# The Influence of Online Trust Across Cultural Borders

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# Abstract



## Abstract

This thesis describes the mediating role of online trust on the behaviour of people on the Internet. Building on current literature on the topic, the definition of online trust is extended in order to account for cultural influences on trust. After laying out the theoretical foundations, the implementation of a browser extension, that could serve as an instrument to measure online trust, is given. In the end, a review of the used literature is provided and the limitations of the extension are discussed.

## Zusammenfassung

Die vorliegende Arbeit beschreibt die vermittelnde Rolle von Online Vertrauen auf das Verhalten von Internetnutzern auf. Auf der aktuellen Literatur zum Thema aufbauend, wird die Definition von Online Vertrauen im Hinblick auf kulturelle Einflüsse erweitert.
Nachdem die theoretischen Grundlagen gegeben sind, wird die Implementation einer Browser-Erweiterung, welche als Messinstrument für Online Vertrauen verwendet werden könnte, beschrieben.
Danach wird ein Rückblick auf die verwendete Literatur gemacht, damit so die Einschränkungen der Erweiterung diskutiert werden können.

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## 1 Introduction

Through the rapid growth of the Internet, which now counts over 2 billion users, the processes through which websites become successful have fallen under scholarly scrutiny (Internet Economy Report 2011: 26).

### 1.1. The Significance of Online-Trust

In the years around the beginning of this century, **Online-Trust** or **eTrust** has been recognized as a key success factor for web sites (see McKnight and Chervany 2001; Fogg and Tseng 1999).

This convinced exponents from a host of different disciplines, ranging from computer science over sociology and psychology to economic, management and marketing disciplines, to conduct research on the influence of online trust (see Bart *et al.* 2005; Flanagin and Metzger 2007; Heijden *et al.* 2003; Hoffmann *et al.* 2011; Wang and Emurian 2005).

While many different factors have been demonstrated to be antecedents of eTrust, the work of Fogg *et al.* suggests, that graphic design is a key factor for online trust (2003: 5).

Reinecke and Bernstein have been able to prove empirically, that the culture of an user influences his or her graphic design preferences (2011: 2).

### 1.2. Website Design In Practice

To illustrate how different web sites utilise graphic design to attract customers, the login and registration screens from six different social networks are used.

The first three, which are shown on the right side of this page, seem to be very similar at a first glance. They all use blue colours on a light background and they all feature their brand on the top-left corner of the page, with the form on the right part of the screen. But the Qzone page, which targets the Chinese culture, already reveals some prominent differences.

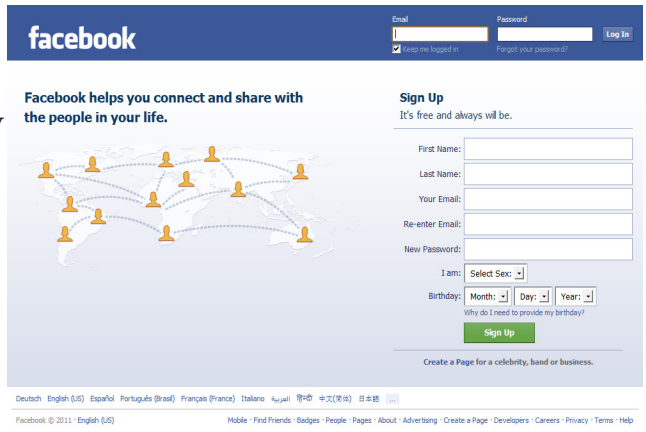


**Figure 2.**
Facebook Login
www.facebook.com, November 2011


**Figure 3.**
Qzone Login
qzone.qq.com, November 2011

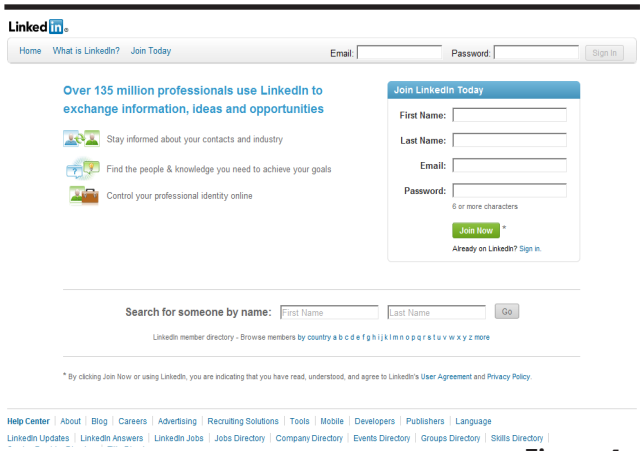


**Figure 4.**
LinkedIn Login
linkedin.com, November 2011

# Introduction



The most obvious difference is probably the site language, which can not be changed like on the Facebook page. Furthermore, in place of the registration form on Facebook and LinkedIn, it places the login form.

The differences for the next three examples, which can be observed on the figures to the right, are even more striking.

The Japanese and the German sites feature radically different colour schemes and photographic pictures. Both European pages place the login form at the left side of the screen.

For a web service provider to make use of the global availability of the service through the Internet an tap into new markets, it would become necessary to create many different designs for the service. Otherwise, specialized local providers with a customized interface to the local culture would be in a competitive advantage.

Website designers have been using specially crafted interfaces to fit their target audience for a long time, as the previously mentioned examples have illustrated. And the issue of cultural differences is also acknowledged by designers themselves, as the following quote from a web design blog shows: *"Graphic design is a lot like languages. It's an identity; beautiful and enigmatic. Graphic design varies from culture to culture, influenced by a country's culture, history and way of life. Just like art and music, graphic design aesthetics differ from culture to culture. There may be common elements found in a culture's graphic design, not found in other cultures and vice versa."*, (Arandilla 2011).

It is very difficult to find any good advice on cultural adaptation for graphic designers. One entry in an other design blog is going to demonstrate, how a current proposal for cultural adaptation has to be imagined.


**Figure 5.**
Mixi.jp Login
mixi.jp, November 2011

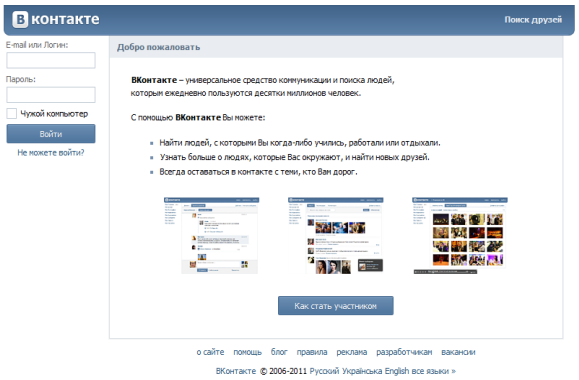


**Figure 6.**
Vkontakte Login
vkontake.ru, November 2011

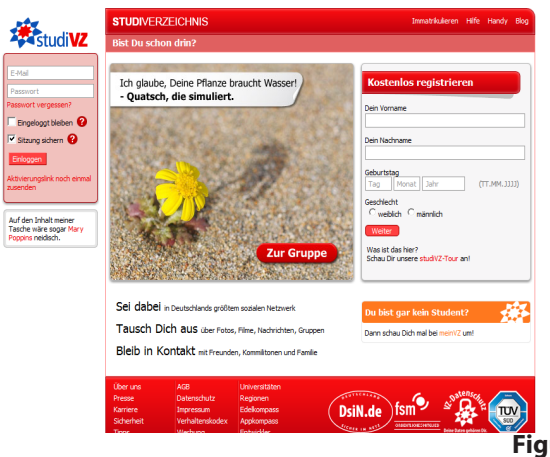


**Figure 7.**
StudiVZ Login
studivz.net, November 2011



**Culture Clash**

As well as a different language, other cultures simply view the world differently. This might sound a bit daunting as a designer, but a little bit of knowledge will go a long way. Anthropologist and cross-cultural researcher Edward T. Hall devised a framework that classifies different cultures into low context and high context. Low context cultures like Germany and Scandanavia [sic] prefer clear statements with an obvious message, whereas Japan and other Eastern cultures place more emphasis on visual stimulus or other communicative devices.

**High Context**

Japan
Arab Countries
Greece
Spain
Italy
England
France
North America
Scandinavian Countries
German-speaking Countries

**Low Context**

Source: Understanding Cultural Differences by Hall, E. and Hall, M.

This may mean changing the layout or the way in which you get your point across. For an American website trying to launch in Japan, for example, you should pay more attention to the use of images and the more subtle ways that your message can be conveyed.

**Colour me Beautiful**

It's also wise to be aware of the different cultural meanings of colours. In the West, red will conjure up fiery thoughts of passion or love, while over the water in South Africa, red is the colour of mourning, signifying death. Of course you're never going to please everyone, but going for a neutral light background with dark text will generally put you in good stead for being multi-culturally friendly [sic].

(Arno 2011).

The only practical advice given, to use a *"neutral light background with dark text"*, is rather nondescript. One could even go as far, as to say, that the advice is not to adapt, but to design an interface fitting for a subset of cultures, and hoping that nobody is going to be offended by it.

### 1.3. Implications for current Research

To find out, if scientific publications can offer more exact advice, than the above examples, the state of the current research about online trust is going to be discussed. That discussion is going to allow for the conclusion, that online orust is indeed also dependent on cultural influences. Especially the influence of culture on online trust has not yet been subject to a thorough research. As a method to investigate the cultural influence on eTrust, a browser extension is proposed. That extension could measure implicit and explicit factors leading to trust, and combined with the data gained in a survey, it would be possible to make more accurate statements about online trust.

## 2 Online Trust

While the significance of online trust on the Internet is supported unanimously, not all studies agree on the degree of the influence of trust. While Lee *et al.* conclude, that trust is the single most important factor in online business (2011: 199), most researchers are content to posit a direct and positive relationship between trust and behavioural intent (Casaló *et al.* 2011: 206, Chen and Barnes 2007: 21, Kwek *et al.* 2011: 172). Trust is often theorized as an antagonistic value to perceived risk and online customer distrust (Wang and Emurian 2005: 106). Bart *et al.* even state, that customers can be more loyal online than offline (2005: 133). Because of the empiric evidence provided, the assumption, that trust influences online behaviour is not challenged within this paper. In order to understand the remaining differences in the findings of the different sources, a more detailed inspection of the research has to be given.

### 2.1. Definition of Online Trust

The definition of online trust is not as easy, as the broad body of research on the topic would suggest. One reason for the existence of multiple definitions of trust is, that it is used as a synonym for related concepts like credibility, reliability, or confidence (Wang and Emurian 2005: 108). Indeed, credibility according to Fogg and Tseng is defined as a concept made up by trustworthiness and expertise (1999: 80). And online trust in turn, also contains the factors perceived usefulness (Casaló *et al.* 2011: 201), a concept also incorporated by some definitions of credibility (Chen and Barnes 2007: 23). For the purpose of avoiding any confusion, it is important to define those concepts that build the basis for the concept of online trust.



### 2.2. Antecedent Concepts for Online Trust

The five most commonly mentioned antecedents for online trust are usability, reputation, satisfaction, security and privacy (Casaló *et al.* 2011: 201). While in the following part of the article several other concepts are going to be defined, all of them are connected to the five main antecedents. It is recommended to keep those categories in mind, when reading the more detailed definitions, which detail different nuances and characteristics of the key antecedents.

#### 2.2.1. P-I Theory

The Prominence- Interpretation Theory is introduced by Fogg *et al.* (2003: 11). It is used to describe the process of a credibility assessment by a person. The theory states, that first something is noticed (Prominence) and then a judgement about it is made (Interpretation), a process that is repeated for all the distinctive elements of a web site (Fogg *et al.* 2003: 11). They found out, that the single most prominent feature of online trust is the design and look of a web site (2003: 5).

#### 2.2.2. Technology Acceptance Model

The technology acceptance model (TAM) was first developed by Davis to explain the acceptance of technology in the workplace (Davis 1989 quoted in Heijden *et al.* 2003: 42). This model was then used by Chen and Barnes to explain the elements affecting online trust and behaviour (Chen and Barnes 2007: 23).

According to Heijden *et al.* (2003: 42), the technology acceptance model was based on the theory of reasoned action (TRA). They state, that person forms an attitude about an object based on a set of perceived assumptions about said object (2003: 42). Then, based on that attitude, an intention to behave is formed.

Chen and Barnes measure three variables to determine the TAM (2007:23). They base the first two variables on the propositions of Davis *et al.* (according to Heijden *et al.* 2003: 42), and add the enjoyment of technology as a third variable (Chen and Barnes 2007: 23).

#### 2.2.3. Perceived Technology

Kwek *et al.* use the concept of perceived technology as a synonym to the technology acceptance model (2011: 170). They argue, that the perceived technology is, just as the TAM, derived from perceived usefulness and the perceived ease-of-use (2011: 170).

#### 2.2.4. Perceived Usefulness

The perceived usefulness is defined as the *"belief that a particular system would enhance job performance and benevolence toward a web site"* (Chen and Barnes 2007: 23; Heijden *et al.* 2003: 42). In the work of Wang and Emurian, their definition of the context design dimension is similar to the perceived usefulness (2003: 118).

#### 2.2.5. Perceived Ease-of-use



Perceived ease-of-use is defined as the *"belief, that a particular system would be free from effort"* (Chen and Barnes 2007: 23; Heijden *et al.* 2003: 42). The data collected by Chen and Barnes does not support the hypothesis, that perceived ease-of-use influences online trust (2007: 28). Wang and Emurian identify the structural design as one antecedent dimension to online trust, which is similar to the perceived ease-of-use, because it defined through the organisation and accessibility of the information on the web site (2003: 117-118). In contrast to those findings, Casaló *et al.* were not able to prove any connection between perceived ease-of-use and online trust (2011: 206).

#### 2.2.6. Perceived Risk

Perceived risk is often defined as a value that is mediated by trust (Kwek *et al.* 2011: 169). Chen and Barnes define perceived risk as the user's evaluation about the potential of an event to cause economic hazards (2007: 23). The economic hardships can take the form of fraud or abuse, but they can also take the form of disclosure or modification of data. However not every study confirms the positive connection between perceived risk and online trust. Some studies assert that perceived risk is not related to online trust, or even posit a negative connection between online trust and perceived risk (Kewk *et al.* 2011: 169).

#### 2.2.7. Perceived Privacy

Perceived privacy is another important antecedent to online trust, and is defined as the customers' ability to control the presence of other people during the interaction with the web page as well as the ability to the control over the information provided during the interaction (Chen and Barnes 2007: 34). Hoffmann *et al.* discovered with an experimental research, that a fair degree of reciprocity in the exchange of data serves to reduce privacy concerns and the perceived risk (2011: 16).

#### 2.2.8. Perceived Credibility

The concept of credibility, which is analysed by Fogg *et al.* (2003) as well as by Flanagin and Metzger (2007), is defined by the two key components of trustworthiness and expertise (Flanagin and Metzger 2007: 321). Because online trust also contains the dimension of expertise through the variable of perceived technology, it is possible to use the concepts of credibility and trust interchangeably.

#### 2.2.9. Enjoyment of Technology

Chen and Barnes understand enjoyment of technology mainly as an expression of the desire of a customer to transact online (2007: 23). Heijden *et al.* use this category to describe the internal motivation, which also has a direct influence on the acceptance of new technology (2003: 42).

#### 2.2.10. Social Interaction and Commitment

According to Wang and Emurian, embedding social cues like face-to-face interaction also induces online trust (2003: 118-119). Social interaction between

customers through online customer reviews (OCR) can also increase the purchase intention of customers (Lee *et al.* 2011: 191), but only if a certain level of trust in the web page is already existing (Lee *et al.* 2011: 196).

#### 2.2.11. Company Perception and Brand Strength

Chen and Barnes measure company competence through an assessment of the perceived company size and the perceived reputation (2007: 24). While the perceived reputation matters for the evaluation of the trustworthiness, they come the conclusion, that the perceived company size does not play a role (2007:28). Other surveys reveal several possible explanations, for the phenomenon discovered by Chen and Barnes. One is, that brand strength does not play the same role for every web site category, it is more important for automobile, financial, computer and community sites than for portals or retailers (Bart *et al.* 2005: 148). Another explanation could be, that the strong penetration of e-bookstores in Taiwan has lead to an heightened trust in such stores for the Taiwanese culture (Chen and Barnes 2007: 22). In the research conducted by Hoffmann *et al.*, brand strength and reputation is the second most important factor for the formation of initial online trust (2011: 17).

#### 2.2.12. Personal Trust Disposition

There are not only external factors affecting the perceived trustworthiness of a web site. While Chen and Barnes group the internal factors under the personal trust disposition (also referred to as **trust propensity**) and the purchase intent (2007: 24). The research of Bart *et al.* reveals additional internal concepts that influence the online trust assessment, such as the **online expertise, shopping** and **entertainment experience** (2005: 133, 139-140, 149). Wang and Emurian state, that a certain individual level of trust has to be reached, in order for a person to take part in an online transaction (2005: 112).

#### 2.2.13. Behavioural Intent and Saliency

The intent to use a service on the Internet and the saliency of the service also play an important role for the perceived trustworthiness. Chen and Barnes divide online transactions into three discrete steps, namely information retrieval, information transfer and product purchase (2007: 25). Because the trustworthiness of a service moderates the behavioural intent of the users, building online trust is essential for the success of e-commerce (Chen and Barnes 2007: 31), but the consumers behavioural intent in turn also influences the perceived trustworthiness, as the findings of Flanagin and Metzger prove, where more salient messages positively impacted credibility ratings (2007: 337).

### 2.2.14. Visual Aesthetic and Graphic Design

One additional antecedent for online trust is the **graphic design** dimension, which refers especially to the design cues that give customers a first impression of the web page (Wang and Emurian 2003: 115-117). The findings of Flanagin and Metzger support the significance of the category of graphic design, because they found that there is no difference in credibility of a web page from a strong brand compared to a web page with an imaginary brand using a similar design (2007: 334). They hypothesise, that the sophisticated design of the imaginary page overcomes the infamiliarity with the site (2007: 334).

There are two main publications that elaborate on the connection between online trust and aesthetic design. Those are *"Colour appeal in website design within and across cultures: A multi-method evaluation"* from Cyr *et al.* (2010) and *"The Dimensions of Web Site Credibility and Their Relation to Active Trust and Behavioural Impact"* of Cugelman *et al.* (2009).

Cugelman *et al.* show, that modelling website credibility through three dimensions (**perceived trustworthiness**, **perceived expertise** and **visual appeal**) is more appropriate than a model that lacks a conceptual representation of the website appearance (2009: 467).

They explain further, that website credibility not only affects active trust, but additionally has a significant direct impact on behaviour. Active trust also influences the behavioural impact. In conclusion, their model suggests that the three components of website credibility can not be ignored when researching how websites influence behaviour (2009: 467).

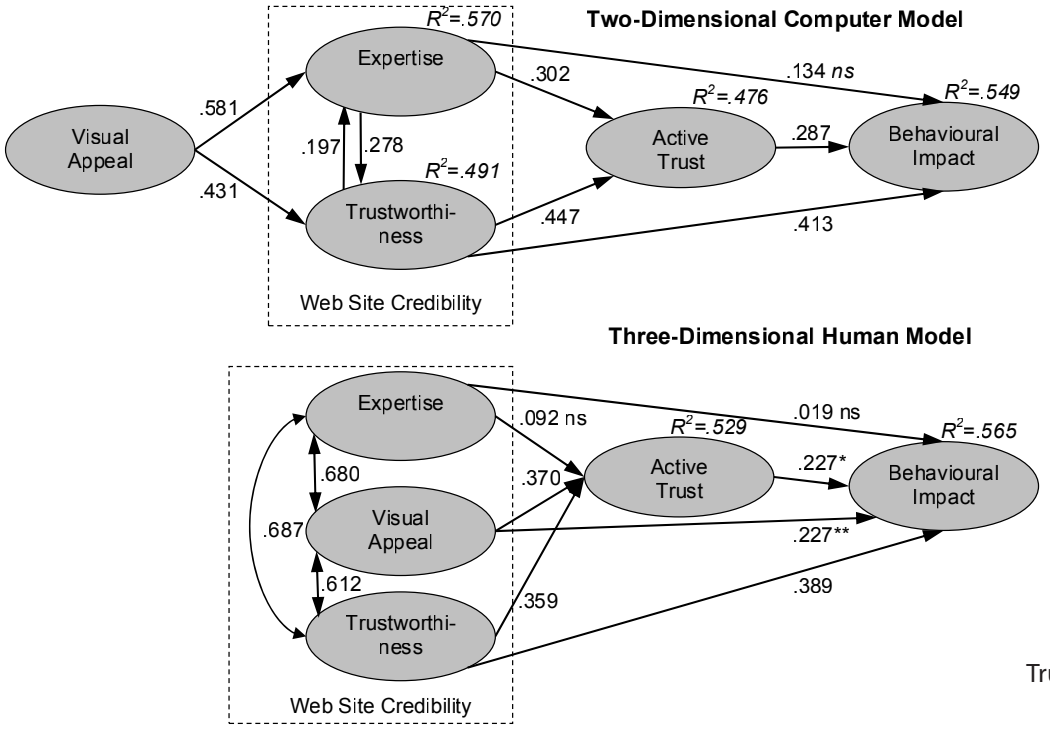


**Figure 8.**
Trust Model Cugelman
Cugelman 2009: 12

Cyr *et al.* analyse one of those key components, namely the visual appeal. They investigate the effects of colours in website design (2010: 1). They also state, that the influence colours in web design across different cultures have not yet been investigated sufficiently.

**Their two research questions are:**

1. How do different applications of colour (blue, yellow, grey) in website design influence colour appeal of the website? And in turn, does increased colour appeal impact important e-loyality antecedents such as trust and satisfaction?
2. Between diverse cultural groups (Canada, Germany, Japan) are there differences in how applications of colour on websites impact colour appeal? Does this in turn impact user trust and satisfaction?

(2010: 2)

To test those two questions, Cyr *et al.* have developed a research model, that incorporates six different hypotheses for the influence of colour on the Internet (2010: 3).

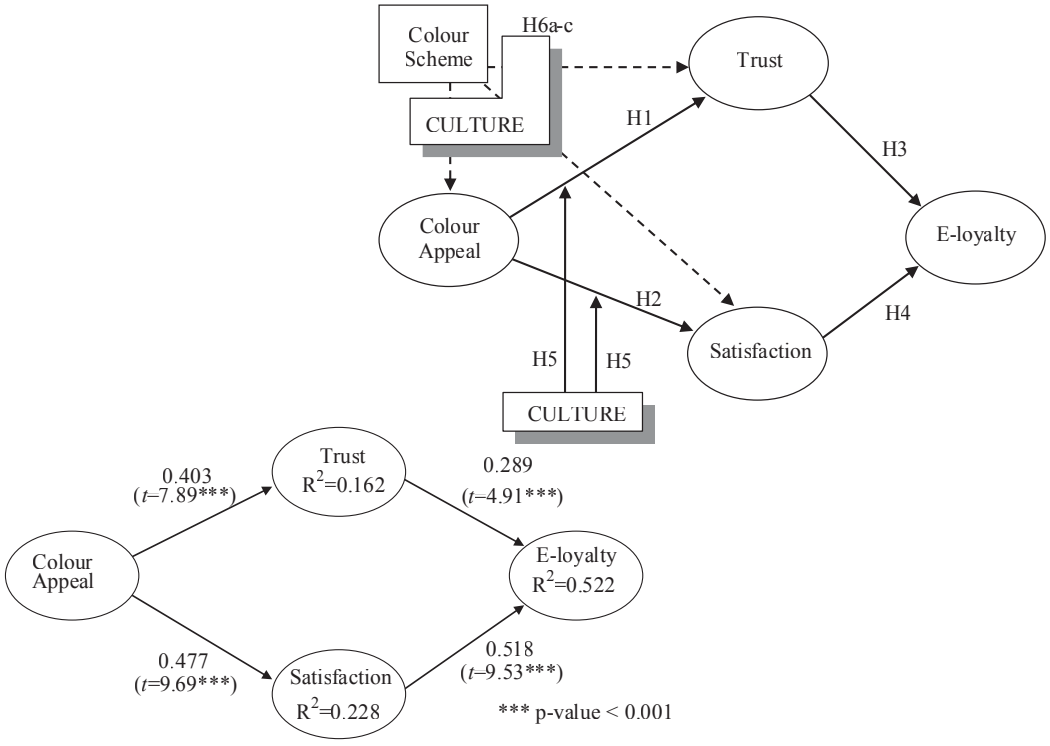


**Figure 9.**
Trust Model Cyr
Cyr *et al.* 2010, 3, 11

Their first two hypotheses are, that the colour appeal of a web site influences both trust and satisfaction towards any web page. Hypotheses three and four state, that e-loyalty is defined through trust and satisfaction, connecting the e-loyalty with the colour appeal. They assume that those first four hypotheses are independent of the cultural group of the participants. Through the hypotheses five and six, they try to account for the role of culture in their schema. Therefore hypothesis five states that the influence of colour appeal on trust and satisfaction is going to be moderated by cultural values. In addition to that, they try to make predictions about the preferred colours of the three examined cultures in the sixth hypothesis.

The evidence gathered in the study supports the first four hypotheses of Cyr *et al.* (2010: 15). In other words, they are able to prove the following four statements:

- Increased colour appeal leads to more trust.
- Higher trust leads to more e-loyalty.
- Increased colour appeal leads to better satisfaction.
- Better satisfaction leads to more e-loyalty.

Unfortunately they are not able to conclude, that culture acts as a moderating influence on colour appeal. Even with that being the case, their research reveals differences on how the three cultural groups perceive colour. The Germans for example spend most of the time viewing yellow areas, whereas the Canadians look at the three tested colours for an equal duration, and the Japanese spend the least time viewing yellow (Cyr *et al.* 2010: 13).

This leads us to the conclusion, that even if the Cyr *et al.* were not able to definitely prove the influence of culture, they still observe enough differences between cultures to leave room for additional research. Most importantly, they prove that a causal link from colour to electronic loyalty exists, and that said link is mediated by trust and satisfaction (Cyr *et al.* 2004: 357 and 2010: 16).

### 2.3. Dimensions of Online Trust

Casaló *et al.* propose a model, where trust is divided into two distinct categories (2011: 200). They state, that any party assessing the trust of another party does that through a cognitive assessment of the other party, which then results in a behavioural consequence (2011: 200). They further state, that the assessment is done for three beliefs about the other party: **Honesty**, **benevolence** and **competence** (2011: 200). According to Chen and Barnes, online trust has three dimensions: The first dimension is **technology and presentation**, the second dimension consists of **security assurance** and the third is based on **reputation**, fulfilment and interaction (2007: 22). Similar to those three dimensions are the three dimensions used by Wang and Emurian (2003: 112), namely **ability** (which is related to technology), **integrity** (similar to security) and **benevolence** (akin to reputation).

## 2.4. Methods and Limitations for the Research of Online Trust

Chen and Barnes used undergraduates and postgraduates for their survey, because students are an applicable sample population for online customers (2007: 26). In the beginning of the survey, the initial trust was determined by answering statements about four different websites (Chen and Barnes 2007: 26). Then the subjects were asked to choose a website selling books and to browse the site in search of a product. Afterwards they filled in a questionnaire, where they had to rank different aspects of the website in a 7-point Likert scale (Chen and Barnes 2007: 26,35-36). While most studies also used a similar Likert scale (see Lee *et al.* 2011: 194; Heijden *et al.* 2003; Flanagin and Metzger 2005: 325, 327), some surveys were also able to gain valid data with a 5-point Likert scale (Kwek *et al.* 2011: 171; Hoffmann *et al.* 2011: 30).

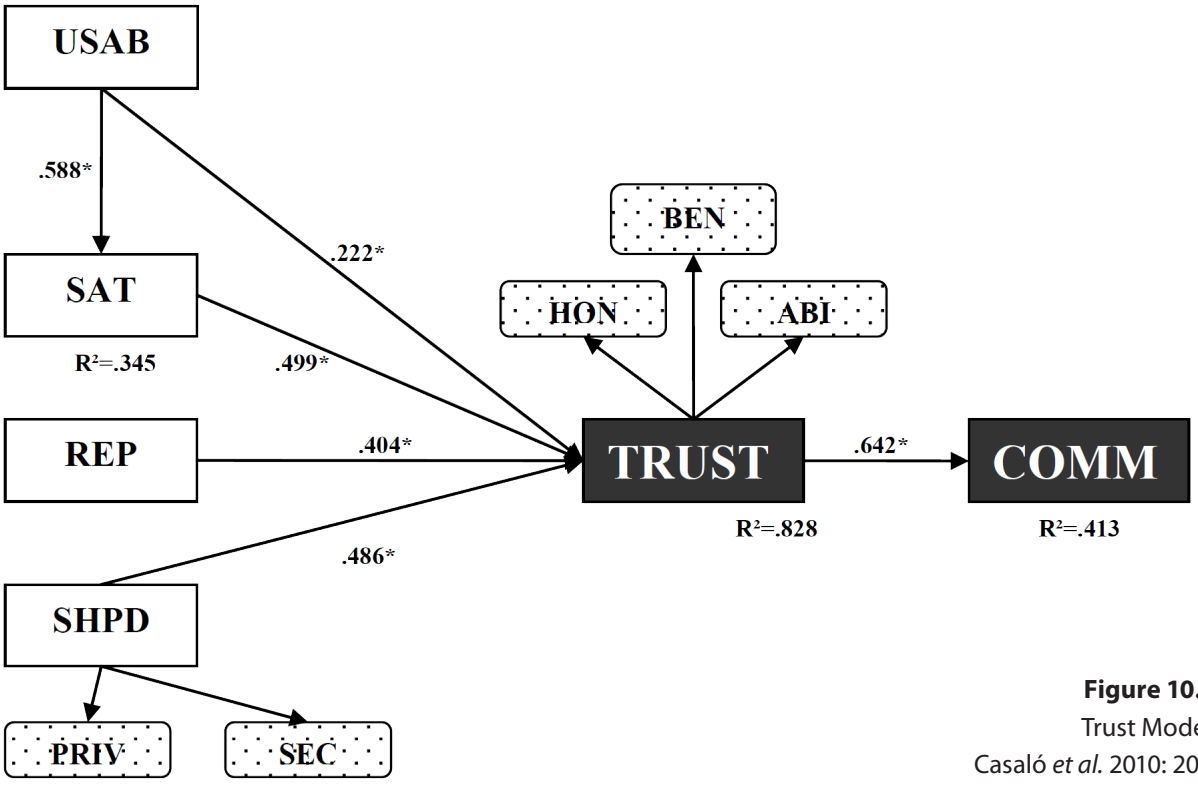


**Figure 10.**
Trust Model
Casaló *et al.* 2010: 205

The model of Casaló *et al.*, where trust is defined by the four factors of usability, satisfaction, reputation and security/privacy has been able to explain most of the variance for the construct of online trust (2010: 206). In their model, usability does not affect trust as much as the other three variables, but it is still important because of the influence that perceived usability has on customer satisfaction (2010: 206). In fact, they have even been able to explain more of the variance, than the other studies, which is even more impressive, because they did not account for the influence of graphic design on trust, which is also an important factor, as the findings of Fogg *et al.* (2003) have been able to demonstrate.

The main limitation of the survey conducted by Chen and Barnes is, that the data they only observe point in time, and do not, how trust is developed over a period of time and through a series of interactions (2007: 32). Another problem area of their research is, that they only looked at one particular web site category (2007: 32). Thanks to the study of Flanagin an Metzger (2007), the influence of website categories on credibility has already been thoroughly investigated.

The research of Casaló *et al.* comes with similar limitations as the previously discussed studies, they have only surveyed a student sample in a single cultural context at a singular moment of time (2011: 207). They recognize this themselves and state that future research concentrate on the role that culture plays in the generation of trust (Casaló *et al.* 2011: 207). Kwek *et al.* also make a case for a longitudinal study which could additionally include a more diverse group of subjects (2011: 173).

### 2.5. Cultural Influence on Online Trust

Casaló *et al.* theorise that the adaptation of new technology is determined through availability and cultural variables (2011: 199). As it has already been demonstrated earlier with the TAM, variables influencing the adaptation of new technologies are partially overlapping with the variables determining online trust. Therefore culture plays an important role for the formation of trust (Casaló *et al.* 2011: 199). They hypothesise, that the Spanish e-commerce penetration (3%) is lower than the penetration of countries with a similar technological availability (for example Switzerland (7.4%), Germand (8.0%) and the United Kingdom(10.7%) ), because of cultural differences (Casaló *et al.* 2011: 199). Those cultural influences take place on several layers. The findings of several studies on online trust with people from different nations are compared below, in order to determine, if cultural factors can be revealed through such a comparison.

The subjects of the study of Chen and Barnes were mostly (~80%) from North and Middle Taiwan (2007: 27), therefore they provide an example for the Taiwanese cultural factors influencing online trust. In the view of Chen and Barnes, Taiwanese customers have a lower degree of trust propensity in a business environment, which results in a lower initial trust (2007: 31). The Taiwanese e-bookshop industry on the other hand is very mature and has the highest volume of online customers in Taiwan (Chen and Barnes 2007: 22). Similarly, the research of Lee *et al.* earns most of its merit, because their research had Korean students as subjects (2011: 193).

For the Chinese, perceived technology and perceived risk were significantly and positively related to online trust (Kwek *et al.* 2011: 172). Furthermore the relationship between trust and purchase intention was also proven statistically (2011: 172).

In contrast to the other studies about behavioural impact of the perceived ease of use and the perceived usefulness, those two variables have a small impact for the sample of dutch students (Heijden *et al.* 2003: 44-45).

## 2.6. An Anthropological Definition of Culture

In order to investigate the effects of cultural influences on online trust, it is necessary to have a valid definition of culture. The fact, that cultural anthropologists have struggled for more than a century to create a definition of culture, without arriving at an uncontested conclusion demonstrates the difficulty of the task. For the purposes of this thesis, a limited conception of culture is conceived, in order to provide an adequate understanding of culture.

The one definition of culture that almost always quoted in anthropological literature, was written by Edward Burnett Tylor (1874): *"Culture or civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society."*

A definition that is more than one hundred years old is not quite state of the art. There have since been many criticisms and extensions to the above definition. However it is still quoted, because it provides a good impression of how culture was originally understood by anthropologists. For a deeper awareness of the current anthropological views on culture, further attention has to be given to newer definitions.

Some of those modern definitions of culture, are problematic, because they consist of vast lists of different concepts. One example is the definition of Leslie White: *"Culture consists of tools, implements, utensils, clothing, ornaments, customs, institutions, beliefs, rituals, games, works of art, language, etc."* (1959: 3). In place of such a definition, one could just say, that culture is everything humans do or create. Such a definition of culture would lead to the loss of the analytical value of the concept. In this case, it would be better to just use the categories that are actually described instead of the term *"culture"*. A good definition of culture has not only to include the relevant aspects, but also has to create useful boundaries to limit the scope of what it tries to describe.

The influential cultural anthropologist Clifford Geertz describes culture in his sophisticated, but slightly convoluted style as *"Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take cultures to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning."* (1973:5). While his definition is not only very elegant in its concise description of culture, it also highlights one important factor for the reason why disciplines outside of anthropology seldom make use of the concept.

He postulates, that anthropologists do not try to search for laws. Exactly those laws would be what other disciplines would need in order to profit from the anthropological knowledge.

As an example to illustrate this, one could take another statement Geertz makes: *"Cultures have been characterized as sets of control mechanisms – plans, rules, instructions, what computer engineers call programs for the governing of behavior."*

(Geertz 1973: 44).

If cultures were similar to programs, it would be desirable to know how they work, so that behavioural patterns could be predicted or processes that try to invoke a certain behaviour could be created. One way to apply such a knowledge could be the creation of effective instructions for people to stop smoking. Another way could be creating an application that can predict the preferences of its users in order to increase their satisfaction.

The ephemeral nature of culture makes it difficult to crystallize such laws from the observable human behaviour. It could even be pointed out that speaking of any particular culture is incorrect, as there are always different and sometimes even conflicting cultural laws effecting humans.

*"First, most anthropologists nowadays avoid use of the term 'a' culture. Second, most agree that 'culture' is not a homogeneous web of meanings that a bounded group creates and reproduces and that can be damaged by change but, rather, that 'culture' is an evolving process, an always changing, always fragmented product of negotiation and struggle that flows from multiple axes of inequality*", as Carole Nagengast puts it (1997: 356).

The above definition provides a good scope of how cultures are understood in current anthropology. It extends the original definition of Tylor mainly with the notion, that human behaviour is subject to many different and dynamic cultures.

For this definition to be useful in our thesis, its scope has to be limited. Arjun Appadurai proposes one way to do so: *"culture is not usefully regarded as a substance but is better regarded as a dimension of phenomena, a dimension that attends to situated and embodied difference. Stressing the dimensionality of culture rather than its substantially permits our thinking of culture less as a property of individuals and groups and more as a heuristic device that we can use to talk about difference"* (1996: 12-13).

The essence of this definition is, that culture can be used as a means to describe differences between people and groups. This limitation makes it possible to describe with culture, why people behave differently, depending on their cultural values. And with one more addition, we have defined culture sufficiently for the purposes in this article. Appadurai further suggests, *"that we regard as cultural only those differences that either express, or set the groundwork for, the mobilization of group identities"* (1996: 13).

Therefore the concept of culture is henceforth used to describe a set of arbitrary behaviour that distinguishes one group of humans from another.

## 3 Online Trust Across Cultural Borders

The previous section of this thesis has discussed the theoretical foundation on which the practical part of this project has been created. In the next section, those theoretical considerations are condensed into a theoretical framework.

### 3.1. Trustworthiness and Visual Appeal as an Explicit Metric

But before casting the full attention onto the creation of a theoretical framework, a short digression is made into two practical examples taken from important online stakeholders.

The first example is taken from Wikipedia, which gives visitors the ability to rate the articles posted on the web site:

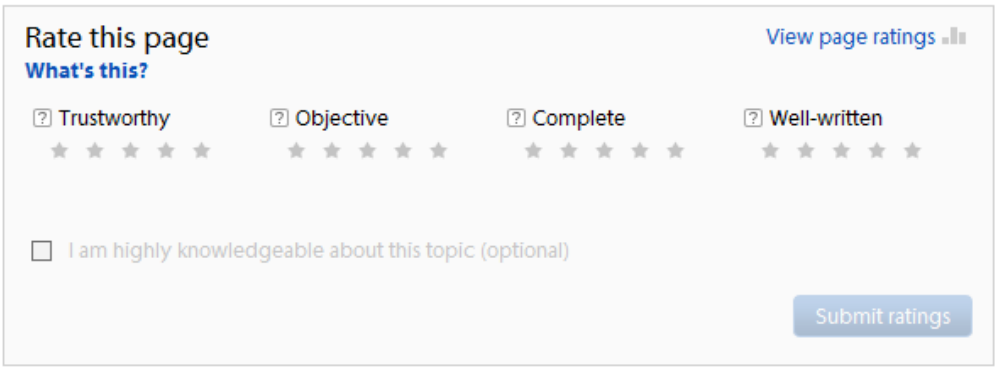


**Figure 11.**
Wikipedia Article Rating
Accessed on Wikipedia 2011

The first rating category *"Trustworthy"* instantly catches the eye, as it is positioned at the dominant left border of the box. But Wikipedia is not the only entity that chooses to use trust as a determinant to rate the quality of a page.

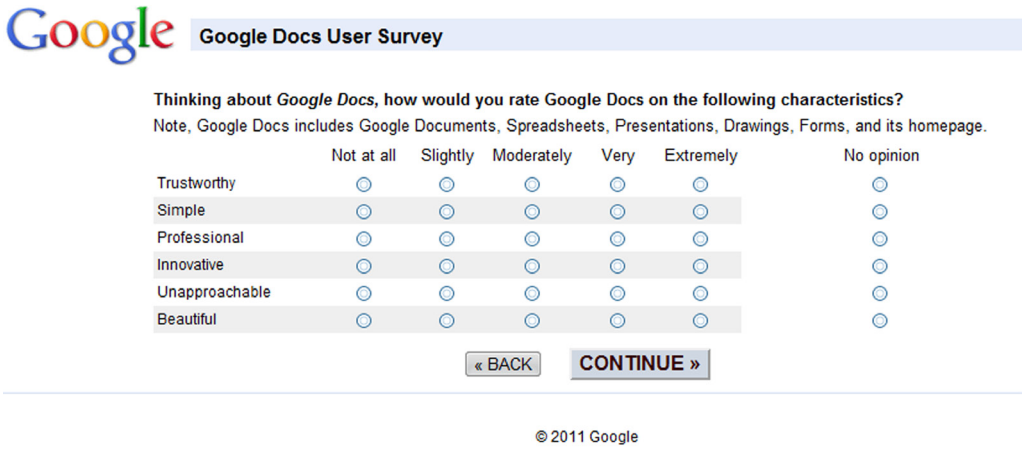


**Figure 12.**
Google Docs User Survey
Accessed on Google 2011

The second example is taken from the Google Docs User Survey. Again, the first value that the participant has to rate is the *"Trustworthiness"* of the service. Additionally we can observe, that it is possible to group the keywords on the above list into two rough categories. The first category concerns the credibility (*"Trustworthy"*, *"Professional"* and *"Innovative"*), and the second category concerns the design (*"Simple"*, *"Unapproachable"* and *"Beautiful"*) of Google Docs.

It is probably no coincidence, that Google chose to let users rate their services with those labels. In the next section the reasons for choosing the two categories of *"Trustworthiness"* and *"Visual Appeal"* as instrument to rate online services are going to be outlined.

### 3.2. A Model of Online Trust

Through the inclusion of the most significant determinants for online trust, a model grounded in the empirical findings of the current research can be proposed.

The antecedents for online trust (perceived usability, satisfaction, security, privacy reputation and the visual appeal) are grouped together. According to the current state of the art, those antecedents determine trust to a high degree.

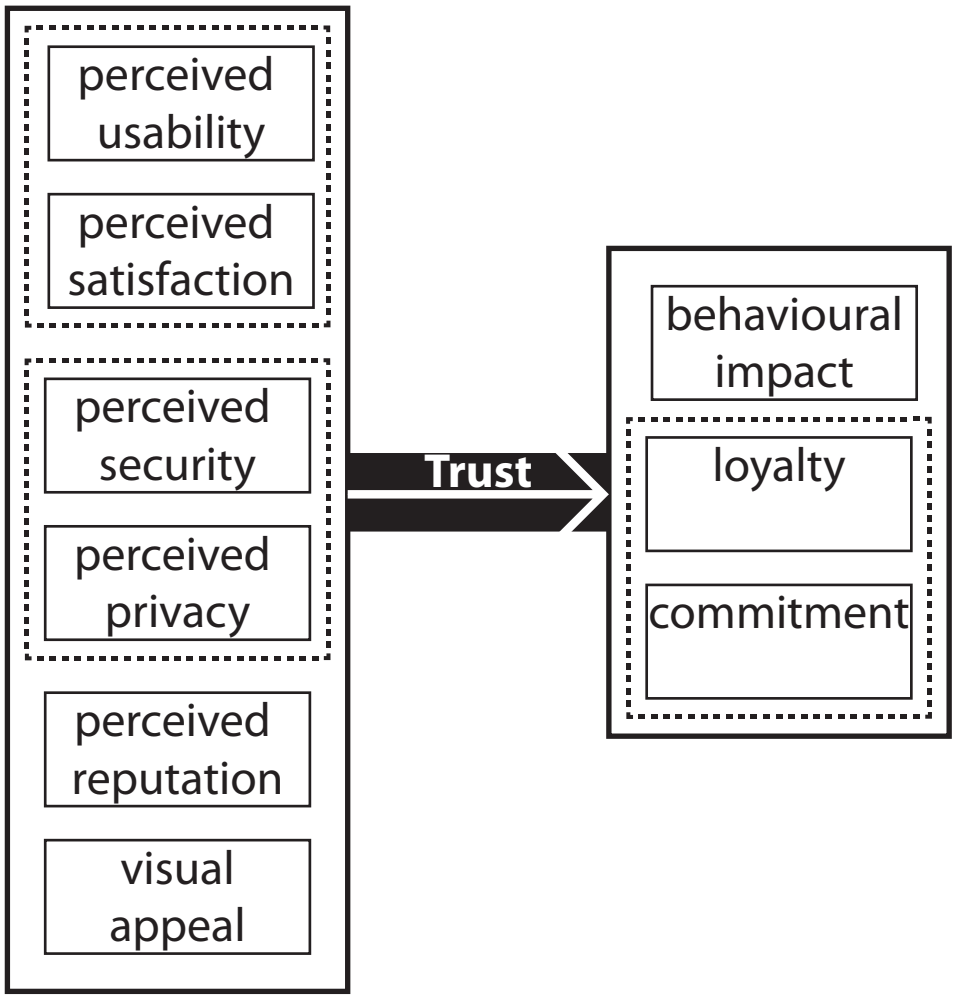


**Figure 13.** Model of Online Trust

In the above figure, this model of online trust is visualized. The antecedents of trust as well as the variables determined by trust have been grouped together. Additionally, the variables that belong together because of conceptual connections between each other have also been grouped together. Those are: The usability which influences the satisfaction according to the TAM; The security and privacy which also belong together (see Casaló *et al.* 2010: 205).

### 3.3. Online Trust Across Cultural Borders

In the previous part of this thesis, it has been demonstrated, that several surveys on online trust with similar student samples did not always come to the same conclusions (Chen and Barnes 2007; Kewk *et al.* 2011; Heijden *et al.* 2003). The most striking example is that of the dutch sample, where neither perceived usefulness nor perceived ease-of-use are statistically related to online trust (Heijden *et al.* 2003: 44-45). Those findings can be contrasted with the survey in Spain, where the similar concepts of perceived usability and satisfaction account for an significant part of the concept of online trust (Casaló *et al.* 2010: 205). It is imaginable, that cultural influences could explain such differences in the formation of online trust, even if there has not yet been any conclusive research in that area. In the model proposed earlier, culture might separately influence each of the categories defining online trust. This could be observed by grouping people according to their culture and then checking for similarities between the weights leading to online trust.

### 3.4. Measuring Cultural Differences

If one wishes to measure differences between cultures, special attention has to be paid to some factors like the reference-group effect, the rating methodology and the questionnaire design. If that is not done with scrutiny, the results of the research are going to be at least skewed, if not completely wrong.

#### 3.4.1. The Reference-Group Effect

There are not only differences in how various cultures perceive colour, but there are also differences in how the members of one culture rate things in any given scale or questionnaire. Greenholtz *et al.* discuss this problem within their survey about the implications of *"Cross-cultural comparisons using subjective Likert scales"*, and come to the conclusion, that they *"are compromised because of different reference groups"* (2002: 903).

The reference-group effect they mention means that the standards that are employed by people to rate themselves on subjective Likert scales are always depending on the other members of the same cultural group. Greenholtz *et al.* state, that through this effect, cultural differences are concealed (2002: 915). They also prove, that when the reference-group effect is controlled in a study, that this makes it possible to show cultural differences with subjective Likert scales (2002: 915).

The same effect is also observed by Oishi *et al.*, who compared the results of a Likert scale rating and of pair wise comparison for the value orientations of Americans and Japanese (2005: 299). In the subjective Likert ratings, the two cultures did have a similar result for individualism, and the Americans had the higher score for collectivism. The pair wise comparison, on the other hand, resulted in the Americans to have a higher affinity to individualism and a lower one for collectivism (2002: 303).

In the article at hand, the reference-group effect should not falsify the results,

because it has been proposed to group different groups of people together according to their own culture. As long as the subjects culture is determined correctly, and the newly assembled group is a valid representation of the individual culture, the way they rate and use web services is only going to be compared within the reference-group of the subject.

The limitation of this strategy is, that comparisons between different cultural groups can only be made with extreme caution.

### 3.4.2. Rating Methodology

It has been established, that it is possible to use an adapted version of the Likert scale to evaluate the individual position in relation to its reference-group. This section details the advantages and the disadvantages of using a Likert scale with five levels.

This decision to use a scale with five levels is not without precedence. Google also used a 5-point Likert scale for its survey. Wikipedia also uses five different tiers, they are illustrated by *"Stars"* , whereas Google provides adjectives to label the scale. The *"No opinion"* offered in the survey of Google is implicitly also available for the system that Wikipedia uses: If a user does not click on one rating, he has *"no opinion"* for it.

There are several studies, that try to discern, how many points a Likert scale should offer. Lietz (2010) makes a summary of the findings of those studies. According to her, the most commonly used ones are the 5-point and the 7-point scales (2010: 260). While 7-point scales provide better data, than 5-point scales, and that trend of more options providing more valid results continues for 10-point scales (2010: 261), she also states, that it is possible to rescale them to match each other, which would imply that the advantages of using scales with more points are not that grave (2010: 260).

Furthermore, the in the literature taken from the current research, both 5-point Likert scales (e.g. Hoffmann *et al.* 2011) and 7-point Likert scales (for example Lee *et al.* 2011) are used by the authors.

Another factor important for the decision of the scale to use, is the content of the question. Lietz states, that shorter scales are preferable for absolute judgments and longer scales are more useful for abstract evaluations (2010: 261). Dawes (2002: 1) goes even further and writes, that *"the eleven point scale produces data that is essentially the same as that produced by the five point scale"*.

Because web pages are rated on an absolute scale, it should be possible to choose 5 levels for the scale, without negatively impairing the validity of the generated data. One other advantage of choosing a 5-point scale is, that such scales are already used widely (Google, Wikipedia), and users are already going to be familiar with such a rating system.

According to Lietz (2010: 263), there is no significant difference between using textual labels or symbols to differentiate between the tiers of a rating system. In order to keep the rating interface as unobtrusive as possible, it might be

advantageous to use a symbolic rating system. The resulting interface that is displayed on web sites has been designed accordingly and can be seen in the following image:


### 3.4.3. Questionnaire

Now that the form in which people may rate web pages has been specified, the general style that the questionnaire for collecting information on the culture of the users should have can be defined.

The rule of thumb is, that questions and statements should remain as simple as possible, in order to maximize the participants understanding (Lietz 2010: 250-251). In practice, this means that a sentence should not consist of more than 16-20 words. Furthermore following the rule of simplicity, questions should use the active voice and avoid the use of pronouns and possessive forms (251). Additionally, this means that specific terms should be used, and vague words, ambiguity or abstractions should be avoided (251, 253). Negatively worded questions also increase the probability of respondents to make mistakes (254).

More instructions for the creation of questions are detailed by Smith and Roodt 2003. According to them, one should avoid abbreviations, slang, colloquial expressions, technological terminology and intensifier words like *"very"*, *"good"*, *"satisfied"* and *"really"* (60).

In the end, the easiest solution to the creation of an universally usable interface is attained through the usage of symbols. Because of the universal dispersion of the *"Star"*-Symbol on the Internet, most users should be comfortable in using them for rating web sites.

### 3.5. Determining Participants' Culture

With those general rules about the design of research questions in mind, it is possible to go one step further and look at which particular questions should be asked in order to determine the respondents culture with as few questions as possible, while preserving an accurate representation of the cultural groups.

For their research in culturally adaptive interfaces, Reinecke and Bernstein already had to develop an algorithm, that approximates an users cultural background (2011: 6).

Their system only asked the following three questions (7):

- *"Where do you currently live?"*
- *"In which other countries have you lived before?"*
- *"How long have you lived in each of these countries?"*

The program then created a weighted average of the durations of each residence, and was then able to successfully create an adapted user interface with only that information (Reinecke and Bernstein 2011: 7).

Based on the success of that experiment, this project uses the same questions. However, we do not only wish to find an approximation of the cultural group. Our intention is to test those criteria further and to determine, if there are more accurate questions. This makes it necessary to introduce additional inquiries like the languages the participants speak.

And because the study of Reinecke and Bernstein only choose participants, that were students (2011: 11), and the extension of this thesis accepts users from any educational level or with any computer literacy, there is also the need to determine the social class of the respondents. That includes questions about the age, education and income levels.

In reference to the findings of Reinecke and Bernstein (2011) and demographic informations collected by Bart *et al.* (2005), a total of twelve questions are proposed in order to model the cultural and demographic background.

1. Where do you currently live?
2. How long have you been living here?
3. In which other countries have you lived before?
4. How long have you lived in each of these countries?
5. What is your gender?
6. What is your age?
7. What is your employment status?
8. What is the highest level of education you have completed?
9. Including yourself, how many people live in your household?
10. What is your household's combined yearly income?
11. The number of hours I spend per week on the Internet are:
12. Do you consider yourself to be knowledgeable about Internet sites?



## 4 The Browser Extension

Because many earlier studies have been limited by the scope of the sample and the duration, during which data about the influence of online trust was collected, a new instrument for measuring online trust is proposed.

In order to measure the influence of culture on online trust, a Firefox browser extension is recommended. That extension could unobtrusively collect data in order to connect the preferences of users with cultural groups. Because this data would be collected for a multitude of different users and over a longer period of time, most of the problems of earlier research about online trust could be mitigated. The extension would collect the data through three different methods:

- Through asking the users to fill out a **questionnaire** about themselves, we gather information about the culture they belong to.
- By anonymously connecting the **web history** of the extension users, we unobtrusively measure, which web pages the users prefer to use.
- And by letting the users **rate** web services for their **trustworthiness** and their **visual appeal**, we gather insights on the conscious cognitive process underlying the users preferences.

### 4.1. Choice of Browser

The choice of the browser an extension is developed for also has an influence on the result of the thesis, because the participant group demography changes for different browsers. One example can be given through the Steam Hardware and Software Survey (Valve Corporation 2011). Since they collect the information with their client software, the group of people providing the data are going to be called 'gamers'. Of those gamers, more than 63% have the Mozilla Firefox browser installed, which is a very high value compared to the global usage of the Firefox browser of about 20% (Bright 2011A). Additionally, people who visit the technological news provider 'Ars Technica' are significantly less probable to do so with the Internet Explorer (~14% of visits) than with an alternative browser (Bright 2011B). Compared with the global market share of the Internet Explorer of ~50%, those examples allow the conclusion, that the browser somebody uses can already be seen as an indication of the users culture.

### 4.2. Browser Extension User Interface Design

To explain how the implementation of the extension was done, there are several paths that could be taken. One example would be to talk about what is implemented on the client-side of the extension, and what was done on the server. Here an approach is pursued that focuses on the design of the different elements and explains the decisions that shaped the extension. Therefore the explanation is divided into two parts, the first being the graphic user interface, and the second focuses more on the implementation of the features the user can not 'see' directly.

### 4.3. Login & Registration

The first screen a user sees is the login screen, where he can either log-in with an existing account or where he can create a new account. This screen is displayed as soon, as the user starts the Firefox browser, and it is positioned as an overlay in the browser window at the top right corner of the frame, where web sites are displayed. The log-in and the registration are both handled as simple as possible. This information is necessary to be able to collect a history of the web services and ratings any user makes. Since the user name can be chosen arbitrarily, the information is automatically anonymised. For security reasons, the password is encrypted.

### 4.4. Rating Interface

When a user is logged in (the Login information is stored in the local Firefox profile), and he visits any web page, the extension displays the rating screen after a short delay. This delay is intended to give the user the time to form a first impression, based upon which he can then rate the page. According to Lindgaard *et al.*, a visitor of a web site is capable of reliably evaluating the visual appeal of a page in 50 milliseconds (2006: 115, 125). Because not every web site has the same loading time, the timer for the delay begins only when the web page has been completely loaded.

### 4.5. Questionnaire

Since we also wish to be able to ask the user about his cultural background, the extension can display a link to the questionnaire in the rating interface. This is then opened in a new window, where the user can fill in the requested information.

Those three visible pages, have already covered everything an user of the extension actually interacts with. This is because, the extension has been developed with simplicity in mind, so that the barrier for using it is as small as possible. In the next part of the article, the implementation of the extension is going to be explained.

### 4.6. Implementation

The implementation is conceptually divided into two parts. The first part is the client, which is a simple JavaScript extension to the Firefox web browser. The second part is a server, which is programmed in php and which uses a mysql database that stores the data gathered by the extension. The advantage of this architecture is, that the functionality of the extension is mostly independent of the browser. This could be useful, if the questionnaire has to be adapted, or an additional message to be displayed to the user. All the changes necessary to do those things could directly be programmed on the server and would immediately be propagated to the users of the extension without the need to update the extension.

The drawback is obviously, that a good web server is necessary, in order to

handle the requests sent by the clients. However, because such an infrastructure is also going to be necessary to actually collect the data sent by the clients, this solution might provide additional flexibility for the extension developers without incurring too big a cost.

One other problem that is often encountered by browser extensions is, that new versions of the browser, easily break a sophisticated extension, which makes the maintenance of such add-ons rather expensive. By handling most of the extensions functionality on a remote server, the local version of the browser has a reduced impact.

### 4.7. Browser – Client

Therefore the client only implements two procedures. The first one sends the web pages the user visits to the server. This is procedure is called, as soon as a web page is completely loaded, and if a user is saved in the local Firefox profile. It is also possible to deactivate this behaviour in the settings of the extension.

The second procedure is also called when the page is loaded. In addition to sending the information of the web page to the host, a frame is displayed, where the user can rate the website. The actual content of that frame is also rendered by the server.

### 4.8. Server – Database Host

On the server the functions necessary to process the extensions requests are implemented. If the request shows, that there is no user logged in locally, the server displays the according page.

If there is an user logged in, the server stores the information for the web pages that were visited by the user. In order to protect the anonymity of the participants, the server automatically encrypts the web pages visited by the users, so that even with access to the information stored in the database, it is not possible to reconstruct the complete browsing history of an user.

Then the server creates the content that is displayed on the rating screen. If the user chooses to rate the page, the server stores those ratings in the database.

And the server also provides the page, where the users fill in the questionnaire and then proceeds to save their answers in the database.

Since the sensitive information about the users is always encrypted on the server, and because nothing is saved without the extension users approval, the anonymity of the participants is protected.

Because the architecture of the database on the server can be seen at one glance into the *"create_database.sql"* file, it is not necessary to describe the database design in greater detail here.

# 5 Conclusion

The starting point of this project was the research of Reinecke and Bernstein, which successfully tested the concept of culture as a model to adapt a website to its users.

## 5.1. A Model of Online Trust

In order to understand the status of the current research, a thorough review of the literature on the topic of online trust has been realised. By incorporating the most salient conceptions about online trust into a compact model, a solid basis for the practical part of this project is provided.

The proposed model defines online trust through the following six dimensions:

- Perceived Usability
- Perceived Satisfaction
- Perceived Security
- Perceived Privacy
- Perceived Reputation
- Visual Appeal

In order to order those concepts, usability and satisfaction are grouped together because of their relative affinity. The perceived security and privacy are also relatively similar to each other. Those four categories together can be summarised with the technology acceptance model, which measures the influence of web sites through the perceived expertise and the perceived trustworthiness. In addition to the technological acceptance model, the categories of the perceived reputation and the visual appeal of a web site are also incorporated into the model, because of empirical evidence supporting their saliency.

## 5.2. Advantages of a Browser Extension

The extension implicitly measures the perceived usability and satisfaction through a log of the web history of an user - it is assumed, that an user visits any site more often, if the perceived expertise of the site is high. Because the perceived trustworthiness can not be measured as easily as the perceived expertise, the users are asked to rate the web pages they visit according to their trustworthiness in a scale from one to five stars. Because the visual appeal of a web site for an user is also difficult to measure, the subjects are also asked to rate the visual appeal of a site.

The advantages of collecting research data through a browser extension are mainly because of the nature of data that can be automatically collected this way. Most of the current research on online trust has been made with students as their sample. While it is argued, that students are a good average for online customers, it is still desirable to test the findings of the pilot studies on students with a wider audience. Additionally the extension can collect data about the users repeated

interactions over a longer period of time. Until now the research on online trust has not yet been able to provide insights into the way trust is formed through repeated interactions. This could also be remedied by the proposed project.

The browser extension has been developed in *JavaScript* according to the requirements on Firefox add-ons. Additionally a *PHP* based script for a server has been created in order to store the data collected by the extension in a *SQL* database.

### 5.3. Limitations of this Project

Most limitations of this thesis are caused by structural limitations. In order to test the performance of the extension and the robustness of the proposed research model, a pilot study would be necessary. It can also be assumed, that the code for the extension would have to be optimised further.

Another problem is the recruitment of research participants. Because a great number of participants who have the extension running for an extended period of time would reap optimal results, they would have to be attracted by some kind of reward. The usage of intrinsic rewards like an evaluation of the online history or the generation of an online trust profile would be proposed. It would even be imaginable, that the extension could take the role of an recommender system, where it recommends web sites to users through collaborative filtering.

Because of the complexity of the above proposals, it is suggested that the verity and salience of the research model is confirmed in a pilot study, before investing further into the development of the extension.

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## Abbreviations

| Acronym | Meaning |
|---|---|
| OEA | Online Advertisements |
| OCR | Online Customer Reviews |
| P-I Theory | Prominence-Interaction Theory |
| TAM | Technology Acceptance Model |
| TRA | Theory of Reasoned Action |



## Extension Installation Instructions

The installation of the local extension client is extremely straightforward. The extension can be installed just by dragging and dropping the **Extension.xpi** file from the file system on the Firefox browser.

The Installation of the server-side part of the implementation is slightly more difficult. The server has to be able to provide an sql database which can be created with the "**create_database.sql**" file from the cd. Furthermore the server has to be able to execute php script files. For the extension to work, the php script files have to be installed on the server and the constants in the "**config.php**" have to be defined accordingly.

# Appendix



**Table 1.**
Findings of Chen and Barnes 2007: 29

| Hypothesis | Result |
|---|---|
| H1a. Perceived usefulness is positively related to online initial trust in e-commerce | Supported |
| H1b. Perceived ease-of-use is positively related to online initial trust in e-commerce | Not supported |
| H1c. Enjoyment of technology is positively related to online initial trust in e-commerce | Not supported |
| H1d. Perceived security is positively related to online initial trust in e-commerce | Supported |
| H1e. Perceived privacy is positively related to online initial trust in e-commerce | Supported |
| H1f. Perceived company size is positively related to online initial trust in e-commerce | Not supported |
| H1g. Perceived good reputation of the company is positively related to online initial trust in e-commerce | Supported |
| H1h. Perceived willingness to customise is positively related to online initial trust in e-commerce | Supported |
| H1i. Perceived interaction with consumers is positively related to online initial trust in e-commerce | Not supported |
| H2. Personal trust disposition is positively related to online initial trust in e-commerce | Supported |
| H3. Online initial trust and familiarity with online purchasing are positively related to consumers' purchase intention in e-commerce | Supported |
| H4. Familiarity with online transactions is positively related to purchase intention in e-commerce | Supported |

# Appendix



**Table 2.**
Findings of Fogg *et al.* 2003: 5

| Topic of Credibility Comment | Incidence |
|---|---|
| Design Look | 46.1% |
| Information Design/Structure | 28.5% |
| Information Focus | 25.1% |
| Company Motive | 15.5% |
| Usefulness of Information | 14.8% |
| Accuracy of Information | 14.3% |
| Name Recognition & Reputation | 14.1% |
| Advertising | 13.8% |
| Bias of Information | 11.6% |
| Tone of the Writing | 9.0% |
| Identity of Site Sponsor | 8.8% |
| Functionality of Site | 8.6% |
| Customer Service | 6.4% |
| Past Experience with Site | 4.6% |
| Information Clarity | 3.7% |
| Performance on a Test | 3.6% |
| Readability | 3.6% |
| Affiliations | 3.4% |



## Contents of the CD

**Online-Trust:** Folder with all source code of the extension.

**Server:** Folder with all code to be installed on the server.

**Literature:** Folder with the literary sources according to the bibliography.

**SQL:** Folder with the database definitions.

**Extension.xpi:** Compressed archive which is ready for the installation.

**Thesis.pdf:** Adobe document file containing the thesis.

**Abstract:** Abstract in English.

**Zusfsg:** Abstract in German.