The effects of e-commerce websites colors upon consumer trust

Jean-Eric PELET	Panagiota Papadopoulou
Phd in Marketing	Phd in Information Systems
ISG Paris – CEREMa IEMN - IAE de Nantes – LEMNA 147 Avenue Victor Hugo 75116 Paris France jepelet@yahoo.com	National and Kapodistrian University of Athens Department of Informatics and Telecommunications Athens Greece peggy@di.uoa.gr

Abstract

This article aims to study the impact of the colors of e-commerce websites as an atmospheric variable of the interface, on customer trust. The effect of the colors of e-commerce websites on customer trust has only been indirectly examined in terms of website characteristics, such as web site quality and usability, where color is viewed as a key interface attribute. Thus, the relationship between color itself and trust remains largely unaddressed. Relying on a literature review as well as on investigations provided by an exploratory qualitative analysis, we wish to introduce the theoretical and methodological bases addressing this issue.

Key words: *Color, Trust, E-commerce, Trusting attitudes*

Track: *Consumer Behaviour*

1. Introduction

The growing development of e-business raises questions about trust, especially questions considering color variables. In an attempt to address this gap, this paper aims to shed light on the customer's perception of trustworthiness of e-commerce websites's interfaces as influenced by their color. Among the various variables supporting a positive experience of e-commerce websites, color plays an important part. In an online environment, a vendor's competence will largely be assessed through the presentation of products and product information. Overall, most e-commerce websites present a product using images. These should be clear, of high quality and with high color precision (Papadopoulou, 2007).
The role of color has been shown to be important for the readability and memorization of the information, information seeking and navigation within a web vendor site (Pelet, 2008). These color-dependent factors constitute or are closely intertwined with the antecedent factor of trust associated with a web vendor's site. This implies that color should be an important variable for trust, as it is a key attribute of web site characteristics that have an effect on trust. However, our knowledge regarding the effect of color on trust is incomplete. The consumer is able to act because of the interactivity of the computer which is, furthermore, under his control and so his fear of mishandling is overcome. Ensuring the readability of a web page, allows the visitor to obtain available information. Consequently, he has the optimal conditions under which to deliberate if purchasing on the commercial website is a possible goal.
The aim at this research is to prepare the empirical analysis which will put to the fore the effects on trust of e-commerce websites colors.

2. Literature Review

2.1. Trust in e-commerce

Trust has traditionally been a complex and multidimensional concept that is difficult to define and measure (Rousseau et al., 1998). This has led to a diversity of trust conceptualizations and operationalizations in literature across disciplines, including e-commerce (Gefen et al., 2003). In line with research in traditional settings, a large stream of e-commerce research has examined trust around the notion of belief or beliefs about the vendor, for the most part referring to the perceived benevolence, competence, integrity and predictability of an online vendor. Although these beliefs are the most frequently investigated trust construct in the empirical literature (Grabner-Krauter and Kaluscha, 2003), our knowledge is beset by a lack of clarity and consensus regarding its conceptualization and measurement. This poses a difficulty in understanding and capturing the multidimensionality of the trust construct, at both conceptual and empirical levels.
Trust has long been recognized as a critical success factor for e-commerce (Torkzadeh and Dhillon, 2002). Recent surveys show that the success of current online shopping sites is primarily attributed to the fact that they have earned the trust of users. At the same time, the lack of customer trust, long identified as one of the greatest barriers inhibiting online commercial transactions (Hoffman, Novak and Peralta, 1999 ; Dayal, Landesberg and Zeisser, , 2001), continues to be high (Consumer Reports WebWatch, 2002, 2005 ; eMarketer, 2006 , 2008). Despite the technological advancements and the adoption of trust building mechanisms by online vendors, such as trust seals, security and privacy policies, recent surveys show that the portion of Internet users who do not trust online shopping sites has increased since 2002 from 14% to 21% in 2005 (Consumer Reports WebWatch, 2002, 2005). Building customer trust is still a major challenge for online vendors and remains an open issue as to how it can be accomplished within an ecommerce environment.

Trust in e-commerce has been extensively addressed as a research topic from different viewpoints and at different levels of analysis. It is an important predictor of online consumer behavior as it influences the intended use of an e-commerce web site. As such, it has been the topic of numerous research studies, looking into trust antecedents. The interface of the vendor web site has been identified as being an important contributor to trust (Gefen *et al.*, 2003). Several empirically tested models on trust include web site characteristics as factors that affect trust, such as perceived site quality (Kim and Tadisina, 2005; Corbitt *et al.*, 2003; McKnight *et al.*, 2004; McKnight *et al.*, 2002a), web site appeal (Hampton-Sosa and Koufaris, 2005), ease-of-use (Gefen *et al.*, 2003; Koufaris and Hampton-Sosa, 2004), usefulness (Koufaris and Hampton-Sosa, 2004), usability (Flavian *et al.*, 2006; Roy *et al.*, 2001), navigation (Bart *et al.*, 2005; Sultan *et al.*, 2002) and security (Koufaris and Hampton-Sosa, 2004; Gefen *et al.*, 2003).
However, whilst such factors are important characteristics of the interface design of a vendor web site, they do not include color. Although these studies provide valuable insights for the effect of a vendor web site on trust, there is a lack of research on the relationship between color and trust. This imposes a limit on our understanding of the effect of color on trust. Color, as an important interface element, is expected to influence customer trust in an online vendor. The relationship between color and trust has only been addressed with respect to website interface aspects, such as web site quality, usability, website design and their effect on trust.

2.2. Colors as a main variable regarding atmosphere associated with e-commerce websites

Color has always been used by human beings as an aid to distinguish important information from unimportant or irrelevant information. It is essential in strategies of camouflage for example. It also aids an individual's memory in many uses such as presenting information, assisting in education or even with the intention to buy.
Color contains three principal components (Trouvé, 1999) :

- Hue (or chromatic tonality), is the attribute of the visual sensation defined according to the colors denominations such as blue, green, red…;
- Saturation provides the proportion of chromatically pure color contained in the total sensation;
- Brightness corresponds to the component of an illuminated surface according to which the surface seems to emit more or less light.

Unlike most empirical studies dealing with color which compare warm and cold colors, we have decided to focus on hues, brightness and saturation so as to demonstrate that the influence varies according to the intensity of each one of those components. These various levels occasion particular contrasts according to the chosen hue, which can then enhance or disturb the readability of the whole page. This can represent an obstacle for the website's usability and consumer trust.
Though the color variable is a widely researched topic (see the periodical published by Divard and Urien, 2001), to this day, very few studies focus on this phenomenon within the context of the Internet. Despite this, color is omnipresent on e-commerce websites. Generally speaking, it affects consumer behavior in compliance with Mehrabian and Russell's psycho environmental model, the SOR model (Stimulus Organism Response) (Mehrabian and Russell, 1974).
E-commerce website interfacing seeks to place consumers in a particular context by activating the sensory system (hearing or sight) so as to be able to perceive their emotional, cognitive, psychological, physiological and behavioral responses through their being altered. The context of visiting an e-commerce website takes into account the reading of commercial information and of posted comments from other customers. It also concerns the viewing of

photographs and images related to the products. It can also be a place where it is possible to play with the different plugins or elements dedicated to keep the visitor longer. It is also a place to shop. In order to narrow the context of this research, we only take into account the information that can be read and looked at, with regard to the photographs of products on each page of each article.

The components of atmospherics on e-commerce websites, quoted by respondents during a research based on semi-directing talks, revealed color as a pivotal variable (Lemoine, 2008).

While several studies about the impact of colors on Internet site readability (Hall and Hanna, 2004 ; Hill and Scharff, 1997) provide advice about how to choose the most harmonious colors, experts in research in usability such as Nielsen (2000) release managerial recommendations. E-commerce website interfacing seeks to place consumers in a particular context by activating the sensory system (hearing or sight) so as to be able to perceive their emotional, cognitive, psychological, physiological and behavioral responses through their being altered.

Color perception is a complex process in that it is more than a mere physiological or psychological fact. It is also shaped by the consumer's national culture, general education, educational and socio-professional backgrounds.

To this day, the effects of the three-color components on the Internet have been but seldom documented.

Gorn and Alii's works (2004), focusing upon the impact of the three color components on downloading time perception, demonstrate that a lengthy waiting time influences the user's appraisal of the Internet site and can lessen his/her desire to recommend it to others.

Kiritani and Shirai (2003) show that the effects of screen background colors upon time perception vary according to the tasks performed by Internet users. When reading a text written on a white, blue or green screen background, users have the feeling that time passes by more slowly.

Pelet (2008) has shown the importance of considering chromatic colors vs. achromatic ones, taking into consideration the effects of the three color's components: hue, brightness and saturation.

Color, as an important variable for interface usability, memorization and buying intention, is expected to be an important antecedent of customer trust in an online vendor. In particular, color could have an effect on customer’s trusting beliefs in an online vendor, specifically, the beliefs in the vendor’s benevolence, competence, integrity and predictability. In an attempt to address this gap, the objective of this paper is to shed light on how customer trust can differ according to the colors of the ecommerce website.

Hence, we posit:

H1: The color of a web vendor site has a positive influence on customer trust

3. Research design

3.1. Qualitative analysis

The first step of this research aims at conducting an analysis based on interviews. After handing out a document detailing the procedure to be followed, we questioned 21 participants with a view to gathering information about users – novices (15/21) and experts (6/21) as well. The main objective of the exploratory phase was to explore the empirical knowledge gained by consumers and webmasters when browsing the e-commerce website dedicated to the experiment. It also aimed at confirming that the colors used – true to our conceptual model’s situational factors – had an impact on their perception and trust, so as to prepare our data collection. The question we asked in order to understand their behaviour when facing an e-

commerce website targets the consumer's trust. Questions were thus oriented towards the ease of use and ease of surfing the website as well as questions linked to trust, ergonomics and interest in the website aspects.
The *respondent 19* said that *"…the more readable the site, the more one wants to spend time on it because I trust it"*. He further reinforces his assertion about the factors which discourage him to revisit a particular website: *"… if the site is complicated to access, has a complicated address in the address bar which is completely unmemorizable in order to revisit the same page, a difficult readability, too many animations, I don't trust it… "*. This testimony which corresponds with the response of *respondent 3* who is more direct about the appearance of the ecommerce website: *"… its brightness encourages me to go and consult a commercial website, if it is clear and convivial. And what discourages me is, if it is all the reverse. I need to trust the website to buy on it"*.
Color was actually mentioned by all the interviewees as a means of principal location within the interface of the site. It is perceived as an aid for consumer moves and sometimes caused aggravation if it appeared too violent. *" times you feel aggravated, irritated, because it does not function well, because there are bugs or because it attacks you, yes it can attack you and doesn't help to trust it when it is too "violent" at the level of the colors " (respondent 14).*
Not only is color part of the design of the website, but when soft, it also seems to comfort consumers thus filling them with enough self-confidence to buy an item in an environment to be "tamed": *" What I like in the Boursorama website, it is a site initially on the general level that is comfortable. Comfortable visually speaking I would say. I trust these types of websites." (respondent 16)*
The exploratory qualitative analysis enabled us to note that color was actually an integral part of the atmosphere on the most important e-commerce websites, and it even seems to hold a more important part than we thought prior to the analysis. Not only is color part of the design of the website, but when soft it also seems to comfort consumers thus filling them with enough self-confidence to buy an item in an environment to be tamed. When used in compliance with the contrasts advocated by Itten (1970), color can prove very timesaving, a major asset of the relationship and trust between consumers and websites. Making information research easier by implementing rules specific to ergonomics and interaction between man and machine, the colors encountered when browsing an e-commerce website enable Internet users to appropriate the website more easily, according to its layout. Finally, it helps to establish trust in the vendor.

3.2. Conceptual model

The second step of this research design was the development of a conceptual model describing trust building in e-commerce, according to colors. Trust is approached as a multidimensional concept and is analyzed into a set of four trusting beliefs ; the beliefs in the benevolence, competence, integrity and predictability of the e-vendor, trusting intention and trusting behavior. Following the typology of McKnight et al. (2002) and McKnight and Chervany (2001-2002), trusting beliefs in an online vendor are defined as follows:

- *Trusting Belief - Benevolence* is the belief that the online vendor cares about the customer and is motivated to act in the customer's interest and not opportunistically.
- *Trusting Belief - Competence* is the belief that the online vendor has the ability or power to do for the customer what the customer needs done.
- *Trusting Belief - Integrity* is the belief that the online vendor makes agreements in good faith, communicates honesty and fulfills promises.
- *Trusting Belief - Predictability* is the belief that the online vendor's actions (good or bad) are consistent enough that the customer can forecast them in a given situation.

These constructs have been synthesized and theoretically interrelated, resulting in an integrated model and a vertical understanding of how customer trust depends on e-commerce websites colors.
The model explains how the atmosphere of an e-commerce website and particularly the color variable and its components (hue, brightness, saturation) can have an impact upon the consumer's trust and its components (. It draws inspiration from Mehrabian and Russell's SOR model used in environmental psychology. (Fig.1)

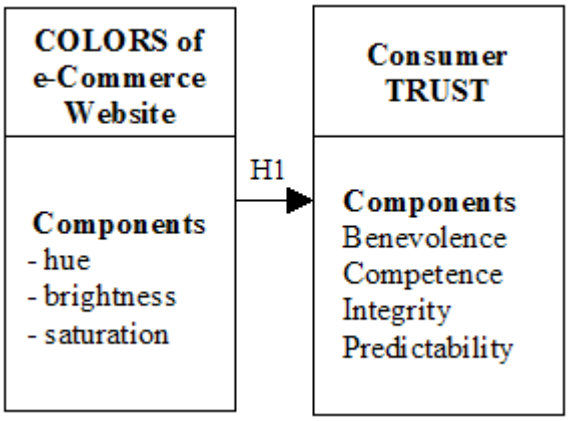


Figure 1: Conceptual model of the Research

An empirical study will be performed to test the model and the depicted relationships. A measurement instrument may be developed and pretested to derive the refined final instrument which will be used for the study. We will conduct a quantitative analysis to confirm the results obtained so far, by carrying out a lab experiment. This will allow us to draw valid conclusions about the groups to survey. Though the Internet enables one to conduct non-intrusive studies – meaning that Internet users are not even aware that their behavior is being analyzed, a study focusing on the color variable requires one to take into consideration three aspects at least of e-purchase:

1. Screen adjustment (calibration),
2. Color of the walls must be grey, and the brightness of the room must be of 1000 lx,
3. Participants have to pass the Ishihara test (they cannot be colorblind).

In order to measure the differences in color perception we will create 8 different graphic charters with varied hues and brightness rates but with the same saturation rate.

To work out our first experimental design we will resort to the graphic charter used by Hill and Scharff (1997) which supported the best readability rate in relation to contrast and we will choose as chromatic colors a yellow dominant and a green dynamic. Starting from this charter, we will inflect the brightness level of the two colors so as to obtain the second experimental design. For experimental designs 3 and 4 we will keep the same colors but will switch dynamic and dominant colors. Experimental designs 5, 6, 7 and 8 will be based on black and white (achromatic colors), the most frequently used ones on e-commerce websites with different brightness levels such as the experimental designs we have chosen relying on green and yellow hues.

References

Bart, Y.Y., Shankar, V., Sultan, F., Urban G. L. (2005). Are the Drivers and Role of Online Trust the Same for All Web Sites and Consumers? A Large-Scale Exploratory Empirical Study. *Journal of Marketing*, Vol. 69, No. 4, pp. 133-152.

Chaudhuri A. et M. Holbrook (2001). "The chain of effects from brand trust and brand affact to brand performance: the role of brand loyalty", *Journal of Marketing*, Vol. 65, No 2, pp. 81-93.

Consumer Reports WebWatch (2002). "A Matter of Trust: What Users Want from Web Sites". *Research Report prepared by Princeton Survey Research Associates*, Available at http://www.consumerwebwatch.org/webcredibility.cfm

Consumer Reports WebWatch (2005). "Leap of Faith: Using the Internet Despite the Dangers". Res*earch Report prepared by Princeton Survey Research Associates International*. Available at: http://www.consumerwebwatch.org/webcredibility.cfm

Corbitt, B.J., Thanasankit, T. and Yi H. (2003). Trust and E-Commerce: A Study of Consumer Perceptions. *Electronic Commerce Research and Applications*, 2, pp. 203-215.

Divard R. and Urien B. (2001). *The Consumer Lives in a Colored World*, Recherche et Applications en Marketing, 3-24.

eMarketer (2006). "*Online Privacy and Security: The Fear Factor*". Available at : http://www.emarketer.com/Report.aspx?privacy_re tail_apr06

eMarketer (2008). "*US Consumers Wary of Online Payments*". Available at: http://www.emarketer.com/SiteSearch.aspx?arg=tr ust&src=search_go_welcome

Dayal, S., Landesberg, H., and Zeisser, M. (2001). "*Building trust online*". McKinsey Quarterly (October). Available at: www.mckinseyquarterly.com/ab_g.asp?ar=1138.

Divard R. and Urien B. (2001), Le consumer vit dans un monde en colors, Recherche and Applications en Marketing, 3-24.

Flavián, C., Casaló, L. and Guinalíu, M. (2006). The Role Played by Perceived Usability, Satisfaction and Consumer Trust on Website Loyalty. *Information and Management*, No. 43, pp. 1-14.

Gefen, D., Karahanna, E. and Straub, D. W. (2003). Trust and TAM in Online Shopping: An Integrated Model. *MIS Quarterly*, Vol. 27, No. 1, pp. 51-90.

Gorn G., Chattopadhyay A., Sengupta J. and Tripathi S. (2004). Waiting for the web : how sreen color affects time perception, *Journal of Marketing Research*, XLI, May, 215-225.

Grabner-Kraeuter S. and Kaluscha, E., (2003). Empirical Research in On-line Trust: A Review and Critical Assessment. *International Journal of Human-Computer Studies*, 58, pp. 783-812.

Hall R.H. and Hanna P. (2004). The Impact of Web Page Text-Background Color Combinations on Readability, Retention, Aesthetics, and Behavioral Intention, *Behavior and Information Technology*, 23(3). 183-195.

Hill A. and Scharff L. V. (1997). Readability of websites with various foreground/background color combinations, font types and word styles, *Proceedings of 11th National Conference in Undergraduate Research*, 2, 742-746.

Hampton-Sosa, W. and Koufaris, M. (2005). The Effect of Web Site Perceptions on Initial Trust in the Owner Company. *International Journal of Electronic Commerce*, Vol. 10, No. 1, pp. 55-81.

Hoffman, D.L., Novak, T.P. & Peralta, M. (1999). "Building Consumer Trust Online", *Communications of the ACM*, 42 (4). 80-85.

Itten J. (1970). *The elements of Color*, New York, Van Nostrand Reinhold Company.

Kim, E. and Tadisina, S. (2005). Factors Impacting Customers' Initial Trust in E-Business: An Empirical Study. In *Proceedings on the 38th Hawaii International Conference on System Sciences*, January 3-6, Waikoloa, Hawaii.

Kiritani Y. and Shirai S. (2003). Effects of background colors on user's experience in reading website, *Journal of the Asian Design International Conference*, Academic Journal, 1, 64.

Koufaris, M. and Hampton-Sosa, W. (2004). "The Development of Initial Trust in an Online Company by New Customers", *Information & Management*, 41, pp. 377-397.
Kuan, H.-H. and Bock, G.-W. (2007). "Trust Transference in Brick and Click Retailers: An Investigation of the Before-Online-Visit Phase", *Information & Management*, 44, pp. 175-187.
Lemoine J.-F. (2008). *"L'influence de l'atmosphère des sites web marchands sur les réponses des internautes"*, 24ème congrès international de l'association française du marketing, Paris, 15 et 16 mai 2008, CDRom.
McKnight, D.H. and Chervany, N.L., (2001-2002). "What Trust Means in E-Commerce Customer Relationships: A Interdisciplinary Conceptual Typology", *International Journal of Electronic Commerce*, Vol. 6, No. 2, pp. 35-59.
McKnight, D. H., Choudhury, V. and Kacmar, C. (2002). "The Impact of Initial Consumer Trust on Intentions to Transact with a Web Site: A Trust Building Model", *Journal of Strategic Information Systems*, Vol. 11, pp. 297-323.
McKnight, D. H., Kacmar, C. and Choudhury, V., (2004). Shifting Factors and the Ineffectiveness of Third Party Assurance Seals: A Two-Stage Model of Initial Trust in a Web Business. Electronic Markets, Vol. 14, No. 3, pp. 252-266.
Mehrabian A. and Russell J. A. (1974). *An Approach to Environmental Psychology*, Cambridge, Mass, MIT Press.
Nielsen J. (2000). *Designing Web Usability*, Indianapolis, Indiana, New Riders Publishers.
Papadopoulou, P. (2007). *Applying virtual reality for trust-building e-commerce environments*, Virtual Reality, Volume 11, Numbers 2-3, June 2007 , pp. 107-127(21)
Pelet J.-E. (2008). *Effects of the color of e-commerce websites on the memorization and on the intention of purchase of the Net surfer*, June, Thesis in Management, Nantes University, France
Rousseau, D. M., Sitkin, S. B., Burt, R., and Camerer, C. (1998). *Not so different after all: A cross-disciplinary view of trust*. Academy of Management Review, 23, 1-12.
Roy, M., Dewit, O. and Aubert, B. (2001). "The Impact of Interface Usability on Trust in Web Retailers", *Internet Research*: Electronic Networking Applications and Policy, Vol. 11, No. 5, pp. 388-398.
Sultan F, Urban, G, Shankar, V, Bart, I (2002). Determinants and role of trust in e-business: a large scale empirical study. *Working paper* 4282–02, Sloan School of Management, MIT, Cambridge
Torkzadeh, G. and Dhillon, G. (2002). "Measuring Factors that Influence Success of Internet Commerce", *Information Systems Research*, Vol. 13, No. 2, pp. 187-204.
Trouvé A. (1999). *La mesure de la couleur*, Paris, CETIM, éd. Association française de normalisation (AFNOR).