominici, 2009a). The "conservative" think the 4P paradigm is able to adapt to environmental changes, including new elements within each P (Van Waterschoot & Van den Bulte, 1992; Aldridge, Forcht, & Pierson, 1997; Peattie & Peters, 1997; Bhatt & Emdad, 2001; Allen & Fjermestad, 2001); on the other hand the "revisionist" claims that the 4P paradigm is outdated and needs a formal review (Costantinides, 2002 and 2006; Chen, 2006), considering in particular the emerging field of electronic marketing (e-marketing) and its peculiarities (Kalyanam & McIntyre, 2002; Kimiloglu, 2004).

In this view, noting the importance of the Internet (Erragcha & Romdhane, 2014), many scholars aimed to study a new concept of quality on the web (Cox & Dale, 2002; Parasuraman & Zinkhan, 2002; Zeithaml, Parasuraman, & Malhotra, 2002).

2.1 User Perceived Web Quality

Zeithaml et al., (2002) identified the criteria that customers use in evaluating web sites (in general) and service quality delivery through web sites in particular: these include information availability and content, ease of use or usability, privacy/security, graphic style, and fulfillment.

These findings are consistent with the model by Cox and Dale (2002), which with they share some common features. The Cox and Dale model is based on: ease of use, customer confidence, online resources, and relationship services.

Aladwani and Parwia (2002) recognized the need to shift the attention to quality perceived by users who navigates the website: the so-called user perceived web quality (UPWQ). The authors found three dimensions of perceived quality: (1) technical adequacy, (2) web content e (3) web appearance. Each of them has the following sub-dimensions: (1) technical adequacy referrers to security; ease of navigation; broadcast services; limited use of special plug-ins; search facilities; anonymity; availability; valid links; reliability; browser sniffing; personalization or customization; speedy page loading; interactivity; ease of access; multi-language support; protected content; bookmark facility. (2) Web content relies on usefulness of content; completeness of content; clarity of content; uniqueness of content; broadness of content; originality of content; currency of content; conciseness of content; accuracy of content; finding contact info.; finding people without delay; finding site maintainer; finding links to relevant sites; finding firm's general info.; finding products/services details; finding customers' policies; finding customer support; finding FAQ list; finding free services; using limited registration forms; finding online help; diversity of content; finding free info. (3) Web appearance considers attractiveness; distinctive hot buttons; changing look; organization; proper use of fonts; proper use of colours; proper use of graphics; graphics-text balance; proper use of multimedia; style consistency; proper choice of page length; good labelling; text-only option; proper use of language/style; color consistency.

Seethamraju (2004) supported these findings with a structural equation model, providing the same dimensions of UPWQ. In its study, only few items do not converged with Aladwani and Parwia model, they are: customisation, speed of page loading and interactivity, ease of navigation, attractive web site, and organised web site.

Yang et al. (2005) follow to this stream, but they rework the classification of UPWQ in (1) information quality and (2) service quality which reconfigured UPWQ dimensions. With respect to (1) information quality the dimensions are: usefulness of content and adequacy of information. With respect to (2) service quality the dimensions are: usability, accessibility, privacy/security, and interaction.

Ahn et al. (2007) enriched this model adding also system quality: therefore they considered (1) system, (2) information and (3) service quality. More in detail: (1) System quality items are: design, navigation, response time, security, availability, functionality, error-free transaction, multimedia. (2) Information quality: contents, completeness, detail, accuracy, timeliness, information reliability, format. (3) Service quality: responsiveness, credibility, assurance, empathy, follow-up service, competence. They also found that UPWQ had a significant impact on the perceived ease of use, playfulness, and usefulness, and consequently, they also discovered that it encouraged website use in the context of online retailing (Ahn et al., 2007).

2.2 Applying UPWQ to e-commerce

Many scholars studied online satisfaction (Bay et al., 2008; Muylle et al., 2014) or web quality (Zeithaml et al., 2002; Cox & Dale, 2002; Aladwani & Parwia, 2002; Seethmaraju, 2004; Ahn et al., 2007), but their is a need for more focused research about specific e-commerce quality even after 15 years after the call of Cox and Dale (2001 for further research to identify suitable specific determinants for e-commerce.

Barnes and Vidgen (2002) proposed an integrative approach to the assessment of e-commerce quality. They suggested a classification in three main component: (1) usability, (2) information, (3) service interaction. These components underline five sub-dimensions: (1a) usability/ease of use, (1b) design, (2) information quality, (3a) trust and (3b) empathy i.e., issue for transaction and security.

This model provided an application of the concept of web quality for an e-commerce, however it is still very tied to technical approach to website quality. Our proposal is also to consider commercial aspects (such as the free shipping option or the presence of discounts and promotions) to study how such factors are perceived by user.

Moreover, to keep pace with the times, it will also be considered the compatibility with smart phone and tablet in compliance with the new studies in the mobile commerce (m-commerce) field (Tarasewich et al., 2002; Park & Chen, 2007; Ngai & Gunasekaran, 2007; Palumbo & Dominici, 2015; Chang et al., 2015).

M-commerce offers potential opportunities for further research and applications (Barnes & Scornovacca, 2004; Di

Fatta & Cupido, 2016): through smartphone and tablet, users are connected to the Internet more easily and quickly (Lin, 2012; Liang, 2015). In addition, the use by the users of the various devices can be monitored and interpreted through increasingly sophisticated systems for data analysis, which open up new possibilities in terms of profiling of marketing campaigns through effective segmentation (Palumbo et al., 2014).

3. Methodology

In order to fill the above-mentioned gap, we remixed the five sub-dimension by Barnes and Vidged (2002) including commercial aspects and compatibility with smart-phone and tablet (Ngai & Gunasekaran, 2007; Palumbo & Dominici, 2015) so as to develop a framework including new features of user perceived web quality that are specifically fitting for e-commerce.

Our research started with a focus group in order to identify of the key factors for the UPWQ applied to e-commerce. The focus group methodology has the advantage to use an idiomatic language and concepts typical of the discipline (in our case e-commerce) by encouraging the spread of articulated reflections and at the same time providing the researcher with the opportunity to observe the process sense-making in action (Wilkinson, 1998).

Indeed, our focus group consisted of 8 subjects, divided equally between men and women: 2 web marketing experts, 2 e-commerce chief marketing officers and 4 regular buyers of online. The results converged to 8 key factors of user perceived web quality for e-commerce grouped into two main macro-category: technical and emotional features. With respect to technical features, we considered the following features: (1) ease of use, (2) design, (3) responsibility, (4) information quality; with respect to emotional features: (5) empathy, (6) trust, (7) free shipping, (8) discount.

Using these 8 sub-dimensions, we built a questionnaire for measuring UPWQ. For each feature, the interviewee had to express a preference on a Likert scale from 1 (not at all important) to 10 (extremely important): we used a single measurement item for each feature because, according to Gardner (1998), in "perceptual" contexts, it captures in a dry manner the first impression of the client / user

We used a 10 points scale because, according to Dawes (2008), there are two main advantages: first of all, a scale composed of pair elements, avoids the focus on the central element (for example in a scale from one to five, the respondent often choose the median element, i.e., three); secondly a wide scale allows to highlight the differences between factors.

The second point is particularly relevant because our idea is to make explicit that not all factors contribute in the same way in determining the UPWQ. In this base we developed a Pareto Chart, which is a qualitative methodology representing the importance of the differences caused by a certain phenomenon (in our case the 8 sub-dimensions of UPWQ for e-commerce). The next section will explain more in detail what is and how to use a Pareto Chart.

3.1 Pareto Chart

Generally speaking, Pareto Chart is a qualitative methodology for business and management (Myers, 2013) which traces its root in quality control issues (Juran, 1951; Ishikawa, 1985).

The main advantages of the Pareto Chart have been pointed put by Juran (1951; 1962; 1974), who argued that there is some universal principle according to which a small percentage of the quality characteristics usually contributes to the high percentage of the quality values. Thus, the main advantage of Pareto Chart is to identify critical factors leading to success or failure (i.e., defects) in a quality process.

Other authors (Kano, 1995; Witell & Lögfren, 2007), stressed on the relevance of Pareto Chart in analyzing individually quality attributes and the different ways in which they influence consumer satisfaction or quality perception.

The Pareto Chart is a graph including both bars and lines, where each factor is represented by bars placed in descending order and a line representing a cumulative distribution, i.e., the Lorenz curve (Gastwirth, 1971 and 1972). In other words, the bars are ordered using frequencies in non increasing order and the line is added in order to show their cumulative sum (Kano, 1995; Wilkinson, 2006).

3.2 Sample

The questionnaire was made by preliminary demographics staff and 8 sections about (1) ease of use, (2) design, (3) responsibility, (4) information quality, (5) empathy, (6) trust, (7) free shipping, (8) discount. For each question, the interviewee had to express how each feature helps to determine the quality of an e-commerce.

The responses were graded from 1 to 10, with the lowest value identifies "not at all important" and the maximum

value means “extremely important”. The interviewees had to mark a cross at the value they deemed appropriate.

A sample of 500 respondents was selected using a purposive sampling method: we have turned the survey to “online regular buyers” (Chen & Barnes, 2007), meaning that respondents were selected through an online form that required as a condition of access: purchasing at least three products or services online in the past year, or spending on e-commerce at least 150€ in the past year.

The first 500 candidates who met at least one of the two requirements were selected to participate to the survey. A structured self-administered questionnaire was used to elicit responses from the respondents.

In the face of the administration of 500 questionnaires, 458 were correctly filled with a high response rate: 91.6%. This value is due to the preliminary selection of the candidates and therefore it is aligned with survey response rate levels and trends by Baruch and Holton (2008).

4. Results and Discussion

The demographic profile of the respondents in presented in the following Table 1. It can be shown that 51.75% are female and 48.25% male. The majority of the respondents are 26-40 years old (44.54%) and they have a bachelors degree (40.39%).

Table 1. Sample demographics (our elaboration)

Variable	Attribute	Frequency	Percentage
Gender	Male	221	48.25%
	Female	237	51.75%
Age	18-25	107	23.36%
	26-40	204	44.54%
	41-55	147	32.10%
EDU	Secondary School	86	18.78%
	Diploma	149	32.53%
	Bacherors Degree	185	40.39%
	Master o PhD	38	8.30%

Let us move to the second part of the questionnaire consist of 8 sections about (1) ease of use, (2) design, (3) responsibility, (4) information quality, (5) empathy, (6) trust, (7) free shipping, (8) discount.

To schematically represent the results obtained, the assessments of the respondents were scored and compared in percentage. A clear difference between technical and emotional factors has quickly emerged. Specifically, as can be seen in Table 1, the UPWQ is determined for 64.32% by emotional features against 35.68% by technical ones.

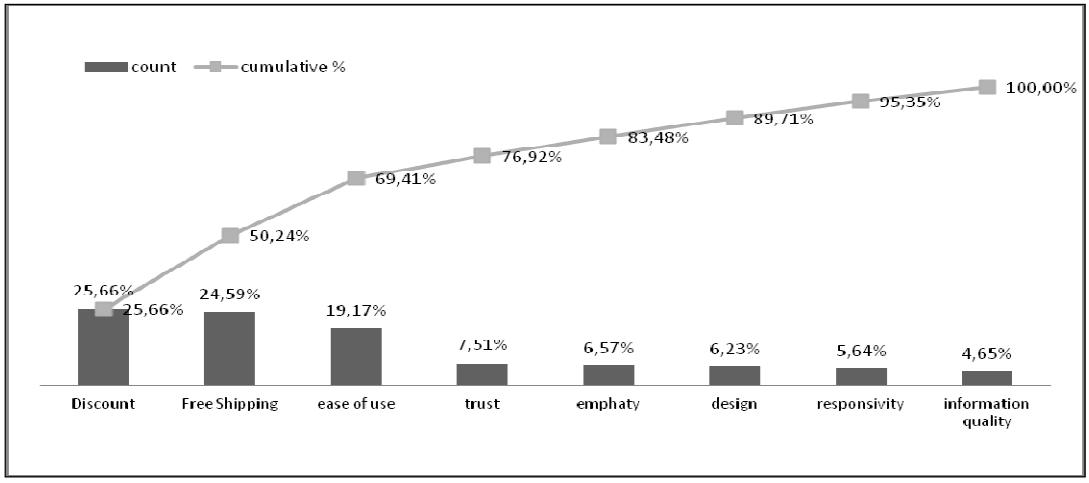
These finding are consistent with previous studies providing (Chen & Dubinsky, 2003; Ha & Stoel, 2009) providing that customers are not only web users with technical needs, but also shoppers with service, emotional and experiential needs.

Table 2. Technical and emotional features (our elaboration)

Technical features	Count %	Emotional features	Count %
(1)Ease of use	19.17%	(5)Empathy	6.57%
(2)Design	6.23%	(6)Trust	7.51%
(3)Responsivity	5.64%	(7)Free shipping	24.59%
(4)Information quality	4.65%	(8)Discount	25.66%
Total	35.68%	Total	64.32%

Going into more detail, it is possible to outline that certain factors have more relevance than the others: in primis discounts, free shipping and ease of use. To better understand these results, we used the representation of the cumulative frequency by Pareto Chart (Note 1): indeed, as above explained, this methodology highlight the critical factors in determining quality (Juran, 1974).

The originality of this study is applying this argument, in our digital era, to the concept of user perceived quality for e-commerce.



Graph 1. UPWQ for e-commerce using Pareto Chart

The graph clearly emphasizes that three feature (i.e., "discount", "free shipping" and "ease of use") determine the 69.41% of UPWQ for an e-commerce. In other words, this means that other factors give only a marginal contribution.

Therefore, as will be explained more in detail in the next sections, a practical implication is that online sales managers should focus in developing these factors more than the others to increase the UPWQ.

Particularly, the first factor (discount) and the second (free shipping) representing more than half of the total: 50.24%. In other words, according to user perception of quality, the sum of the other 6 factors is even less relevant than discount and free shipping (only 2 factors), that are the most critical.

These findings are consistent with Dominici and Di Fatta (2016), identifying through the Kano Model "discount" as a one dimensional factor. This means that customer satisfaction is proportional to the ability to e-commerce discounts and promotions.

Other scholars (Udo & Marquis, 2002) also found that online customer satisfaction is positively related to promotional sales and discounted price. Zhang et al., (2015) suggested also temporary price discount affects positively user perception.

The second most important feature is "Free shipping": as already noted by Dominici and Di Fatta (2016), this feature is an attractive factor for e-commerce. In other words, if "free shipping" is present, it generates a great attraction on customer satisfaction; but, if missing, it does not cause dissatisfaction. These findings are also consistent with previous study (Gehrke & Turban, 2009; Zhou et al., 2012; Turban et al., 2015). Could be useful consider the difference with "Free return" i.e., the ability to return purchased goods for free (there are not return shipping costs). It is considered a not very relevant factor (Bower & Maxham, 2012).

Meng and Rong (2015) argued that many e-commerce websites offer free shipping to their customers as an additional service, because this factor has a positive effect on the conversion rate (i.e., the percentage of buyer among all the visitors). In the light of this reasoning, is often required a rethinking of the logistic function to ensure "free shipping" which is a new needs specifically related to e-commerce (Simoni, 2011; Ordanini, 2011).

The third feature is ease of use, which is widely accepted in the previous literature as relevant factor for the UPWQ (Gefen & Straub, 2000; Gefen et al., 2003; Delone & Mclean, 2004). We have already shown that emotional feature are more relevant, however, although ease of use is a technical factor, it is the third most relevant factor. This finding is supported by Corbitt et al., (2003), founding a causal relation between ease of use and user experience, that is positively related to e-commerce participation. Other studies (Ramaya & Ignatius, 2005) explores the relation between perceived ease of use and perceived enjoyment as the main drivers of intention to shop online: they showed that perceived ease of use and perceived enjoyment are positively related to intention to shop online.

Another relevant aspect to be taken into account is trust. Trust is a very problematic point for the UPWQ and particularly for online sales: indeed, according to Wang and Emurian (2005), lack of trust is the strongest barrier for e-commerce. Indeed, e-trust may be considered the key factor in building relationship with customers on the

Internet (Corbitt et al., 2003). Users attribution of a low score to trust in affecting their perceived quality for e-commerce website (Kim et al., 2009; Kim et al., 2011). As a consequence, building consumer trust is a challenge for online merchants and, on the other hands, it is also an interesting research topic for further studies.

With regard to the remainder factors analyzed, they have a low impact on the UPWQ. However, an adequate consideration is required: it's wrong to conclude that these attributes have no relevance at all in determining the quality of an e-commerce; but could be useful that managers allocate resource at firs on the most relevant factors and, secondly, on the residual ones (Yang & Fang, 2004).

5. Conclusions, Limitations and Suggestion for Further Researches

In this study we analyzed the web quality issues with a specific attention to its determinants with reference to e-commerce. In doing so we considered the perspective of the user perceived web quality, and classified the factors according to a Pareto Chart in order to identify the more relevant feature for e-commerce quality.

First of all, we can conclude that all eight features have some impact on UPWQ. However, the main advantage of the methodology is to provide a preferential ordering. Our results showed that emotional features are more relevant than technical ones. Moreover we outlined the critical factors affecting the user perceived web quality and found that, following the Pareto Principle, few features determine the major part of phenomenon. More specifically: "discount", "free shipping" and "ease of use" determine the 69.41% of UPWQ for an e-commerce.

These features are the drivers that managers and online businesses need to manage to target their e-commerce customers. According to our findings, e-commerce managers should focus in developing "discount", "free shipping" and "ease of use" more than the other aspects. Given the need to allocate (limited) resources, this study can be a valuable support to guide this resource allocation for e-commerce strategy to the most relevant feature.

These reflections have to be taken into account for the implementation of the whole firm's strategy. Specifically, "discount" promotion is a choice that belong to a commercial perspective (marketing & sales), based on cost control (finance); or "free shipping" option for e-commerce requires an adequate shipping and delivery system: some scholars (Gunasekaran et al., 2008; Wu & Wu, 2015) suggested supply chain management as competitive strategy in our networked economy.

With respect to the limitations of this study, we considered e-commerce as unique field without considering the differences among sectors: a more in depth analysis could investigate specific sector (e.g., fashion e-commerce, travel and booking online sales etc.)

Another limit is given by the sample size that was restricted to Italian online shoppers only. Therefore, it might be interesting to repeat this research methodology in other countries to point out eventual communalities or differences in the findings.

Our last reflection is about the development of purchases through the mobile devices: the so-called m-commerce (Wang & Liao, 2007). Further researches might study the features affecting perceived quality for m-commerce, comparing them with feature determining the user perceived web quality for e-commerce in order to identify commonalities and differences.

Other studies could analyze the e-commerce performance point of view: in other words, given the 8 feature for UPWQ, which factors actually push the customer to buy? Comparing several e-commerce websites, could be interesting to test if there are any recurring issues (i.e., discounts) which boost sales.

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Note

Note 1. This is an application of the well known Pareto's 80/20 rule, who argued the 80% of income was limited to 20% of the population.