

A study on the applicability of SERVQUAL dimensions for web sites

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Abstract	A survey has been undertaken amongst students of two universities (Erasmus University Rotterdam, The Netherlands, and Northeastern University Boston, USA) to study what quality factors are perceived as important in relation to their use of web sites. The results of the questionnaire survey are analysed in relation to the five service quality (SERVQUAL) dimensions (tangibles; reliability; responsiveness; assurance; empathy) as developed by Zeithaml et al [1]. There is evidence that the same dimensions are applicable to E-Business, although the underlying aspects have to be specified within the E-Business context.	
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A study on the applicability of SERVQUAL dimensions for web sites

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Abstract: A survey has been undertaken amongst students of two universities (Erasmus University Rotterdam, The Netherlands, and Northeastern University Boston, USA) to study what quality factors are perceived as important in relation to their use of web sites. The results of the questionnaire survey are analysed in relation to the five service quality (SERVQUAL) dimensions (tangibles; reliability; responsiveness; assurance; empathy) as developed by Zeithaml et al [1]. There is evidence that the same dimensions are applicable to E-Business, although the underlying aspects have to be specified within the E-Business context.

Keywords: E-Business; Web Quality Factors; Survey Research; SERVQUAL

1. INTRODUCTION

E-Business is one of the major buzzwords these days. In recent years a hype has been created around E-Business. Companies were considered to be hopelessly old fashioned if they did not spend millions of euros on web sites and E-Business strategies. The companies of the "new economy" seemed to determine the future of business. Money for investments was almost freely available and profits did not seem to matter to anybody (including investors). When the

hype was at its peak profitable companies of the "old economy" risked to be taken over by the Internet companies of the "new economy". Companies whose only assets were a web site and a warehouse had a market value that exceeded the market value of many established multinationals even though they never made any profits.

In 2001 this bubble burst. The equity value of the Internet companies collapsed like a house of cards. For venture capitalists and other investors in Internet companies it became clear that, in the end, all companies have to make profits to survive, even in the "new economy". Since that moment it got harder and harder for Internet companies to get money from investors. This led to a huge number of bankruptcies amongst these companies [2].

Now that the hype is over it is becoming clear that E-Business is here to stay. Despite all the bankruptcies of Internet companies there is a huge growth of trade over the Internet. Traditional companies of the "old economy" turn out to be the new engine behind E-Business. These companies are procuring and selling more and more products and services over the Internet. Trade over the Internet between businesses is expected to grow from \$43 billion in 1998 to \$1.3 trillion in 2003 [3]. This may or may not be an exaggeration but the fact is that the growth in E-Business is tremendous. By 2004 total trade over the Internet is expected to grow to more than \$7 trillion [4]. The number of Internet users is also increasing. By the end of 2001 a record half billion people worldwide had Internet access from their homes [5]. This number is expected to grow to almost one billion in 2005 [6]. The investments in information technology (IT) do not seem to decline either. From a recent Dutch survey can be concluded that investments in IT are stable at the level of previous years. What has been learnt from past experience is that investments in IT should be broader than just equipment and the IT department. There is a tendency to include more different groups of management in the IT-strategy. This is a direct result of a shift in emphasis from efficiency improvement to improvements in service and quality of information supply to the customer [7].

Just like in the bricks and mortar world companies have to offer excellent service on the web. Web sites will become very important to companies as more products and services will be bought either over the Internet or by making use of the Internet before purchasing in a bricks and mortar store. Therefore companies need to have web sites that live up to customers' expectations. How do customers distinguish a good web site from a bad one? What factors determine the quality of a web site?

2. CUSTOMER SATISFACTION

You could wonder why companies should offer high quality web sites, or why companies should offer quality in general. The reason why companies offer quality is to satisfy the customer [8]. Because a web site is part of the connection between a company and its customers, it is evident that it should reflect the quality efforts that are in place throughout the company. Besides this reason there is another reason why a company should provide high quality web sites to its customers: there is no human contact through web sites. The interaction via the Internet between a company and a customer is always through technology and not through human interaction. This means the 'moment of truth' between a company and a customer is the web site and not human contact. Although companies may try to emulate human interaction with technology it stays different because some aspects of human interaction cannot be replaced with technology, e.g. courtesy, friendliness, helpfulness, care, commitment, flexibility and cleanliness [9]. The absence of these aspects of human interaction through which quality can be delivered to customers will have to be compensated by better performance on other quality factors or by excellent performance on 'new' specific web quality factors.

A key aspect in customer satisfaction is the way a customer can get satisfied or dissatisfied with a company's service. If a company wants to satisfy its customers the first problem it needs to solve is what it is that satisfies customers and, equally important, what it is that makes customers dissatisfied with the company and its products and services. If customers are

satisfied or not, depends on the balance between customers' expectations and customers' experiences with the products and services [1]. When a company is able to lift a customer's experience to a level that exceeds that customer's expectations, then that customer will be satisfied.

Because customers have ever increasing expectations it is necessary for companies to continuously improve their quality and hence customers' experiences with the company. The issue is what should be improved to keep the customers satisfied. What customers experience is not just one simple aspect of a company but a whole range of aspects. Some of these aspects are concerned with the way customers experience the company itself, some are concerned with the way customers experience the physical product and, finally, some are concerned with the way customers experience the service the company offers.

Comparing customers' expectations and their perceptions of actual performance can be done by making use of the SERVQUAL scale of Berry, Parasuraman and Zeithaml [1]. This scale has been developed for the service sector. It has five generic dimensions or factors:

- Tangibles: Physical facilities, equipment and appearance of personnel
- Reliability: Ability to perform the promised service dependably and accurately
- Responsiveness: Willingness to help customers and provide prompt service
- Assurance (including competence, courtesy, credibility and security): Knowledge and courtesy of employees and their ability to inspire trust and confidence
- Empathy (including access, communication, understanding the customer): Caring, individualised attention the firm provides its customers

In the SERVQUAL instrument, 22 statements measure the performance across these five dimensions. For each statement the expectation and the experience of a customer is determined.

Although there is some criticism on the long-term stability of the results of the SERVQUAL scale [10] and on the general applicability of the five dimensions [11], it is widely used by academics and practitioners to measure service quality.

3. SERVQUAL DIMENSIONS IN RELATION TO E-BUSINESS

3.1. Tangibles

Aspects in the tangibles factor are e.g. 'has up-to-date equipment', 'physical facilities are visually appealing' and 'materials are visually appealing'. These aspects might be even more important in E-Business as there is no face-to-face contact between the customer and an employee. The visual aspects of the equipment (i.e. the web site) are the only visual contact there is between a customer and an organisation. Therefore the need to have well functioning, good-looking web sites is paramount. There are a great number of customers that abandon their shopping carts on the Internet because they get frustrated with the technology and the design and lay out of the web site interface [12].

The visual aspects of web sites are also judged differently by people of different age. While young people may be attracted by flashy graphics and sounds and a high-speed interface, older people don't want blinking texts that are hard to read or animations that distract from the use of the web site [13]. Although a number of web sites offer users the opportunity to customise the web site to their needs, this customisation process is mostly aimed at the content of the web site and not at the graphics, animations and sounds.

3.2. Reliability

Some of the aspects in the reliability factor have to do with 'doing what is promised' and 'doing it at the promised time'. Although many organisations seem to think that the major reason why customers shop via the Internet is because of the low prices, this does not always need to be the case. Some organisations found out the hard way that there are also a lot of customers shopping via the Internet because of convenience considerations [14]. If customers

cannot trust an organisation to do what they ask for, then those customers will be dissatisfied. Priceline for example ran into big problems by the end of 2000 because of its focus on the lowest prices. People could buy a plane ticket at a very low price but because of possible inconvenient flying times there was a big risk for customers. This resulted in dissatisfied customers that were happy to trade off Priceline's discounts for the convenience of a competitor [14].

3.3. Responsiveness

One of the aspects in the responsiveness factor is 'gives prompt service'. The amount of time it takes to download a web page appears to be of great importance to users of the Internet. Research in 1999 found that fewer than 10% of users leave a web site if page response time is kept under seven seconds. However, when it rises above eight seconds 30% of users leave. When delays exceed twelve seconds a staggering 70% of users leave a web site [9]. It can be assumed that nowadays people expect web sites to be even quicker than in 1999 because of technological advances. So, it is very important for organisations to have a web site that is quick, but on the other hand users expect web sites to be visually appealing. As the number and size of animations, pictures and sounds increase to make a web page more visually appealing, the time it takes to download that web page will increase also, which is judged negatively by users. So, there is a trade of between the looks of a web site and the speed of that site. Organisations will have to try to find the right balance between good looks and speed.

The trade of between looks and speed is complicated by companies' demand that their web sites convey the corporate image [15]. The design department of a company wants web pages to be easily recognisable as belonging to that company. In their view web pages have to display company and product logos as well as other graphics that underscore the corporate identity. These graphics add to the overall size of web pages and thereby increases the download time for Internet users. It is questionable weather users are willing to accept slower

pages in return for more logos and graphics that do not improve the functionality of the web site (although they might improve the visual appeal).

3.4. Assurance

One of the aspects in the assurance factor is 'knowledge to answer questions'. Customers expect to find everything they want on a web site. In a bricks and mortar store people feel comfortable with a limited inventory. On the Internet people are not satisfied if they cannot find everything they want. Web shops need to have great depth of inventory and rich and relevant product information [16].

Two other aspects in the assurance factor are 'employees can be trusted' and 'feel safe in your transactions with employees'. Firstly, there is the risk for users to share personal information with an organisation they do not know. Research on this topic [17] shows that at least fifty percent of users are very concerned about: misuse of credit card information given over the Internet; selling or sharing of personal information by web site owners; and cookies that track customers' Internet activity.

Secondly, the same research shows that two in three active web users typically abandon a site that requests personal information and one in five has entered false information to gain access to a web site. Aspects in the assurance factor that could be very important in E-Business are [18]:

- Availability of a formal privacy and confidentiality policy on a web site
- Secured access to a web site (that customers are prompted to acknowledge)
- General reputation of supplier
- Certifications or guarantees of assurance
- Reports of experiences of other customers

The first aspect in this list is also acknowledged by the International Organizations for Standardisation in Geneva. The Code of Practice for Information Security Management (ISO/IEC 17799:2000) provides a basis for establishing and maintaining the means of handling sensitive data [18].

Certifications and guarantees of assurance are also important in E-Business. More and more organisations are trying to obtain certification to an objective, consensus-based standard, just like they did earlier with quality management standards [18]. These organisations are becoming aware of the advantages of such certification in relation to customers' trust in these organisations.

3.5. Empathy

In the dimension of empathy there are several aspects that are usually not found on a web site. Because of the fact that there is no human interaction, web sites normally do not offer personal attention or have your best interests at heart. According to some this is a major flaw in web site design. Some companies are developing technology to make the web experience much more like real life. Already a lot of web sites have a design that can be personalised by the users of these sites, so people can have their own version of the web site. This kind of web site design is aimed at giving users the experience of getting personal attention. The idea is that the more a web site is tailored to a particular customer's needs, the more likely that customer is to come back again and again [19]. The most advanced technologies in this area aim to create a face-to-virtual-face interaction. A friendly looking face of a virtual assistant on your screen is supposed to make customers feel more comfortable. With the use of artificial intelligence the virtual assistant can suggest products or services that might be of interest to a customer based on previous purchases and on reactions to the questions of the virtual assistant. The latter possibility of asking users of a web site questions via a virtual assistant will enable companies to tailor their offerings to the wishes of the user to prevent customer

dissatisfaction. The only purpose of all these technological gadgets is just to add one of the web's key missing ingredients: warmth [19].

3.6. Other aspects

It seems that most of the factors and aspects that have been defined for general service environments are also important in E-Business. Besides the five factors as defined by Berry, Parasuraman and Zeithaml [1], empirical evidence might come up with more specific dimensions related to E-Business. Some research has been done in this area [20, 21, 22, 23, 24, 25, 26, 27, 28, 29], however more research is needed [9, 20, 22, 24, 30, 31, 32].

Table 1 provides an overview of research, both theoretical as well as empirical, that has been conducted on web quality factors. The leftmost column shows the five factors as defined in the SERVQUAL scale [1]. The five SERVQUAL factors are all displayed in italics typeface to visualise the resemblance between the SERVQUAL scale and the publications on web quality. If the authors of a paper use a different name for one of the SERVQUAL factors, then that name is replaced by the SERVQUAL factor's name for a better comparison of the factors. If the authors of a paper split up one of the SERVQUAL factors in two or more separate factors, then those factors are grouped together and named after the appropriate SERVQUAL factor.

The publications on web quality in table 1 are all papers from international academic journals and conferences in the field of E-Business and quality management.

Table 1: Overview of web quality factors by author

From table 1 can be concluded that only Madu and Madu [24] mention all SERVQUAL factors. This is however no coincidence because Madu and Madu based their paper on the SERVQUAL scale and another quality model. Another paper that contains the majority of the SERVQUAL factors is the paper by Zeithaml [22]. This is of course because she is one of the developers of the SERVQUAL scale. Zeithaml [22] states that although empathy is an important factor in general bricks and mortar services, it is not an important factor in E-Business. Ranganathan and Ganapathy [26] and Wan [27] both contain three of the five SERVQUAL factors (although only the reliability factor appears in both papers). It can also be concluded that two of the five SERVQUAL factors appear in most web quality papers: these are tangibles (in seven papers) and reliability (in six papers).

Only Zhang and von Dran [28] and Bhatti et al. [29] do not mention any of the five SERVQUAL factors. The other publications on web quality factors mention at least one of the SERVQUAL factors but they also mention at least one other factor.

It is also worth noting that the paper by Zhang and von Dran [28] is of a different abstraction level than the other publications in table 1. All the other publications aim to develop a list of rather concrete web quality factors while Zhang and von Dran [28] are looking for the more emotional and motivational aspects behind the concrete web quality factors. Zhang and von Dran [28] define only three factors: the basic factor, the performance factor and the exciting factor. These factors represent the customers' emotions when using web sites. The basic factor consists of aspects that customers will not notice unless they are missing, the performance factor consists of aspects that customers will explicitly look for and they will always be noticed (whether they are missing or not), the exciting factor consists of aspects that will excite the customer when they are available, but their absence will not be noticed by customers. This is quite a different approach to the problem of web site quality than the other papers. It is however not clear what concrete aspects fit in any of the three factors of Zhang and von Dran [28].

4. RESEARCH METHODOLOGY

The empirical research is conducted by means of a questionnaire survey because this makes it relatively easy to study the perceptions and opinions of a large group of people in a limited time frame and at low costs. The survey is undertaken under the student population of the Erasmus University Rotterdam (EUR), The Netherlands, and amongst students at Northeastern University (NEU), Boston, USA. Students are expected to be familiar with E-Business and the Internet. Students received an e-mail with a hyperlink to the web site containing the questionnaire. They can fill out the questionnaire electronically and respond by clicking a submit button.

The purpose of the questionnaire survey is to develop empirical evidence on the quality factors of web sites that are important in the eyes of a group of people that is familiar with the Internet and that makes often use of it. The questionnaire consists of the following questions:

- Personal information (gender, age, university, academic discipline)
- Respondents' use of Internet (equipment, frequency of use)
- Specific web sites that are visited by respondents (a predefined list of 20 categories of web sites)
- Aspects of web quality (a predefined list of 50 aspects)

5. SURVEY RESULTS

5.1. Sample and response rate

At the Erasmus University Rotterdam 5,000 students got an email with a hyperlink to the questionnaire. At Northeastern University 6,000 students got an email.

The response rate for the direct mailings to students is rather low (5% of the number of emails send out), however, the total number of respondents is still very acceptable for doing statistical analysis.

5.2. Descriptive statistics

In table 2 and 3, the sample is described in terms of gender and age respectively.

Table 2: Number of respondents by gender

Table 3: Number of respondents by age

Especially the respondents of Northeastern University show a wide spread over academic disciplines and, judged by the age of the respondents, more students are at the undergraduate level; in Rotterdam, students have only be approached in areas of economics and management.

Table 4 shows the respondents' use of the Internet in terms of the quality of their own equipment and table 5 summarises the frequencies of their Internet visits.

Table 4: Satisfaction of respondents with the equipment they use

Table 5: The use of the web

It is interesting to note the types of web sites that are used most often by our respondents (see table 6). The types of web sites that are used most often are: search engines, university sites, daily news and entertainment sites; web sites that are used less frequently are: E-shops and chat rooms. Sites with stock exchange information are not visited very often either, not even by the students in economics and management from Rotterdam.

Table 6: Websites ranked by overall frequency of visits

Factor analysis on the data covering the types of web sites that are visited by respondents (Principal Component Analysis, Varimax rotation with Kaiser Normalization, KMO=0.83) shows there are five clear factors or groups of web sites that cluster together:

1. E-shop sites for books, music, movies etc (Cronbach's alpha = 0.75, n = 5)
2. Sites related to university and study information (Cronbach's alpha = 0.64, n = 5)
3. Sites with games, entertainment and sport (Cronbach's alpha = 0.66, n = 4)
4. Sites with company information, stock information and banking sites (Cronbach's alpha = 0.69, n = 3)
5. Sites with more general information, like daily news, travel, libraries, and search engines (Cronbach's alpha = 0.58, n = 4)

In table 7 (top ten) and table 8 (bottom ten) the importance (expectations) and the satisfaction (experiences) are summarised on predefined aspects related to the quality of web sites. Tables 7 and 8 also show the gaps between experiences and expectations (satisfaction minus importance). It can be concluded that the gap is widest for the aspects respondents perceive as most important.

Table 7: Importance of, and satisfaction with aspects of web quality

Table 8: Importance of, and satisfaction with aspects of web quality

Most of the aspects in table 7 seem to relate to reliability issues in pure e-commerce. Customers that buy a product on the Internet want web sites and the organisations behind them to be trustworthy. E-commerce web sites need to be fast, simple and always available. Customers want a clear overview and confirmation of what they bought and what they have to pay for.

A lot of the aspects in table 8 seem to relate to extra service and information that is provided to the customer. Apparently respondents do not find these extras very important in their use of the Internet. The only aspect in table 8 with a positive delta is 'brand image is important'. The importance of this aspect is very low according to the students in the questionnaire survey. This is something I did not expect. Although respondents find reliability aspects most important (see table 7), they do not include brand image in their list of reliability aspects. Respondents seem to judge the reliability of a web site and the organisation behind it on other aspects than brand image.

Confirmative factor analyses are used to verify the existence of the five dimensions according to the SERVQUAL scale [1]. Table 9 compares the results of the confirmative factor analysis on expectations (KMO=0.91) with the confirmative factor analysis on experiences (KMO=0.93).

The five factors on the importance of web quality aspects (expectations) are very similar to the five factors of the SERVQUAL scale (see the left column of table 9). The majority of the

variables in each of the factors resemble the items of the SERVQUAL scale in the corresponding factor.

The five factors on the satisfaction with web quality aspects (experiences) are also very similar to the five factors of the SERVQUAL scale (see the right column of table 9). The five-factor analyses of importance and satisfaction are virtually the same. The number and ranking of variables per factor differ slightly, but the variables with the highest factor loadings are in both cases (importance as well as satisfaction) in the same factor.

Table 9: Confirmative factor analysis (5 factor solution)

6. CONCLUSION AND FURTHER RESEARCH

The SERVQUAL scale proves to be a useful starting point in the development of web quality factors. Both theory as well as empirical research support the validity of the SERVQUAL scale in E-Business environments.

Theory on web quality factors was by and large in agreement that the five SERVQUAL factors (tangibles, reliability, responsiveness, assurance and empathy) are important in the field of E-Business. However, theory suggested that there are also other factors that are important in the field of E-Business, but there was no agreement on the number and contents of those other factors. Although the number of possible other factors was quite large, there were virtually no similar factors that could be found in multiple publications on web quality factors.

The empirical research also supports the use of the SERVQUAL scale in the field of E-Business. From the statistical analyses it became clear that the factors that are important in determining the quality of web sites are similar to the factors (as developed by Berry, Parasuraman and Zeithaml) that determine service quality in the bricks and mortar world.

So far, it can be concluded that the quality dimensions developed by Berry, Parasuraman and Zeithaml for service environments are equally useful in E-Business.

It is important to verify the results of the empirical research by using other samples than students. Students may be in some way biased in their approach to E-Business.

The empirical research focussed on web sites in general, regardless of the purpose of those web sites. It may be useful to conduct a similar study about specific types of web sites (like e-shops, entertainment sites, banking sites, etc.). To some types of web sites specific factors could apply that remained invisible in the research.

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Zeithaml et al., 1990	Aladwani and Palvia, 2002	Fink and Laupase, 2000	Madu and Madu, 2002	Olsina et al., 1999	Ranganathan and Ganapathy, 2002	Wan, 2000	Zeithaml, 2002	Zhang and von Dran, 2001	Bhatti et al., 2000	Cox and Dale, 2002
<i>Tangibles</i>	<i>Tangibles</i>	<i>Tangibles</i>	<i>Tangibles</i>		<i>Tangibles</i>		<i>Tangibles</i>			<i>Tangibles</i>
<i>Reliability</i>			<i>Reliability</i>	<i>Reliability</i>	<i>Reliability</i>	<i>Reliability</i>	<i>Reliability</i>			
<i>Responsiveness</i>			<i>Responsiveness</i>			<i>Responsiveness</i>	<i>Responsiveness</i>			
<i>Assurance</i>			<i>Assurance</i>		<i>Assurance</i>		<i>Assurance</i>			
<i>Empathy</i>			<i>Empathy</i>			<i>Empathy</i>				<i>Empathy</i>
	Specific content	National culture	Storage capability	Usability	Information content	Information	Fulfilment	Basic factor	Speed	Customer confidence
	Content quality		Serviceability	Functionality			Compensation	Performance factor		Online resources
	Technical adequacy		Security and system integrity	Efficiency			Contact	Exciting factor		
			Trust							
			Customisation							
			Web store policies							
			Reputation							

Table 1: Overview of web quality factors by author

	EUR	NEU	Total
Male	194	104	298
Female	52	188	240
Total	246	292	538

Table 3: Number of respondents by age			
	EUR	NEU	Total
<21 yrs	81	192	273
21-25 yrs	143	71	214
26-30 yrs	10	19	29
31-35 yrs	8	4	12
>35 yrs	4	7	11
Total	246	293	539

Table 4: Satisfaction of respondents with the equipment they use				
	EUR	NEU	Total	t-test sign.
<i>Satisfaction with:</i>				
PC	3.85	3.83	3.84	n.s.
Connection speed	3.30	3.59	3.46	.01
Printing from the web	3.31	3.53	3.43	.03
Downloading from the web	3.68	3.57	3.62	n.s.

* on a five point scale from very dissatisfied to very satisfied; ** significance level t-test (2-tailed) for inequality of means of EUR and NEU; n.s. = not significant (sign. >.05).

Table 5: The use of the web				
	EUR	NEU	Total	t-test sign.
Easy to find desired web site	3.54	3.80	3.68	.00
Easy to use web page links	3.99	3.92	3.95	n.s.
Easy to find relevant information	3.07	3.38	3.24	.00
Time spend on one site	~ 9 min.	~12 min.	~10 min.	.00
Time on the web per Internet visit	~ 50 min.	~ 60 min.	~ 55 min.	.03
Number of Internet visits per week	~14 visits	~19 visits	~16 visits	.00
* if not indicated otherwise, on a five point scale from very difficult to very easy; ** significance level t-test (2-tailed) for inequality of means of EUR and NEU; n.s. = not significant (sign. >.05).				

	EUR	NEU	Total		t-test
	Mean	Mean	Mean	SD	sign
Search engines	4.32	4.64	4,49	0,86	.00
Universities	4.00	3.38	3,66	1,18	.00
Daily newspapers	3.30	3.63	3,48	1,30	.00
Entertainment	3.34	3.47	3,41	1,16	n.s.
Information portals	3.29	2.92	3,09	1,31	.00
Personal web sites	3.17	2.99	3,07	1,32	n.s.
Electronic libraries	2.94	3.02	2,98	1,14	n.s.
Company information	3.16	2.58	2,85	1,17	.00
Banking	2.87	2.60	2,73	1,36	.02
Games	2.55	2.82	2,70	1,30	.02
Sports	2.69	2.62	2,65	1,40	n.s.
Travel	2.41	2.72	2,58	0,98	.00
E-shops	2.34	2.57	2,47	1,13	.02
Book stores	2.18	2.41	2,31	0,98	.01
Stock exchange information	2.60	2.02	2,29	1,38	.00
Music stores	1.96	2.39	2,19	1,04	.00
Movies stores	1.72	2.27	2,02	1,05	.00
Second-hand products	1.78	2.16	1,99	1,07	.00
Chat rooms	2.00	1.76	1,87	1,20	.02
Who is where	1.86	1.84	1,85	1,13	n.s.

* on a five point scale from never to once a day or more; ** significance level t-test (2-tailed) for inequality of means of EUR and NEU; n.s. = not significant (sign. >.05).

Table 7: Importance of, and satisfaction with aspects of web quality			
<i>top ten with highest scores on Importance:</i>	Importance	Satisfaction	Delta
	Mean	Mean	S-I
Access is fast	4,59	3,13	-1,46
Finding your way on the web site is easy	4,56	3,25	-1,32
A complete overview of the order is presented before final purchase decision	4,48	3,66	-0,82
The registration process is simple	4,37	3,28	-1,08
Tax and/or other charges are clearly detailed	4,37	3,23	-1,14
All relevant order confirmation details are sent by email within 24 hours	4,36	3,60	-0,77
24 x 7 x 365 user accessibility	4,35	3,64	-0,71
There are well programmed search options	4,34	3,07	-1,27
Access to anticipated delivery times is available at all times	4,31	3,08	-1,23
Order cancellation and returns details are confirmed within three days	4,30	3,07	-1,23
* mean values on five point scales			

Table 8: Importance of, and satisfaction with aspects of web quality			
<i>bottom ten with lowest scores on Importance:</i>	Importance	Satisfaction	Delta
	Mean	Mean	S-I
On travel sites a flight/hotel search is provided	3,75	3,30	-0,45
The security policy is accessible	3,72	3,29	-0,44
On travel sites the user can customise seat and meal preferences and the information is retained	3,71	3,17	-0,54
The web site contains company details	3,68	3,27	-0,41
Links are provided to pages on related products and services.	3,61	3,28	-0,33
Scrolling through pages and text is kept to a minimum	3,58	3,30	-0,28
Web site animations are meaningful	3,38	3,03	-0,36
A customer platform is provided for exchange of ideas	3,24	3,16	-0,08
Brand image is important	3,24	3,28	0,04
The user is invited into a frequent buyer program.	3,11	3,05	-0,06

* mean values on five point scales

Table 9: Confirmative factor analysis (5 factor solution)	
IMPORTANCE	SATISFACTION
<p>Factor 1 (<i>Reliability</i>):</p> <ul style="list-style-type: none"> • A complete overview of the order is presented before final purchase decision • Tax and/or other charges are clearly detailed • Different payment options are stated clearly • All relevant order confirmation details is sent by email within 24 hours • Access to anticipated delivery times is available at all times • Terms and conditions of sales are accessible • Order tracking details are available until delivery • Order cancellation and returns details are confirmed within three days • Full details of product or service pricing are available • The registration process is simple • Full product or service characteristics are available 	<p>Factor 1 (<i>Reliability</i>):</p> <ul style="list-style-type: none"> • All relevant order confirmation details is sent by email within 24 hours • A complete overview of the order is presented before final purchase decision • Terms and conditions of sales are accessible • Order tracking details are available until delivery • Different payment options are stated clearly • Tax and/or other charges are clearly detailed • Access to anticipated delivery times is available at all times • Order cancellation and returns details are confirmed within three days
<p>Factor 2 (<i>Tangibles</i>):</p> <ul style="list-style-type: none"> • Finding your way on the web site is easy • Information is found with a minimum of clicks • Navigation is consistent and standardised • There are well programmed search options • Instructions are directly available 	<p>Factor 2 (<i>Tangibles</i>):</p> <ul style="list-style-type: none"> • Finding your way on the web site is easy • Information is found with a minimum of clicks • Navigation is consistent and standardised • The number and type of links are meaningful • The purpose is clear • Scrolling through pages and text is kept to a minimum • Instructions are directly available • Graphics and animations do not detract from use • A standard navigation bar, a home button and back/forward button are available on every page
<p>Factor 3 (<i>Empathy</i>):</p> <ul style="list-style-type: none"> • Links are provided to pages on related products and services. • On travel sites the user can customise seat and meal preferences and the information is retained • On travel sites a flight/hotel search is provided • A customer platform is provided for exchange of ideas • The user is invited into a frequent buyer program. 	<p>Factor 3 (<i>Empathy</i>):</p> <ul style="list-style-type: none"> • Links are provided to pages on related products and services. • A customer platform is provided for exchange of ideas • On travel sites the user can customise seat and meal preferences and the information is retained • On travel sites a flight/hotel search is provided • Web sites that focus on brand awareness have a store locator
<p>Factor 4 (<i>Assurance</i>):</p> <ul style="list-style-type: none"> • The security policy is accessible • The privacy policy is accessible • External validation of trustworthiness is important • The web site contains company details 	<p>Factor 4 (<i>Assurance</i>):</p> <ul style="list-style-type: none"> • The privacy policy is accessible • The security policy is accessible • The web site contains company details • External validation of trustworthiness is important
<p>Factor 5 (<i>Responsiveness</i>):</p> <ul style="list-style-type: none"> • The frequently asked questions and answers contain links that take the user to the relevant page(s) • Information is provided to frequently asked questions and answers • Queries or complaints are resolved within 24 hours • User feedback is sought to measure customer satisfaction • An email address for queries and complaints is provided 	<p>Factor 5 (<i>Responsiveness</i>):</p> <ul style="list-style-type: none"> • User feedback is sought to measure customer satisfaction • Queries or complaints are resolved within 24 hours • The frequently asked questions and answers contain links that take the user to the relevant page(s) • Required stock information is available throughout the buying process
<p>* Principal Component Analysis. Varimax with Kaiser Normalization.; ** Rotation converged in 9 iterations (Importance) and 10 iterations (Satisfaction).; *** Factor loadings >.5; ranking based on factor loadings from high to low</p>	