



June 21, 2011 (Tuesday) 55th EOQ Congress

**CONCURRENT SESSIONS
KEMPINSKI HOTEL CORVINUS**

**Tuesday 13:30 – 17:30
Erzsébet tér 7-8, Budapest V.**

SALON CORVINUS

Tuesday 15:30 – 17:30

14.1. QUALITY DEVELOPMENT AND MEASUREMENT METHODS

Session Chair: *Miflora M. Gatchalian, Quality Partners Co. Ltd., Philippines*

16.45 QWEB Specification: New Perspectives from Different Stakeholders

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Portuguese MSc Student and Researcher born in 1967. His project title: “E-business certification - new proposal for the QWEB (expert searching engine) Specification”, to be prepared in the University of Minho. He graduated in Systems and Computer Engineering, University of Minho, Portugal (1993). Now he works as a computer systems administrator, Production and Systems Department, University of Minho. He is a certified QWEB auditor. His research area: E-commerce, E-business; Electronic business certification.

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Paulo participates as a speaker in many quality management international conferences and he is currently author of several publications in the quality management area (books, papers in international and national journals). He is member of the research team of several quality management research projects and also supervises several Master and PhD thesis. In 2006, 2008 and 2009 Paulo has been distinguished with the award of the Best Paper Presented in the Student Technical Paper Competition during the ASQ World Conference. In 2008 his PhD Thesis was distinguished by the Portuguese Association for Quality as the best thesis developed in Quality. In 2009, Paulo has been distinguished as Senior Member of the American Society for Quality.

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QWEB Specification: new perspectives from different stakeholders

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Keywords

e-commerce, e-business, electronic business certification, QWEB certification.

1. INTRODUCTION

In the digital economy era, e-commerce and e-business are for the majority of the companies' day-to-day activities. A key factor for the e-business success is the trust that the customer has in the service provider, allowing for further visits and purchases in the future.

One way to show the customer that the supplier of the service has a set of best practices is through some kind of certification. A certification is recognition, by an external and independent certification body, of the fulfillment of a certain set of rules defined in a standard or technical specification by the certified company. In e-business, the supplier includes in the site the certification stamp. VeriSign, BBB - Better Business Bureaus, TRUSTe, WebTrust, ACEP (Portugal) and QWEB are among some examples of online certification systems.

The QWEB specification, owned by the International Certification Network (IQNet), defines a set of rules and guidelines for e-commerce and e-business certification. The last edition available (version 2.0) was published in January 2005. By the end of December 2010 there were 59 certified websites worldwide according to the QWEB specification.

Originally from Italy, the QWEB Certification it is used in all over the world.

2. PURPOSE

This research project aims to develop an updated version of the QWEB specification, taking in account the research findings that we were able to identify in the literature review and the new perspectives of the different stakeholders involved: Certification Bodies, Auditors, Certified Companies and QWEB Technical Coaches.

3. METHODOLOGY

Based upon the literature review carried out, we were able to identify which are the main worldwide certification schemes to certify e-commerce and e-business activities. QWEB specification was also analyzed and compared with those schemes. Based on

the information gather, we have identified the characteristics of a website that are considered by the costumers as the most important ones.

During this phase we have also interviewed specialists, including auditors and certification bodies. In Portugal there is only one certification body that offers this certification: APCER - Portuguese Association of Certification (*Associação Portuguesa de Certificação*). APCER is a research partner in this project.

Based on the information gathered in the previous phase, we have defined a set of possible improvements to the current QWEB specification and we have developed a survey that was carried out among the worldwide QWEB certified companies.

Based on the qualitative and quantitative analyses that we will perform over the data collected, we will define a set of improvements to the current QWEB specification, incorporating our research findings.

4. IDENTIFICATION OF POTENTIAL IMPROVEMENTS

According to the literature review carried out three main areas had been identified as relevant to the project:

1. Evaluation systems of customer satisfaction in e-commerce/e-business;
2. Logos/Stamps identifying the use of best practices at e-commerce/e-business sites;
3. QWEB Specification.

Once the literature review had been exhaustively presented in the 54 EOQ Congress (Costa *et al.*, 2010), the current paper will only focus its main aspects.

4.1. Evaluation systems of customer satisfaction in e-commerce/e-business;

Following the growth of e-commerce and e-business worldwide, there is a significant number of published works addressing, from various perspectives, the problems related to e-business, including e-customer satisfaction.

Wolfenbarger and Gilly (2003) developed an instrument (eTailQ) to measure and translate the perception of a customer on the online shopping experience, covering the various stages, from demand to delivery and possible after-sales service. In this research, the factors' "website design" and "fulfillment/reliability" appear as the most valued by e-commerce users, followed by "customer service" and "security/privacy".

The WebQual was developed based on QFD methodology (Quality Function Deployment) and was firstly applied to English schools of management (Barnes and Vidgen, 2000). WebQual 4.0 does not address all phases of e-business and could even be completed without consummating the transaction. Aspects such as billing, delivery and after-sales service are evaluated.

The WebQual, meanwhile renamed E-Qual, was used by Barnes and Vidgen (2003 and 2005) as an evaluation tool of a British Government site.

Based on SERVQUAL service quality concepts (Parasuraman *et al.*, 1994) with its five dimensions (tangibles, reliability, responsiveness, assurance, empathy), Trocchia and Janda (2003) use a semi-structured interview to online stores users in order to identify the main aspects of the quality of online services. Of the 58 taped interviews, five dimensions / areas were identified: performance, access, security, sensation and information. The authors highlight the similarities and differences with regard to SERVQUAL, identifying the range of goods, safety of the procedures used and credibility of information presented as the aspects most valued by customers.

Webb and Webb (2004) developed SITEQUAL that is a tool to obtain feedback from e-commerce users. Based on the work of Webb and Webb (2001), SITEQUAL include those factors that affect consumer perceptions, mainly: service quality (reliability, responsiveness, assurance, empathy, tangibility from Parasuraman *et al.*, 1994) and information quality (accessibility, navigation, security, accessibility, contextual, representation, intrinsic quality from Wang and Strong, 1996). The authors developed a survey that included the 21 service quality items from Parasuraman *et al.* (1994) adapted for information technology services, and the 22 items for quality information from Wang and Strong (1996). The authors concluded that the nine initial factors boil down to 4 for the minimum level desired: reliability, assured empathy, perceived usability and trustworthiness.

Parasuraman *et al.* (2005) proposed a multi-item scale to measure service quality of online stores. Based on the work developed by Zeithaml *et al.* (2000), the authors proposed a survey with 113 items to distribute among e-commerce users. The E-S-Qual is composed by 22 items grouped in 4 areas: efficiency, fulfilment, system availability and privacy. The authors defined a second questionnaire, the E-RecS-Qual for complaint, return and refund, with 11 items grouped in three areas: responsiveness, compensation and contact.

Mohanty *et al.* (2007) suggested that organizations need to identify the most important issues to the business strategy. Since the aim is to retain customers (loyalty), based on the Kano Model (Kano *et al.*, 1984), the authors concluded that customer satisfaction can be measured in 24 dimensions. They identified as key point to the achievement of good business performance the need for quantitative measures to each function, enabling continuous improvement and identification of

potential problems. But as the financial, technical and human organizations are limited, they should select the issues to monitor, matching the most valued by customers, and knowing the existing capacities, identifying the dimensions to improve, thus defining a strategy for the business.

4.2. Logos/Stamps identifying the use of best practices at e-commerce/e-business sites;

One way to tell the customer that the supplier of the service uses a set of best practices is through some kind of certification. A certification is recognition by an external and independent entity of the fulfillment of a set of rules defined in a standard or technical specification by the certified company. In e-business, the supplier includes in the site the certification stamp.

According to Kim *et al.* (2004) the certificates can be classified according to three main areas: security (eg Verisign, WebTrust), privacy (eg WebTrust Trust.e, BBBOnline Privacy) and business integrity (eg BBBOnline Reliability, BizRate.com certified). In this study, the authors attempt to evaluate whether the introduction of security stamps improves business performance. The results indicate a limited effect, conditioned by the user's knowledge on safety.

Hu *et al.* (2003) tested the effect of some of the most popular logos (VeriSign Secure Site, BizRate, TRUST.e, BBBOnline Reliability Program and AOL Certified Merchant Guarantee) on purchase intentions. The authors noted a general increase in purchase intentions after the introduction of stamps, particularly with logos related to guarantees, security and trust.

Kim *et al.* (2008) have analyzed whether an information campaign on security stamps among users increase awareness and importance of the stamps and also the perception of privacy, security and information quality. The authors verified that the assessment of service has not changed only by the introduction of stamps.

Currently there are several organizations that provide online certification services. One of the most popular is Verisign, the leader in issuing SSL Certificates (Secure Sockets Layer) to implement secure sessions on Internet. According to the company, there are over 90,000 hosted domains in 145 different countries with Verisign symbol.

Organizations that purchase a Verisign certificate can include the Verisign Stamp in the website, informing customers of the company's concern with security issues. VeriSign is focused only on security issues.

BBB - Better Business Bureaus, is a nonprofits North American (and Canada) organization founded in 1912 with the goal of promoting clear behaviours, honest and ethically correct marketing and mediate disputes between customers and suppliers. BBB defines confidence in two aspects: integrity and performance. Integrity includes respect, ethics and intent while performance is related to the ability of supplying goods according to the defined level of time and device. Trust standards include a set of policies, procedures and best practices focused on how the business deals with the

public, fairly and honestly. The accreditation program requires the completion of these standards, the commitment to resolving any complaints made by customers and a fee for issuing and maintaining the certificate. The accredited organization has the right to use identifiers stamps.

TRUSTe program (1997) is similar to BBB, but is only implemented in US organizations. It has now over 2,400 certified sites, including reference organizations such as Microsoft, IBM, Oracle, Nestle, and eBay. One of its functions is to arbitrate in disputes between entities (typically customer-supplier), resolving over 5,000 conflicts annually. Its certification program includes four distinct services: *Web Privacy Seal*, *EU Safe Harbor Seal*, *Email Privacy Seal* and *Trusted Download Program*.

The Accreditation Program of Electronic Commerce (PACE) was created in Portugal in 2003 as an initiative of the Business to Consumer Commission of Electronic Commerce Association in Portugal (ACEP). There were 13 websites accredited by this reference in April 2010. The website is audited according to the "Manual of Compliance". This document contains a set of binding recommendations and principles (optional).

4.3. QWEB Specification

The QWEB specification, owned by the International Certification Network (IQNet), defines a set of rules and guidelines for e-commerce and e-business certification.

The specification is based on a set of rules and best practices for key processes and e-business support. If the company implements these rules the website may have a QWEB certification stamp, attesting to compliance with the stated specification.

QWEB Specification version 2.0 (IQNET, 2005) outlines the requirements that entities must meet to obtain the website certification. These requirements are grouped in seven distinct areas: identification of the online supplier, information to be provided on the certified website, on the certified website, transaction management, social responsibility, processing of users' personal information (privacy), security and quality of the e-business process (control, complaints and corrective actions).

5. SPECIALIST OPINION - INTERVIEW

To define the survey, it was important to identify a number of e-business situations, which could potentially represent improvement opportunities for the QWEB specification.

The first relevant source of information was the literature review. It was also important to understand the perspective of the certification bodies. For that purpose we have conducted an interview with the QWEB Product Manager at APCER (Portuguese Association of Certification) that is, simultaneously, a QWEB Auditor. The framework used in the interview was composed by 3 groups of questions: "The QWEB project", "The

QWEB Specification" and "The QWEB certification process".

Regarding "The QWEB project" the main idea is that the product is very interesting to organizations but remains little known. In IT companies often comes as a first experience in certification systems.

In "The QWEB Specification" some improvements were identified like issues related to customer support, security in electronic transactions and outsourcing. There were also references to the inclusion of some topics like handling of complaints, analysis of management indicators and aspects of website usability/design.

Regarding "The QWEB certification process", there are still requests for information about QWEB but in a low level. It was necessary to do a massive marketing campaign to increase the brand awareness. Additionally it will be eventually necessary to reduce the overall certification costs.

6. CERTIFIED COMPANIES OPINION – THE SURVEY

Based on information gathered in the previous phases, we were able to develop a questionnaire that was sent to all QWEB certified organizations. A first version of the questionnaire was tested in a Portuguese QWEB certified company. Based on the feedback gathered we were able to improve the survey and reached its final version. The literature review had shown us a wide range of situations that could be considered to this project. The final version of the questionnaire was composed by 44 questions, grouped in four sections: "QWEB Certification Mark", "Strategic Management", "Customer Support" and "Website".

The Section 1 - "QWEB Certification Mark" was composed by 11 questions that try to address the degree of agreement with statements related to the use of the QWEB certification mark.

Section 2 - "Strategic Management" included 6 questions, which try to evaluate the importance and use of strategic management by the QWEB certified companies.

The Section 3 - "Customer Support" included 3 questions in order to evaluate the importance and use of this aspect by the certified companies.

Finally, the Section 4 – "Website" aim was to evaluate the importance and use of aspects related to the website (15 questions) and the agreement of the certified companies with some questions raised also related to the website (5 questions).

At the end of the survey, there were some open questions related to organization general information: number of employees, turnover, type of business (online only, online and physical place), activity sector, country and QWEB certification year.

The online survey was developed with LimeSurvey solution.

There are 55 QWEB Certified Organizations in six different European countries: Italy, Portugal, Slovenia,

Switzerland, Finland and France. For this reason it was decided to implement the survey in three languages: Italian, English and Portuguese. Response rates are shown in Table 1.

Table 1 - Survey response rates

Country	Sent	Received	%
Italy	42	7	16.7
Portugal	5	4	80.0
Switzerland	4	1	25.0
Slovenia	2	0	0
Finland	1	0	0
France	1	0	0
Total	55	12	21.8

The global response rate was of 21.8%

7. RESULTS

The statistical software used for the analyses was the IBM/SPSS version 19.0.

7.1. Questionnaire reliability

The internal consistency of the factors is defined as the proportion of variability in responses resulting from differences among respondents. That is, the responses differ because the questionnaire is not confusing and lead to different interpretations, but because respondents have different opinions.

The Cronbach's alpha is a measure commonly used to check the internal consistency of data. A high value of this coefficient indicates that the item set is homogeneous. This indicator varies between 0 and 1. For blocks 2, 3 and 4 were considered the data concerning the importance and not the use (Yusof and Aspinwall, 2000, quoted in Sampaio, 2002). The importance parameter reflects better understanding of the concept by the person who responds.

To verify the internal consistency is necessary to know:

- The mean and standard deviation of each item;
- The mean, standard deviation and correlation of the items comprising the factor;
- The relationship between each item and factor in terms of correlation coefficient, the coefficient of each item with the other, and the effect it produces on average of each item, the variance and Cronbach's alpha factor.

Applying the Cronbach's alpha test for each block, we obtained the following results:

- Stage 1 – Compliance Likert scale
Cronbach's Alpha = 0.889 - good internal consistency
- Stage 2 – Importance Likert scale
Cronbach's Alpha = 0.908 - very good internal consistency
- Stage 3 – Importance Likert scale

Cronbach's Alpha = 0.077 - less good internal consistency

- Block 4 – Importance Likert scale

Cronbach's Alpha = 0.823 - good internal consistency

- Stage 4 – Agreement Likert scale

Cronbach's Alpha = 0.542- less good internal consistency

7.2. Organizations general characterization

According to Figure 1, 58% of the respondents' organizations have online and store business. Thus, we can conclude that in most organizations the digital existence appears like a complement to the physical existence.

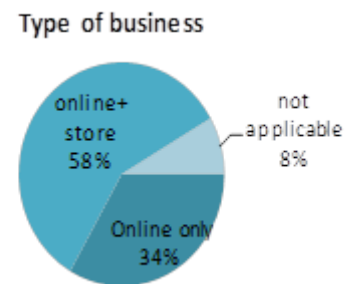


Figure 1 - Organizations business type

Figure 2 complies the QWEB certification year of the surveyed companies.

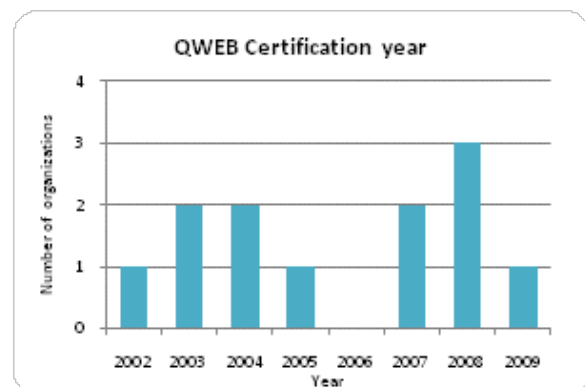


Figure 2 - Organizations certification year

As is illustrated it ranges from 2002 to 2009 with the exception of the 2006 year.

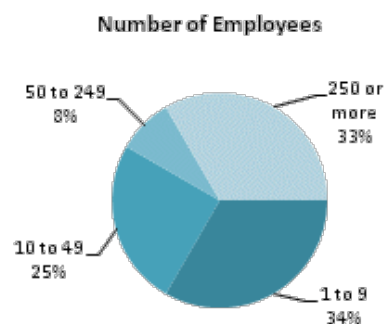


Figure 3 - Organizations size

In Figure 3 we can see the organizations size. Based on Figure 3, we conclude that the QWEB Certification is not characteristic of a particular size of organization, applying both the micro as large organizations.

According to Figure 4, there are more companies with lower sales volumes than high-volume sales.

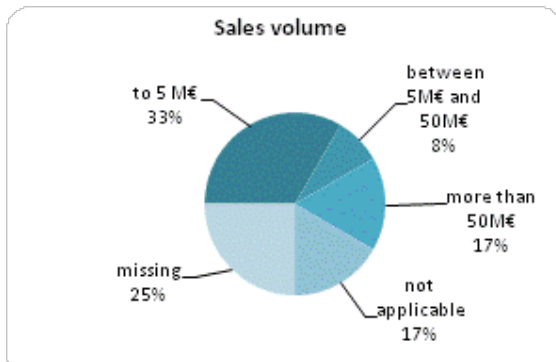


Figure 4 - Organizations sales volume

7.3. Section 1 - "QWEB Certification Mark"

This section was composed by 2 groups: the first one with 10 questions which asked the agreement degree with each one and the second one with two multiple choice questions.

Agreement

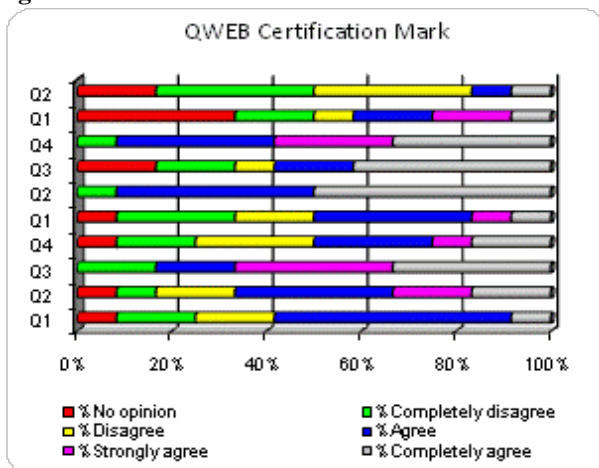


Figure 5 - QWEB Certification Mark (agreement)

By the median analysis we can conclude that 50% of respondents agree with the questions, taking as a central value the option "agree".

Furthermore, we were able to verify that:

- Questions 3, 6 and 8 have the highest average agreement, identifying the organizations with the following statements:

- "The audit process translates into added value to the organization";
- "The QWEB symbol size is suitable for viewing by consumers";

- "QWEB Certification improves in terms of added value if they were included usability tests to the website".

- Question 10 presents the lowest average agreement, and should represent a clear disagreement with his content:

- "Following the granting of certification, annual audits are not justified to back-office".

In the second group, the question 11 asked organizations about the use of the QWEB mark. The results were as follows:

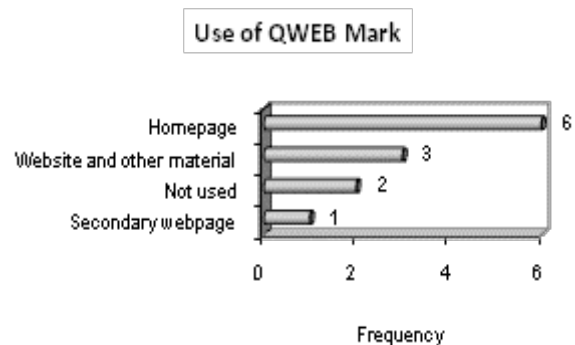


Figure 6 - Use of QWEB Mark

We can see in Figure 6 that the use of the QWEB mark is done mainly in the homepage, representing 50% of respondents. We thus conclude that most organizations value the QWEB brand.

Question 12 asked if the organizations customers are interested in the QWEB system. We can see in Figure 7 that answers are equally distributed among values "rarely" and "never" with no "often" responses.

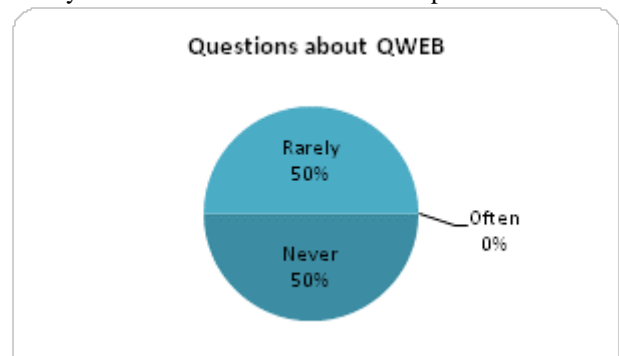


Figure 7 - Questions about QWEB

7.4. Section 2 - "Strategic Management"

Section 2 contains a first part with 6 questions to know the "importance" and "use" of every item submitted, and a second part to select an option from a set of possibilities.

For the first part, we present separately the analysis of responses "importance" and "use".

Importance

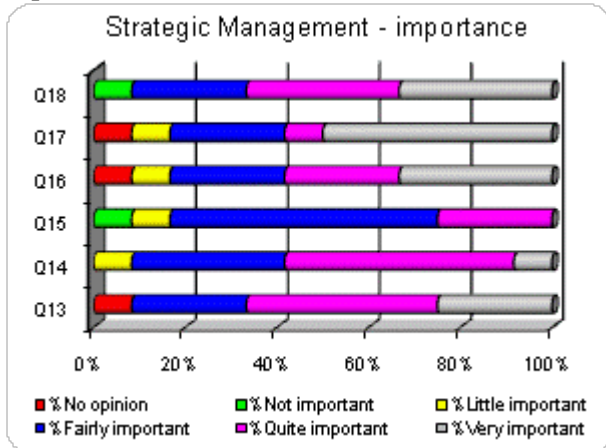


Figure 8 - Strategic Management (importance)

We calculated the values of mean, median and standard deviation, ignoring the values of "no opinion".

We can verify that:

- All issues have average more than 3, which means high importance given to the issues presented;
- Question 13 does not have answers "not important" or "little important", which shows that companies consider important the existence of a "process of self evaluation to the entire system, with the production of formal report";
- Question 15 shows the lower mean and median of importance, showing smaller importance of the "documented procedure on the risk analysis, including definition of responsibilities, areas and reports";
- Question 17 shows the highest mean and median of the importance, meaning a clear emphasis to the "resolution of conflicts (customer-supplier) without resorting to external entities (only parties)".

Use

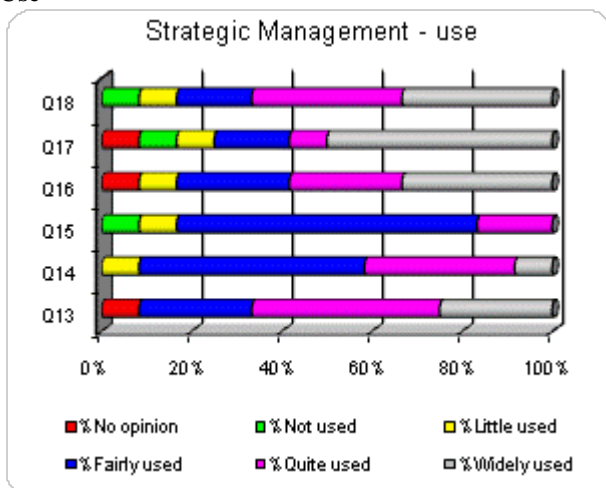


Figure 9 - Strategic Management (use)

The findings are in line with the findings for the "importance", namely:

- Question 13 does not have the options "not important" or "little important", which shows that companies use a

"process of self evaluation to the entire system, with the production of formal report";

- Question 15 shows the lower mean and median of use, showing less use of the "documented procedure on the risk analysis, including definition of responsibilities, areas and reports";

- Question 17 shows the highest mean and median of use, meaning a utilization of "resolution of conflicts (customer-supplier) without resorting to external entities (only parties)".

We can conclude that organisations value and use aspects analyzed relating to "strategic management".

The distribution of opinions both in terms importance and use appear to be similar. In order to assess the strength of association between the "importance" and "use" variables we calculated the correlation between the two variables. He began by verifying the normality of data, however this was not met. So he had to apply the nonparametric association test. Then we used the Spearman coefficient to analyze the association between "importance" and "use". This association was tested by question. The Table 2 presents the correlation coefficients obtained for each question:

Table 2 - Correlation coefficient

Question	Correlation coefficient
Q 13_Importance/ Q 13_Use	1
Q 14_Importance/ Q 14_Use	0.834
Q 15_Importance/ Q 15_Use	0.896
Q 16_Importance/ Q 16_Use	1
Q 17_Importance/ Q 17_Use	0.978
Q 18_Importance/ Q 18_Use	0.994

There is a strong linear association between the "importance" and "use". We conclude that these two variables are positively associated. This means that companies think the important issues also use them.

In the second part of Section 2, we have two multiple choice questions. Question 19 asks organizations about other types of certification beyond QWEB. 11 companies responded affirmatively and all with ISO 9001 (91.7%). Two organizations have also selected the option "other" with "EMAS certification" and another with the "Qualité Marchio Transdev". None of the organizations claim to have ISO20000 certification or ISO27000.

The companies that responded affirmatively as the existence of other certification were asked whether or not QWEB have been implemented first. 45% of entities have the QWEB certification as 1st and 55% did not. QWEB Certification appears both as the first organization's approach to certification and as a continuation of a certification strategy.

Finally on this block, we asked about the indicators used by organizations to monitor the website.

Table 3 - Indicators to monitor the website

Indicator	Frequency
Number of visits/sessions	10
Number of hits	7
Number of different users	7
Average time per session	7
Number of clicks per session	5
Number of visits to the 1st page only	5
Number of visits without purchase	3
Number of dropouts during acquisition	1
Click path	1

As we can see in Table 3, the most used indicators for monitoring the website are:

- number of visits per session;
- number of hits;
- number of different users;
- average time per session.

These four indicators are perhaps the most obvious and also the easiest to get of most systems but may not be the most useful in e-business/e-commerce systems. The "number of visits without consummating the acquisition" and particularly "number of dropouts during the acquisition" are direct indicators of system activity and performance and therefore of high importance.

7.5. Section 3 - "Customer Support"

This section has a structure identical to the previous one. It has a first part with three questions about "importance" and "use" and a second part to the selection of options by the organization.

Importance

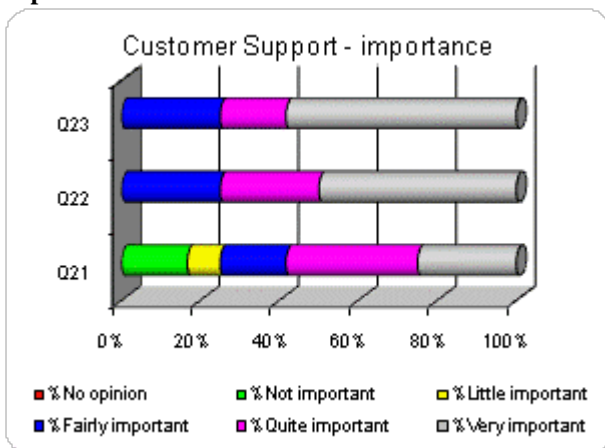


Figure 10 - Customer Support (importance)

We can verify that:

- All questions have average above 3.42, which means a widespread importance given to the issues presented;
- The question 23 has the highest value of average and median, meaning high importance attributed to the

existence of a "clear process of management and treatment of complaints perfectly designed, implemented, monitored and improved (in line with ISO9001)".

- The question 22 also presents high values of mean and median, indicating the importance given to the existence of a "registration of complaints by using a feature of the website framework for this purpose".

Use

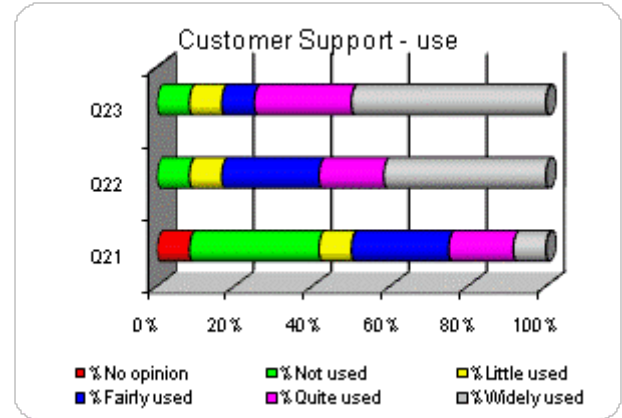


Figure 11 - Customer Support (use)

We can verify that:

- The median value of all issues is bigger than three, so, more than 50% reveal the use of various items of "customer support" shown;
- Question 23 has the highest mean and median values and 50% of "widely used" showing a great use of a "clear process of management and treatment of complaints perfectly designed, implemented, monitored and improved (in line with ISO9001)".

Since the results for the variable "importance" and the variable "use" were similar, it was felt appropriate to verify whether these two variables were associated.

As the data normality was rejected, we obtained this Spearman correlation coefficient:

Table 4 - Correlation coefficient

Question	Correlation coefficient
Q 21_Importance/ Q 21_Use	0.649
Q 22_Importance/ Q 22_Use	0.59
Q 23_Importance/ Q 23_Use	0.916

We can see in Table 4 that questions 21 and 22 although they are associated, do not show high correlation coefficients, showing that this association is not perfect. On the flip side question 23 presents a coefficient of 0.916, demonstrating that institutions consider important and use the "clear process of management and treatment of complaints perfectly designed, implemented, monitored and improved (in line with

ISO9001)". This conclusion is almost obvious given that 11 in 12 organizations surveyed have ISO9001 certification. With the results of two other questions we can see that although these issues were identified as important, their use is still not great.

In the second part of this section, we have two multiple choice questions. We want to identify means of contact used with customers and which the most used.

Table 5 - Means of contact

Mean of contact	Frequency
Email	12
Telephone	12
Fax	9
Face-to-face	5
Chat	2
Video chat	1

We can verify in Table 5 that all organizations provide "telephone" and "email" to contact with customers. In another sense, we found a small use of "video chat". For the most used means of contact the results are in Table 6.

Table 6 - Most used means of contact

Mean of contact	Frequency
Email	8
Telephone	3
Face-to-face	1

The most used mean of contact for customers is clearly the "email" (66.67%), followed by "telephone" (25.00%) and "face-to-face" (8.33%). This is certainly related to the possibility of continuous contact in this way (24h/day and 365days/year).

7.6. Section 4 - "Website"

This section has a first part with 15 questions about the "importance" and "use" of each item and a second part with 6 questions requesting the "agreement" with each one.

Importance

By observing the values obtained for the median, we found that most entities considered important the aspects mentioned in the 15 questions. The most common opinion was "very important".

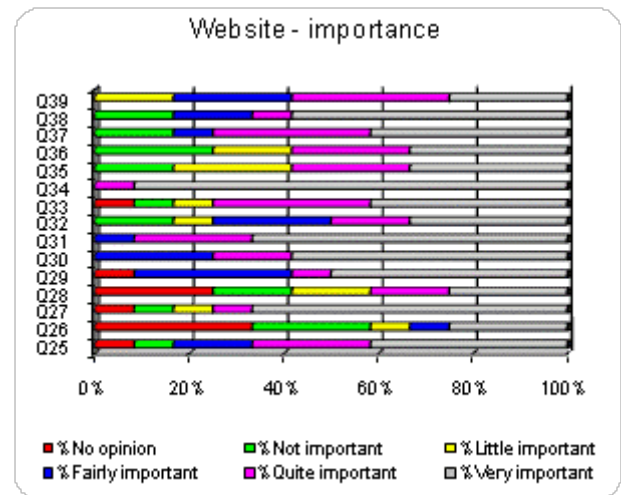


Figure 12 - Website (importance)

It is found that:

- 91.7% of organizations considered as "very important" question 34 – "introduction of personal data in secure session – SSL";
- Apart from question 34, present with high average values the question 31 – "valuation of presentation and navigation simplicity in the website development" and question 30 – "update content performed according to a precise procedure, including responsibilities, precedence and dates", which had only responses of "fairly important", "quite important" and "very important";
- They also have high average values question 27 – "inclusion of a search engine, available at the beginning of the homepage" and question 29 – "all information posted online is associated with the author and creation, publication, review and expiry date".
- The question 26 – "inclusion of hyperlink to the supplier if it is necessary to download/install extra software" has the lowest mean and median values and 33% of "no opinion", which indicates a minor importance or knowledge attributed to this item.

Use

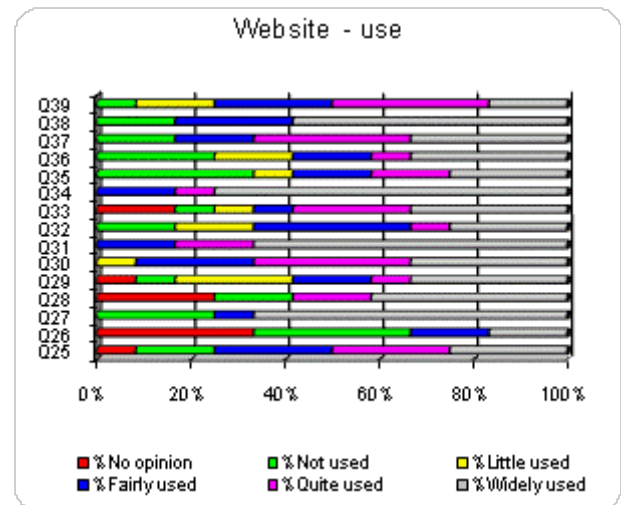


Figure 13 - Website (use)

We can verify that:

- All organizations reported the use of the “valuation of presentation and navigation simplicity in the website development” and “introduction of personal data in secure session - SSL (Secure Sockets Layer)” (questions 31 and 34, respectively);
- 75% of organizations considered as "widely used" to question 34 – “introduction of personal data in secure session - SSL (Secure Sockets Layer)”;
- The question 26 – “inclusion of a search engine, available at the beginning of the homepage” displays the lowest mean and median values and 33% of "no opinion", which indicates a lower use of item.

Similar to what was done previously, we applied a test of association based on the Spearman correlation coefficient to verify if these two variables were associated.

The results obtained are summarized in Table 7.

Table 7 - Correlation coefficient

Question	Correlation coefficient
Q 25_Importance/ Q 25_Use	0.834
Q 26_Importance/ Q 26_Use	0.872
Q 27_Importance/ Q 27_Use	0.788
Q 28_Importance/ Q 28_Use	0.72
Q 29_Importance/ Q 29_Use	0.491
Q 30_Importance/ Q 30_Use	0.649
Q 31_Importance/ Q 31_Use	0.985
Q 32_Importance/ Q 32_Use	0.956
Q 33_Importance/ Q 33_Use	0.875
Q 34_Importance/ Q 34_Use	0.402
Q 35_Importance/ Q 35_Use	0.944
Q 36_Importance/ Q 36_Use	0.714
Q 37_Importance/ Q 37_Use	0.921
Q 38_Importance/ Q 38_Use	0.993
Q 39_Importance/ Q 39_Use	0.829

For analysis of correlation coefficients obtained, there is a weak association in questions 29 and 34, since the respective values of the Spearman coefficient are lower than 50%.

For the other issues we had high correlation coefficients, which mean that organizations use the information they most value. Note that questions 31, 32, 35, 37 and 38 show a positive association of more than 90%.

Agreement

In the second part of this section the level of "agreement" with six statements is asked.

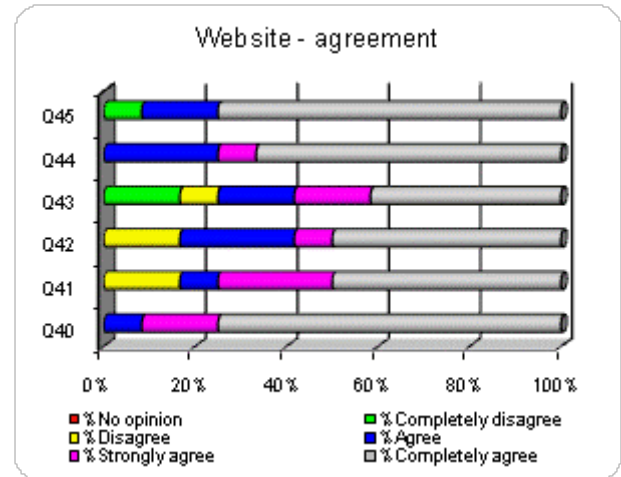


Figure 14 - Website (agreement)

It is found that:

- Questions 40, 44 and 45 present the highest mean and median values, with an average of 4.33 and a median of 5. Thus, it seems clear the agreement with these three statements:

- 40 – “The organization image is seriously affected by online existence of incorrect or outdated information”;
- 44 – “For normal use of the website, it should not be necessary to install specific plug-in”;
- 45 – “Having the website monetary transactions, the system should include minors protection mechanisms”.

8. QWEB SPECIFICATION PROPOSAL

After all the relevant information gathered, a set of improvements to the QWEB specification are proposed in this section. In addition, a reference to the current version of the specification is also included.

8.1. Brand visibility

All indicators point to a weak visibility of QWEB brand. This is also the opinion of the certification body involved in the study – APCER. Customers do not ask questions about the presence of the QWB mark on site. The existence of events or news related to the brand is virtually nonexistent. There are no QWEB scientific papers published. A large marketing campaign is need to improve the national and international brand image. The current research project is also a QWEB disclosure element.

8.2. Audits

It is the opinion of the certification bodies and certified organizations of the advantages of regular annual audits to the front office and back office. This should be maintained, balancing the possibility of integrating back-office audits in ISO9001 audits.

According to the QWEB specification there should be a front office audit every 3-4 months and annually to the back office. (Chapter 6.2 of the QWEB Certification Scheme). In practice each organization is audited -

front-office audit and a back-office audit, every year, and the back-office audit preferably after the front-office one, allowing the clarification of aspects that have not been entirely clear in the online audit.

8.3. Security / SSL

This is highly valued by both suppliers and customers. The existence of mandatory security mechanisms with the corresponding resistance tests would be well regarded by both parties. The feeling of security is a loyalty agent in e-commerce.

Ensuring security is vital not only in the website as well as around the back office. Also the physical access to sensitive locations of an information system (data center) or places responsible for providing goods and services (billing, shipping) will be subject to comprehensive planning with a clear definition of controls to implement.

Where sensitive data is handled like personal data, access information, orders processing, tracking of deliveries, official documentation, among others, the systems should use secure socket layers systems (SSL) that allow information encryption and the consequent difficulty of misappropriation of information.

The current specification refers generically to the need to ensure security, including personal information and transactions and means of payment. It refers to the physical security (access to places) and risk analysis, system backups and networks (chapters 3.5 checklist of front-office and 3.5 checklist of back-office).

8.4. Complaints

Any complaints about all aspects of the operation of electronic business should have the correct treatment. Although this aspect is included in the current specification (Chapter A1.4 checklist of front-office and A1.4 checklist of back-office), it could be completed and defined like in ISO9001. The existence of a specific channel for this purpose should be mandatory. The indication of an email address specifically for this purpose is not currently mandatory, and is often replaced by a form.

8.5. Monitoring indicators

There is a large set of indicators for monitoring sites. For e-commerce/e-business there are a set of key metrics, especially related to purchases and withdrawals. The exchange of goods and services is the main objective of the website. So, it is highly indicative of the good performance of the website the ability to prevent dropouts at the time of purchase. The analysis of loyalty capacity is another important aspect.

The only references to the monitoring operation of the portal in the present specification relate to the achievement of performance levels of services offered in accordance with the terms and conditions applicable to the e-commerce (A1.4.1 point checklist of front-office) and the fulfilment of customers' expectations and desires (paragraph A1.4.2 checklist of front-office). The systems' evolution allows obtaining a wide range of information about their operation, which must be worked and used to benefit the organization. This could

represent the difference between a successful website and one that simply falls and disappears.

8.6. Usability

The majority of customer satisfaction studies in e-commerce situations refer to the usability of the site as one of the factors most valued by customers. The way it is done in user interaction with the system appears as a key factor in customer loyalty.

The system should produce confidence in clients' actions and decisions to be taken to achieve the objectives intended.

The current version of the specification does not include usability testing, referring only in point 3.2 of Chapter A1.1.1 of front-office checklist that the information must be clear, concise, unambiguous and easy to find. An earlier version of the specification provided three different levels of QWEB certification (1, 2 and 3 stars) and the usability tests were part of the upper levels of certification. With the disappearance of this concept, the usability tests are no longer covered by QWEB certification.

This theme includes some complexity and it is not the main goal of this study. It may require the existence and use of automated systems to support the tasks involved, but should be solved and integrated with appropriate depth to the system in order to integrate the concepts but not to make a system of such complexity that could prevent the implementation.

8.7. Cost

The certification cost was not identified as a penalizing factor by certified companies, but was not rejected at all.

Some information from the certification body confirms the existence of various business contacts with potential site certification but do not go for budget reasons. It is certainly connected with the fact that it is necessary to cover not only the award but the whole annual monitoring system.

The joint audits related to other management systems implemented in the organization could allow a rationalization of costs with the consequent reduction in amounts payable by the entities.

8.8. Internal audits

The QWEB specification does not determine the existence of internal audits on the system.

Like other certification systems, this analysis should be periodically and determine the same record keeping for future analysis by themselves and the certifying entity.

This is a practice present in other certification systems and of great importance for the system's sustainability, allowing a constant performance monitor and practices' correction.

8.9. Contact with customers

The operation of an e-commerce system is characterized by a gap between the customer and supplier, with an impersonal and standard environment. If a client finds a problem during the purchase process and if he doesn't

have an easy way to contact the supplier, maybe he will give up.

Emerges as essential to facilitate and promote the customer's contact with the supplier, diversifying the alternative ways of contact as well as the times to do that.

Beyond traditional ways of contact, the system should assess the use of new kind of contact solutions that enable greater proximity to customers, particularly those using real time video and audio.

Chapter 3.2 of the current specification front office checklist refers to the requirement of means of contact, especially directed to the request for assistance, warranty or return of products and goods. Not that the need for the existence of real time contact forms, allowing the clarification of doubts and difficulties, especially during purchase procedures. And in this case, chat and video chat are very important.

8.10. Search engine

The complexity of a site can be easily overcome if there is an internal search system. This mechanism should allow for custom search by customer.

Their inclusion should be done in a general area of the website to facilitate its use, preferably at the beginning of the main page.

It is naturally desirable for inclusion in a general area and central portal to facilitate its use, preferably at the beginning of the main page.

This aspect is closely linked to usability issues already mentioned above.

In the current version of the specification this aspect is not addressed, referring only the ease of finding information (paragraph A1.1.1-2 of Chapter 3.2 of the front office checklist).

8.11. Content Management

It is widely recognized that the existence of online of inappropriate content, inaccurate, outdated or inaccurate contributes to a degradation of the organization image.

The best way to ensure the accuracy of information posted online is to formalize the process of content management. The existence of a well-defined procedure, including responsibilities, dates and precedence should be implemented for the entire website.

The current specification only refers the need of online information be accurate and complete (section A1.1.4 of Chapter 3.2 of the front office checklist). If the process of place/change/remove information is not properly defined and implemented, is very difficult to ensure that all information posted online is accurate, complete and updated.

8.12. Plug-ins

The use of some tools and resources requires the installation of client components to allow them to interpret and execute properly.

The vulnerability of systems to malicious components creates a general fear in the user to install additional elements. It is better not to force users to install

additional components, making the process faster and lighter.

The current version of the QWEB specification makes no reference to the use of these elements.

8.13. Minors Protection

While the use of the internet is perfectly generalized to different age groups, young people are the biggest users of this mass medium.

As the site has transactions of goods and services with payments, it is advisable to use mechanisms to identify orders executed by minors to treat them appropriately and, where appropriate, be rejected.

The present specification generally speaks of the minors protection, including collecting information and prevent refuse orders (A1.1.8 of Chapter 3.6 of the front-office checklist), but does not force the implementation of any mechanism to control or inhibit the use by minors.

9. CONCLUSIONS AND FUTURE WORK

Based on the stakeholders' feedback, it is widely recognized that QWEB is a good certification with a well-developed specification and an appropriate certification process.

However, there is always space for changes and improvements, particularly through technical innovation and market changes that have been presented.

In recent time's e-Trust and BBB systems have emerged in a more continuous and persistent way in the market.

Its visibility, recognition and thus have increased importance. These U.S. systems have been adopted by major brands, which serve as an excellent marketing campaign. This is an aspect in which QWEB clearly fails. Has failed to convince big brands of their added value and be preferred over other systems. Brands certainly prefer systems with visibility in the market. It would imply a large marketing campaign.

Certification bodies have a key role in the promotion of the product to its customers. The promotional effort should start with them along to their customers.

In this paper presents a wide number of aspects to be introduced or strengthened in the current specification. Some aspects are already mentioned in the specification but in a superficial way or optional while others are not contemplated and intended to make them subject to review during their audits.

As future work, the inclusion of usability tests in the specification should be done in a well thought out as it is a matter of some complexity. In this sense it would be interesting to develop studies in this area that might have identified guidelines and issues to include in the QWEB specification.

There is a set of companies that were QWEB certified in the past and that are no longer and it would be interesting to know the reasons for this decision had been taken, in order to avoid similar situations in the future.

It is also important to know the opinion of other organizations in e-commerce market, in order to try to understand the possible interest in the product and its opinion on this kind of solutions.

10. REFERENCES

- APCER (2006), "Especificação QWEB", versão 1.2.
- Barnes, S., Vidgen, R. (2000), "WebQual: An Exploration of Web Site Quality", *Proceedings of the Eighth European Conference on Information Systems*, Vienna, July 2000, 1, 298-305.
- Barnes, S., Vidgen, R. (2001a), "An Evaluation of Cyber-Bookshops: The WebQual Method", *International Journal of Electronic Commerce*, 6, 6-25.
- Barnes, S., Vidgen, R. (2001b), "Assessing the Quality of Auction Web Sites", *Proceedings of the Hawaii International Conference on Systems Sciences*, Maui, Hawaii, January.
- Barnes, S., Vidgen, R. (2002), "An integrative approach to the assessment of e-commerce quality", *Journal of Electronic Commerce Research*, 3(3), 114-127.
- Barnes, S., Vidgen, R. (2003), "Interactive E-Government: Evaluating the Web Site of the UK Inland Revenue", *Journal of Electronic Commerce in Organizations*, 2(1), 22pp.
- Barnes, S., Vidgen, R. (2005), "Data Triangulation in action: using comment analysis to refine web quality metrics", *Proceedings of the 13th European Conference on Information Systems*, Regensburg - Germany, May 2005, 26-28.
- Costa, A., Sampaio, P., Braga, A.C. (2010), "E-business certification: new proposal for the QWEB Specification", *Proceedings of the 54th EOQ Conference*, Izmir - Turkey, October 2010.
- Hu, X., Lin, Z., Zhang, H. (2003), "Trust-promoting seals in electronic markets: an exploratory study of their effectiveness for online sales promotion", *Journal of Promotion Management*, 9 (1-2), 163-180.
- IQNET (2005), "QWEB Certification scheme", Release 2.0.
- Kano, N., Seraku, K., Takahashi, F., Tsuji, S. (1984), "Attractive quality and must-be quality", *Quality - The Journal of The Japanese Society for Quality Control*, Hinshitsu, April 1984, 14(2), 39-48.
- Kim, D. J., Sivasailam, H. R., Rao, H. R. (2004), "Information assurance in B2C websites for information goods/services", *Electronic Markets*, 14(4), 344-359.
- Kim, D. J., Steinfield, C., Lai, Ying-Ju (2008), "Revisiting the role of web assurance seals in business-to-consumer electronic commerce", *Decision Support Systems*, 44(4), March 2008, 1000-1015.
- Mohanty, R. P., Seth, D., Mukadam, S. (2007), "Quality Dimensions of E-commerce and their Implications", *Total Quality Management*, May 2007, 18(3), 219-247.
- Parasuraman, A.; Zeithaml, V. A., Malhotra, A. (1994), "Alternative scales for measuring service quality: a comparative assessment based on psychometric and diagnostic criteria", *Journal of Retailing*, 70(3), 201-30.
- Parasuraman, A., Zeithaml, V. A., Malhotra, A. (2005), "E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality", *Journal of Service Research: JSR*, Feb 2005, 7(3), 213-233.
- Stefani, A., Xenos, M. (2008), "E-commerce system quality assessment using a model based on ISO 9126 and Belief Networks", *Software Qual J*, 16, 107-129.
- Trocchia, P., Janda, S. (2003), "How do consumers evaluate Internet retail service quality?", *The Journal of Services Marketing*, 17(2/3), 243-253.
- Wang, R. Y., Strong, D. M. (1996), "Beyond accuracy: what data quantity means to data consumers", *Journal of Management Information System*, 12(4), 5-34.
- Webb, H. W., Webb, L. A. (2001), "Business to consumer electronic commerce Website quality: integrating information and service dimensions", *Proceedings of the 7th Americas Conference on Information Systems*, 559-62.
- Webb, H. W., Webb, L. A. (2004), "Sitequal: an integrated measure of Web site quality", *The Journal of Enterprise Information Management*, 17(6), 430-440.
- Wolfenbarger, M., Gilly, M. C. (2003), "e-TailQ: Dimensionalizing, Measuring and Predicting e-tail Quality", *Journal of Retailing*, 79 (3), 183-198.
- Zeithaml, V., Parasuraman, A., Malhotra, A. (2000), "A Conceptual Framework for Understanding e-Service Quality: Implications for Future Research and Managerial Practice", working paper, report N°. 00-115, Marketing Science Institute, Cambridge, MA.