



# E-COMMERCE WEBSITE EVALUATION: A CRITICAL REVIEW

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## ► To cite this version:

| Christophe Bezes. E-COMMERCE WEBSITE EVALUATION: A CRITICAL REVIEW. 2009. <hal-00611008>

**HAL Id: hal-00611008**

**<https://hal.science/hal-00611008v1>**

Preprint submitted on 25 Jul 2011

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**WORKING PAPER**  
**LARGEPA**  
**2009 June - N°2**

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**E-COMMERCE WEBSITE EVALUATION: A CRITICAL REVIEW**

**EVALUATION DES SITES INTERNET COMMERCIAUX : UN ETAT DE L'ART**

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Abstract	Sommaire
<p>On the basis of the study of one hundred publications, this work distinguishes three major website evaluation approaches, analyzing websites as information systems, as communication channels, or as retailing channels.</p> <p>Having looked at the respective advantages and drawbacks of each of the three approaches, a synthetic approach links these three concepts. A more frequent use of cross-concepts, such as media richness as well as virtual affordances and flow could draw these three approaches closer together and give rise to common evaluation indicators.</p>	<p>I. Introduction 2</p> <p>II. Evaluation in terms of information systems 3</p> <p>III. Evaluation in terms of communication channels 7</p> <p>IV. Evaluation in terms of retailing channels 10</p>
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## I. INTRODUCTION

In the history of management science, no topic has been the object of more academic research over such a short time than the Internet. This technology has provided a new interface linking businesses as well as individuals, and spanning many fields, from information systems to marketing, worldwide.

With the proliferation of websites (one hundred fold growth in ten years), academic and empirical research has sought to evaluate the features of e-commerce websites most likely to maximize Internet technology adoption, to attract Internet users, turn them into cyber buyers, encourage customer loyalty, improve service and ultimately increase profits. However, there has been great diversity in the research, with different skills involved (information technology, marketing, communication, etc.), as well as a wide range of websites being analyzed.

The Internet is a field of research that is still evolving, with businesses and customers learning together, and little is known about how to develop commercial websites to maximize profit. (Huizingh, 2000).

This is the reason why this article aims at identifying the different evaluation approaches, highlighting the main contributions of each, in order to recognize the concepts which could develop synergies between all or some of the different approaches.

The literature reviewed includes some hundred research articles, as well as previous synthetic work, some of it (Galan and Sabadie, 2001; Bressolles and Nantel, 2007) organizing website evaluations according to the metrics used (behavioral or attitudinal); while some (Bellaaj, 2005) focus their research on the concept being measured (website quality, success, buyer behavior, electronic system quality, impact of the site on the balance sheet).

Yet website evaluation depends largely on the approach used. It seems desirable therefore, following Reix (2003), to propose a third approach to complement the two mentioned above. This approach stems from the definition of an e-commerce website.

From the first generation of the Internet (EDI: Electronic Data Interchange) to today's Internet opening out onto a worldwide network, with virtually no barriers to entry and connecting suppliers and customers (Huizingh and Hoekstra, 2003), the aims and contents of websites have greatly evolved.

Communication is no longer uni- or bi-directional, and an increasing number of websites today offer online payment and support (Azzone et al., 2001). "Doing on line" tends therefore to replace "being on line" (Griffith et al., 2001), although this is happening at varying speeds depending on the country of origin of the business, its sector, the complexity of products, and the buoyancy of the market (Huizingh, 2000; Zhang et al., 2000).

Described as a “mediated interaction tool designed to implement a marketing strategy, used by an intelligent and motivated player in the buying process” (Reix, 2003), an e-commerce website can therefore be considered concurrently or in turn as “a marketing channel”, a retailing channel, “a servuction system element”, or a medium (Helme-Guizon, 2001). Reix (2003) first identified an initial traditional and commonly used approach evaluating websites within the framework of information systems, focusing on the quality of the interface, then a second approach focusing on customer satisfaction and “considering the website as a type of store”. Having reviewed the literature, a third approach seems appropriate: the website as a communication channel.

As for the website as a servuction element, although it is the subject of an increasing amount of research, it can still fit into the “type of store” category.

Evaluations which approach websites as information systems will be studied first, followed by the other two evaluation approaches, respectively as communication channels and retailing channels, attempting to highlight the conceptual and methodological assets and liabilities of each.

An overall synthetic picture will link the main concepts found in the literature before concluding with a few cross-concepts linking each of these evaluations in order to produce common indicators.

## **II. EVALUATION IN TERMS OF INFORMATION SYSTEMS**

Before being considered as a communication or a retailing channel, each website was examined for its primary function: “to facilitate knowledge acquisition” (Fang and Holsapple, 2007).

With this initial approach, the website is analyzed as a “system of inter-related components working together to identify, capture, organize and transfer knowledge between recipients and providers” (Fang and Holsapple, 2007). In this case, the aim is mostly to analyze the navigation conditions which optimize the rapid adoption of the new technological interface.

The original approach can be subdivided into two different paths, one strictly technical and the other more ergonomic.

### **II.1. PURELY TECHNICAL EVALUATIONS**

Purely technical evaluations focus on Internet technology acceptance conditions for adoption by a maximum number of businesses and end users. To achieve this, evaluations use two constructs emanating from the business world, perceived usefulness of the information received – “the extent to which a person believes that using a particular system would enhance their work performance” (Davis, 1989) – and ease of use – “the extent to which a person believes that

using a particular system would be effortless" (Davis, 1989) – the latter constituting an antecedent of perceived usefulness.

Both constructs stem from the Technology Acceptance Model (Davis, 1989; Davis, Bagozzi and Warshaw, 1989) which states that perceived usefulness (enhanced productivity) and, to a lesser extent perceived ease of use (little effort), determine individual behavior in the use of the technology; increasing ease of use can never compensate for a lesser usefulness of the system (Davis, Bagozzi and Warshaw, 1989; Koufaris, 2002). "Whether technology immediately produces the desired result ... or contributes to it in part" (Reix, 2003), the Technology Acceptance Model is underpinned by intrinsic motives such as enjoyment and satisfaction linked to the activity, as well as search effectiveness (Venkatesh, 1999) or social influence (Venkatesh and Davis, 2000; Gefen and Straub, 2003).

The main limitation to this approach lies in its strong technological determinism, in spite of its definite ability to account for the adoption of the Internet. Technological determinism has at least two consequences. The first concerns data collection methods: researchers observe that by using factual rather than perceptual data as often as possible, they are better able to evaluate the quantity of information – number of visits, page hits – than its quality (Alpar et al., 2001).

The second consequence is more conceptual and lies in the incapacity of technical features to account on their own for the overall success of websites. Although the combination of the two constructs has a direct influence on the intentions to return to the site (Hallegatte and Nantel, 2001) as well as on the intention to purchase, Van der Heijden et al. (2004) think it acts as a necessary but not sufficient condition since it has a negative rather than positive influence on the attitude toward online purchasing. Hence the frequent association of the Technology Acceptance Model and other constructs or models such as: SERVQUAL and transaction costs (Devaraj et al., 2003); enjoyment construct (Igbaria et al., 1996), which Childers et al., (2001) even consider as a predictive element in the attitude to online shopping; website trust as a direct influence on intention to use the website (Gefen et al., 2003) and intention to purchase (Pavlou, 2003; Van der Heijden et al., 2003). Trust indirectly acts as antecedent of the two TAM constructs: perceived information usefulness and ease of use (Pavlou, 2003; Hallegatte and Nantel, 2006).

However, technology acceptance better explains the adoption of the Internet than its uses: Soopramanien and Robertson (2007) have shown that it can be used to distinguish online buyers from non-buyers, but not browsers. Thus, because of its low cost, Mathieson (1991) recommends using TAM to evaluate the overall performance of the system, and Theory of Planned Behavior for the more specific and contextualized aspects.

While this initial approach puts the emphasis on ease of navigation, a significant variable in the lowering of price sensitivity (Lynch and Ariely, 2000), a more functionalistic and ergonomic evaluation method will better take into account the website as a whole, putting more emphasis on content and readability.

## **II.2. PREDOMINANTLY ERGONOMIC AND FUNCTIONALISTIC EVALUATIONS**

Against the purely technical evaluations, the specificity of the second approach lies essentially in its taking into account of subjective perception, both in terms of website content and in terms of design. This perception varies with the expertise, the cognitive skills and the end goal of each Internet user. It enables us to study navigational comfort conditions: readability and page hierarchy so that the user feels like continuing his purchase, and maximizing the extraction of rational or emotional content; page design – easy identification of links, "dividing the page into meaningful units" and frame limitation (Ladwein, 2000) – which with high speed connections now appears as a greater handicap than connection speed; site structure (with an internal search engine or requiring the user to browse, specific and broader search).

Research in this area can be split into two categories. The first concerns the object analyzed and distinguishes content from design. For example, for Huizingh (2000), content includes:

- information content, since the primary objective of the website is to deliver commercial information both on the company and on the product, as well as non-commercial information on sponsored events, location, etc.
- transactional content including ordering and requests for proposals, the size of which is directly related to the size of the website
- entertainment (jokes, cartoons, pictures, games and video clips).

As for website design, it includes:

- navigation tree – hypertext links – free or imposed in order to influence navigation; it can take the form of hierarchical network structures, the best one of these, according to Huizingh (2000) being "somewhere between a tree and a full network"
- search function, correlated to the size of the site
- protected information, though usually only found in the financial sector.

The second category of research is centered more on an "intermediate construct likely to regroup several factors relevant to the success of the website" (Reix, 2003). Reix distinguishes research centered on the quality of information and that centered on usability, the latter being defined by the International Organization for Standardization (ISO) as the "effectiveness, efficiency and

satisfaction with which a specified set of users can achieve a specified set of tasks in a particular environment". Table 1 gives a synthetic description of research using this approach.

*Table 1 – Synthetic view of predominantly ergonomic evaluations*

<b>Information quality</b>	<i>Katerrattanakul and Siau (1999)</i> - <u>Intrinsic Quality</u> : accuracy of the contents; accurate workable and relevant hyperlinks - <u>Contextual Quality</u> : provision of author's information - <u>Representational Quality</u> : visual settings or typographical features, consistency, vividness and attractiveness - <u>Accessibility</u> : navigational tools provided to locate the right information	<i>Zhang et al. (2000)</i> - <u>Presentation</u> graphics, colors, layout - <u>Navigation</u> quantity and relevance of the links - <u>Quality</u> accuracy of information, ability to attract visitors	<i>Chae et al.(2002)</i> - <u>Connection Quality</u> responsiveness, stability, - <u>Content Quality</u> objectivity, believability, amount - <u>Interaction quality</u> structure, navigation, presentation - <u>Contextual quality</u> timeliness, promptness
<b>Usability</b>	<i>Palmer (2002)</i> - <u>Download Delay</u> - <u>Navigation/Organization</u> - <u>Interactivity</u> - <u>Responsiveness</u> - <u>Information/ Content</u>	<i>Agarwal and Venkatesh (2002)</i> - <u>Content</u> (relevance, media use, depth/breadth, current information) - <u>Ease of Use</u> (goals, structure, feedback) - <u>Promotion</u> - <u>Made-for-the-medium</u> community, personalization, refinement - <u>Emotion</u>	<i>Kim et al. (2002)</i> - <u>Firmness</u> internal stability, external stability - <u>Convenience</u> information gathering, order processing - <u>Delight</u> system interface, communication interface

Having examined research which evaluates websites as information systems, we note that the two approaches that make up this body of research use the paradigm of man/machine interaction (Reix, 2003) as a common denominator. By focusing on the ability of the technological instrument to meet the expectations of Internet users, these approaches present the immense advantage of being applicable to all websites (e-commerce, non-commercial and blogs) and they highlight two major features of the online experience: navigation ease and content quality (Flores and Volle, 2005).

Yet, while complementary, these approaches share the same limitations: a strong technological determinism along with a primary role being given to cognitive, usefulness and ergonomic factors (Reix, 2003), and even to normative factors (Agarwal and Venkatesh's use of the Microsoft Usability Guidelines tool). By focusing on the cognitive costs through objectively measurable features, they tend to overvalue flow or expert opinion statistics. It is the case, for instance, in evaluations obtained from professional webmasters, who in the end say more about their beliefs than about real facts (Liu et al., 2000). Using several data collection methods can sometimes lead to a robustness of measurements, as is the case with the constructs of Palmer (2002).

Moreover, information acquisition is not the sole reason for using the Internet; Korgaonkar and Wolin (1999) have described "social escapism" motivations, socialization and interactive control, as well as economic motivations, transaction-based security and privacy concerns.

The second research approach consisting in evaluating websites as communication channels will enable us to integrate new affective – as opposed to cognitive – dimensions, as well as attitudinal – as opposed to behavioral – dimensions by using existing models for the evaluation of advertising by the traditional media. Although, as Huizingh and Hoekstra (2003) state: "it is tempting to consider all Internet related features as new – as in the new economy for example, we will understand this new phenomenon better by carrying out more systematic studies of the fundamental similarities and differences between the Internet and standard advertising supports".

### **III. EVALUATION IN TERMS OF COMMUNICATION CHANNELS**

The web can be considered and evaluated as a new medium, though closely linked to traditional media. Eighmey (1997) states that, just as traditional TV viewers do, Internet users enjoy being entertained (or stimulated) and informed (quantity, freshness, access to information). Websites may thus be compared to written or televised advertising to the extent that their common aim is to influence consumers (Huizingh and Hoekstra, 2003).

There are, however, some major differences. On the web, the customer is active and decides the terms of his exposure to the message in terms of time and intensity. Thus, web customer value creation might not be measured solely in terms of product or service, but also in how best to engage in and prolong the dialogue, whether informative or entertaining, and this implies packaging an informative or entertaining experience (Huizingh and Hoekstra, 2003). The



entertainment and information aspects, correlated to irritation by Ducoffe (1996), may have an effect on attitudes to web advertising via advertising value. Secondly, there may be differences in the hierarchy of the effects of web advertising compared to that of traditional media (Huizingh and Hoekstra, 2003). In the case of web media, "product knowledge" and "need for cognition" omitted, cognition would come before attention, followed by affection – strongly correlated to "need for cognition", then conation – consistent with reluctance to buy online and correlated with intensity of use.

In this approach of evaluation in terms of communication channels, two themes emerge: the first and major one is based on the concept of Attitude toward the site; the second and more recent one analyses the website in terms of personality.

### **III.1. EVALUATIONS IN TERMS OF ATTITUDE TOWARD THE SITE**

Chen et al. (2002) adapt the concept of Attitude toward the site from the older concept of Attitude toward the ad (Aad), an advertising efficiency measurement defined by Mc Kenzie and Lutz (1989) as "a predisposition to respond in a favorable or unfavorable manner to a particular advertising stimulus during a particular exposure occasion". Aad has an impact on Attitude toward the brand (Ab) and on Purchasing Intentions (PI). In the same manner, Chen and Wells (1999) propose that Attitude toward the website (Aws or Ast) be an indicator for website value.

Until now, research has essentially examined the factors influencing Attitude toward the site. Among the numerous perceptual dimensions found in the literature which contribute positively or negatively to customer website evaluation, Chen and Wells (1999) identified three main factors: "entertainment (fun, exciting, imaginative, entertaining, flashy), informativeness (informative, intelligent, knowledgeable, useful, resourceful, helpful), and organization (messy, cluttered, confusing, irritating)".

The weighting of each factor relevant in the Attitude toward the website varies according to the website's purpose (Chen and Wells, 1999), but also according to the profile (Chen et al., 2002) and experience of the evaluator (Bruner and Kumar, 2000). Nevertheless, although the site need not measure up to all these criteria in order to obtain a good Aws score, it must imperatively be "useful, user-friendly and informative rather than clumsy, messy or confusing" (Chen et al., 2002). Hence the need for web designers to be wary of effects aiming at impressing visitors – or clients – lest they create a negative Aws right from the home page (Singh et al., 2005). On this matter we must remember the "pivotal role" of the home page in fascinating or repulsing Internet users, Attitude

toward the web page (Awp) being as important as Aws according to Singh et al. (2005).

For their part, Chandon and Müller (2007) have explained that 75% of the attitude of a website visitor is accounted for by entertainment, informative content, ease of use and interactivity dimensions. With the advent of web 2.0, the last is particularly useful when comparing the persuasive effect of websites in relation to traditional media or to printed communication material (Belvaux and Labbé-Pinlon, 2007).

Today, this type of research seems to centre more on Aws effects on online purchase intention (Flores and Volle, 2005; Richard, 2005) or on Attitude toward the brand – a positive influence according to Chandon and Müller (2007).

One cannot fail to note that the research mentioned here tends to focus more on Internet advertising (banners, links, etc.) as a new medium shared among several advertisers rather than on the whole web site as a genuine advertising channel entirely controlled by the advertiser. Indeed, these evaluations are often limited to the home page or in an even restrictive manner, to the ads appearing on it. This is all the more regrettable as the advertisers now own one or several brand websites which significantly influence purchase intentions (Flores and Volle, 2005). Hence, as a communication channel entirely controlled by the advertiser, these sites do not seem to have been studied so far except via the concept of personality of the site.

### **III.2. EVALUATIONS IN TERMS OF PERSONALITY OF THE SITE**

Chen and Rodgers (2006) are two of the few researchers to have studied website personality, which they define as "the set of traits encompassing human characteristics and information technology features associated with a website." Although this definition uses the standard terminology of brand personality, the authors nevertheless insist on three points.

First, website personality differs from brand personality by the way in which it is built, notably through the site interface and design. Secondly, they integrate rational elements into it – perceived use and perceived ease of use – as proposed by Davis (1989). Finally, they underline the advantages of modeling website personality on human personality, hence the attempts at designing the site to meet the needs of Internet users or their motivations, whether utilitarian or hedonic. Mediated interaction can sometimes be deemed to be more satisfying than direct human interaction, using the same evaluation criteria (fun, exciting, sociable). But although Childers et al. (2001) suggest increasing pleasure in the goal-directed profiles by using videos demonstrating products, Koufaris et al. (2001) warn against some excesses in sites that try too hard to adapt their interface to the behavior of each et all of their visitors as this

technique seems to improve user performance but not overall satisfaction (Koufaris et al., 2001).

Using a specific evaluation tool for web personality, the Website Personality Scale (WPS), Chen and Rodgers (2006) have demonstrated that alongside the "Intelligent" criteria identified by Davis (1989), the "Fun" criteria – prevalent in research on advertising – plays a determining role compared to traditional functional and rational criteria. Nevertheless the Fun criteria is comparable to the Enjoyment construct already proposed by Igbaria et al. (1996) to amend Davis's TAM model; it can also be compared to the Entertainment construct used by Müller and Chandon (2004) for the Attitude toward the site. Applied to website personality, the "Sophisticated" criterion must be understood differently than when applied to brand personality, since in the latter it conveys concepts of upper-class, aesthetics and refinement while when applied to the former, it is more centered on how knowledgeable, comprehensive and mature the website is.

Therefore, although "a good website is a website that sells well – either directly or by the advertising it does" – Reix (2003), we should note that the contribution from approaches considering websites as media or communication channels deal with information and advertising, but not with direct selling. Thus the first two approaches discussed (in terms of information systems and in terms of communication channels) analyze websites as "an avenue through which information flows travel" (Palmer and Griffith, 1998) and the interactivity makes this medium richer than "the text and graphics of a printed sales brochure or catalog" (Palmer and Griffith, 1998). Information comes before the product, and communication before retailing. This role of websites is dealt with by a third approach.

#### **IV. EVALUATION IN TERMS OF RETAILING CHANNELS**

Today, several motives drive the proliferation of research on websites as retailing channels in their own right.

First, in terms of strategy, the success of e-vendors who survived the Internet bubble is making researchers and practitioners look at this autonomous retailing channel in terms of logistics and relational marketing. Furthermore, adding an Internet channel is highly likely to enhance existing organizations (*net-enhanced organizations* by Straub et al., 2002b).

Secondly, apart from "chore shopping" and "social shopping", all other attitudes which apply to shopping in a store ("leisure shopping", "utilitarian shopping", "salespeople relation shopping") are all present in the Internet mental imagery of people (Bergadaa et al., 2004).

Finally, the new technical potential of websites could enable them "to replace a physical sales environment" (Galan et al., 2001), with a well-designed interface able to make up for the gap between the experience of shopping in a store and virtual shopping (Mahfouz, 2000).

In that case, "web sites must be considered both a marketing communications vehicle as well as a transaction generator" (Wolfenbarger and Gilly, 2001). Evaluations in terms of retailing channels are mostly concerned with "webmosphere" and consumer satisfaction.

#### **IV.1. EVALUATIONS IN TERMS OF "WEBMOSPHERE"**

Extending Kottler's 1973 concept of store atmosphere, Childers et al. (2001) coined the term "webmosphere". Dailey (2004) defined the concept as "as the conscious designing of web environments to create positive effects (e.g., positive affect, positive cognitions, etc.) in users in order to increase favorable consumer responses (e.g. site revisiting, browsing, etc.)."

According to Childers et al., (2001), "webmosphere" includes structural attributes (frames, hyper-text links, pop ups, etc.), media dimensions (graphics, texts, audio, video, etc.) and site layout (organization and grouping of products).

For this research approach, "the design of e-stores plays the same role as the layout of stores" (Liang and Lai, 2002): "it seems reasonable to speculate that the design of e-stores (e.g. appearance and layout of home pages) may affect e-shoppers' perceived psychic costs significantly and thus their propensity to shop at those stores" (Baker et al., 2002).

However, the actual influence of "webmosphere" on consumers remains a source of debate.

For some researchers, the screen is a compulsory passage which reinforces the dominance of "webmosphere" over atmosphere, as is its capacity to show texts, graphics (images, animations, videos) and sound satisfactorily, in order to create genuine "online atmospherics" (Galan and Gonzales, 2001). Thus, three emotional variables (pleasure, arousal, dominance) may equally describe on line and offline behavior (Koufaris et al., 2001). For example it may be that:

- perceived dominance influences intention to return in repeat customers
- being involved in the product brings more pleasure to repeat visitors than the novelty of the site (as for Hoffman and Novak)
- the enjoyment of the experience and perceived dominance (to create customer loyalty) are both important for new customers
- online shopping enjoyment increases with customer product involvement, stimulating challenges, and use of value added search mechanisms

- online shopping enjoyment possibly has little influence on impulse buying for the category of products tested (video rental).

On the other hand, some researchers are much more cautious in their analysis. They observe that several atmospheric factors, such as temperature, smell, and touch, are not yet present on the Internet (Eroglu et al., 2001), and they wonder whether using such tools as videos increases enjoyment or frustration due to download times (Chiders et al., 2001). They do however recognize that e-commerce presents distinctive features – if not advantages – over traditional commerce such as flexibility of time and space, as well as the reduction of the selling environment to the size of the screen.

#### **IV.2. EVALUATIONS IN TERMS OF CUSTOMER E-SATISFACTION**

The aim here is to "propose a construct gathering all the elements which contribute to customer satisfaction in order to confront it with the characteristics of the site" (Madrid and Monnoyer, 2005).

However, as far as satisfaction on the Internet is concerned, customers have multiple objectives. Keeney (1999) has listed nine fundamental ones: "maximizing product quality, minimizing cost, minimizing delivery time, maximizing ease of transaction, minimizing time spent, maximizing confidentiality, maximizing shopping enjoyment, maximizing security, minimizing environmental impact" (Reix, 2003)

According to Keeney (1999), means objectives are minimizing fraud, assuring system security, maximizing access to information, assuring reliable delivery, minimizing misuse of personal information, providing comparison shopping, maximizing product variety and availability, minimizing personal travel, and maximizing ease of use.

These objectives underlie the constructs which influence attitudes and behavior of online consumers, whether for the purchase of goods or services.

In fact, these satisfaction factors are the positive side of the irritation factors described by Helme-Guizon (2002): updating – broken links, impossible download, obsolete information; ease of navigation – structure, readability of menus, cluttered pages; aesthetics; information content; language; products offered; advertising; transfer time; security; forced selling – preformatted answers; competitive value of the website in relation to other forms of selling.

We note that Wan, cited by Liang and Lai (2002), distinguishes the process (promotion, pricing, transaction, services) from values (information, friendship, responsibility, security).

Most of the evaluations in terms of e-satisfaction (table 2) show that the quality of websites is measured by end users following essentially functional criteria

rather than hedonic or social criteria, although these are mentioned in some of the literature (Rolland and Wallet-Wodka, 2003).

Indeed, in the case of online services, Shankar et al. (2003) note that satisfaction is more influenced by content than by interactivity, although the latter is considered by many as being evidence of better dominance, enjoyment and ease of use. Aside from factors such as convenience or security, the structure of the site also seems to play a major role (Song and Zahedi, 2005), and these features of websites appear to be compatible with Palmer's constructs (2002).

Furthermore, ease of access to information may contribute more to satisfaction and loyalty online than offline, hence the need for managers to identify the adequate quantity of information and to build a site enabling access to a specific type of information – rather than to all the information available – in the format chosen by the Internet user, with no graphics for example (Shankar et al., 2003). The graphic quality of sites may not be a factor which is directly taken into account by customers, but indirectly through other items (Rice, 1997). All this could corroborate the theory according to which the website may develop a way of dealing with information that is much more analytical than intuitive, with hedonic aspects coming as extras.

According to Novak, Hoffman and Yung (2000), customer help services are the key criterion to build a "smooth online shopping experience" coming before variety and quality of information, ease of ordering, contact, cancelling, payment, return, as well as delivery speed. This concords with Szymanski and Hise (2000), for whom the correlation between e-satisfaction and other elements of merchandising such as range of goods is not necessarily obvious except that the criteria taken into account as well as the weight they carry vary according to the type of product and risk levels (Lowengart and Tractinsky, 2001; Venkatesh and Agarwal, 2006).

*Table 2 – Synthetic view of e-satisfaction evaluation criteria*

<b>Szymanski and Hise (2000)</b>	<ul style="list-style-type: none"> <li>- <u>Convenience</u></li> <li>- <u>Merchandising</u> (product offerings, product information)</li> <li>- <u>Site design</u> (ambience, organization, ease of navigation, speed of page posting...)</li> <li>- <u>Financial security</u></li> </ul>
<b>Liang and Lai (2002)</b>	<ul style="list-style-type: none"> <li>- <u>Hygiene factors</u>: security, product tracking, service phone, allowing for product returns, consistent style</li> <li>- <u>Motivators</u>: search engine, easy to sign up, shopping carts, order on line, home delivery, multiple payment methods, credit card payment</li> <li>- <u>Media richness factors</u>: product organization, navigational hyperlinks, price comparison, customized information, value-added information, special effects, on-line sales person, auctions</li> </ul>
<b>Shim et al., (2002)</b>	<ul style="list-style-type: none"> <li>- <u>Ready access to customer service and policy</u>: policy, service phone</li> <li>- <u>Amount of customer effort required to access product/service</u>: number of clicks, scroll right</li> </ul>
<b>Torkzadeh and Dillion (2002)</b>	<ul style="list-style-type: none"> <li>- <u>Fundamental objectives</u>: convenience, ecology, vendor-customer relation, product value</li> <li>- <u>Means objectives</u>: online payment, product choice, vendor trust, shopping travel</li> </ul>
<b>Gefen (2002)</b>	<ul style="list-style-type: none"> <li>- <u>Tangible dimensions</u>: website layout</li> <li>- <u>Combined dimension</u> : responsiveness, reliability and assurance</li> <li>- <u>Empathy</u>: customized content, individualized e-mail...</li> </ul>
<b>Mc Kinney et al. (2002)</b>	<ul style="list-style-type: none"> <li>- <u>Five factors relative to the quality of the information</u> (relevance, timeliness, reliability, scope, perceived usefulness)</li> <li>- <u>Four factors relative to the quality of the system</u> (access, usability, navigation, interactivity).</li> </ul>
<b>Song and Zahedi (2005)</b>	<ul style="list-style-type: none"> <li>- <u>Product promotion</u>: price comparison, discounting, product recommendation, gift certificates, new products...</li> <li>- <u>Service information</u>: warranty, sales assistance, security, customer privacy, tracking order...</li> <li>- <u>External interpersonal</u>: product rating, expert and customer comments, forum, sales rank...</li> <li>- <u>Ease of use and navigation</u>: product cancellation, customization, audio and visual content, price information in product listing, uniformity of design formats, no crowded page, not too many clicks from home page to order page...</li> <li>- <u>Purchase facilitation</u>: picture and detailed product description, FAQ, links to other sites, possibility of adaptation of the product, payment and shipping options</li> </ul>

However, although the approach considering the website as a retailing channel in its own right enables the integration of a lot of the previous research, in particular in information systems, one should underline how little work there is on website image, when there is so much on that of physical stores. Such scarcity in the research on e-commerce sites is all the more regrettable as the "location" dimension in all likelihood having a lesser effect on behavior in the virtual world, channel image should therefore play more of a role in websites. But to influence beliefs then buying behavior of Internet users, these characteristics must not only exist but also be perceived (McKinney et al., 2002; Song and Zahedi, 2005).

From a more methodological stand point, although websites can be analyzed in the same way as a store (Volle, 2000; Helme-Guizon, 2001), publications use composite criteria, mixing traditional retail outlet image dimensions with dimensions describing e-satisfaction for instance (Lohse and Spiller, 1998; Van der Heijden and Verhagen, 2004), mostly in order to classify the sites. Further, even studies that are faithful to dimensions identified for store image (Katerrattanakul and Siau, 2003), and which attempted to measure the impact of website image on intention to purchase (Chen and Lee, 2005) do not include "location" and "salespeople" dimensions. Yet, on the Internet, the former could be taken into account by Google's page rank, or by its presence on price comparison sites, and the latter by the possibility of contact by phone, or the performance of an search tool, FAQ or videos giving professional advice.

One could also evaluate the effects of website characteristics not through attitudinal data, but using factual data: "cost savings, expanded markets, incremental additional sales, reduced search costs, time savings" (DeLone and Mclean, 2003).

## **V. POTENTIAL LINKS BETWEEN THESE EVALUATIONS**

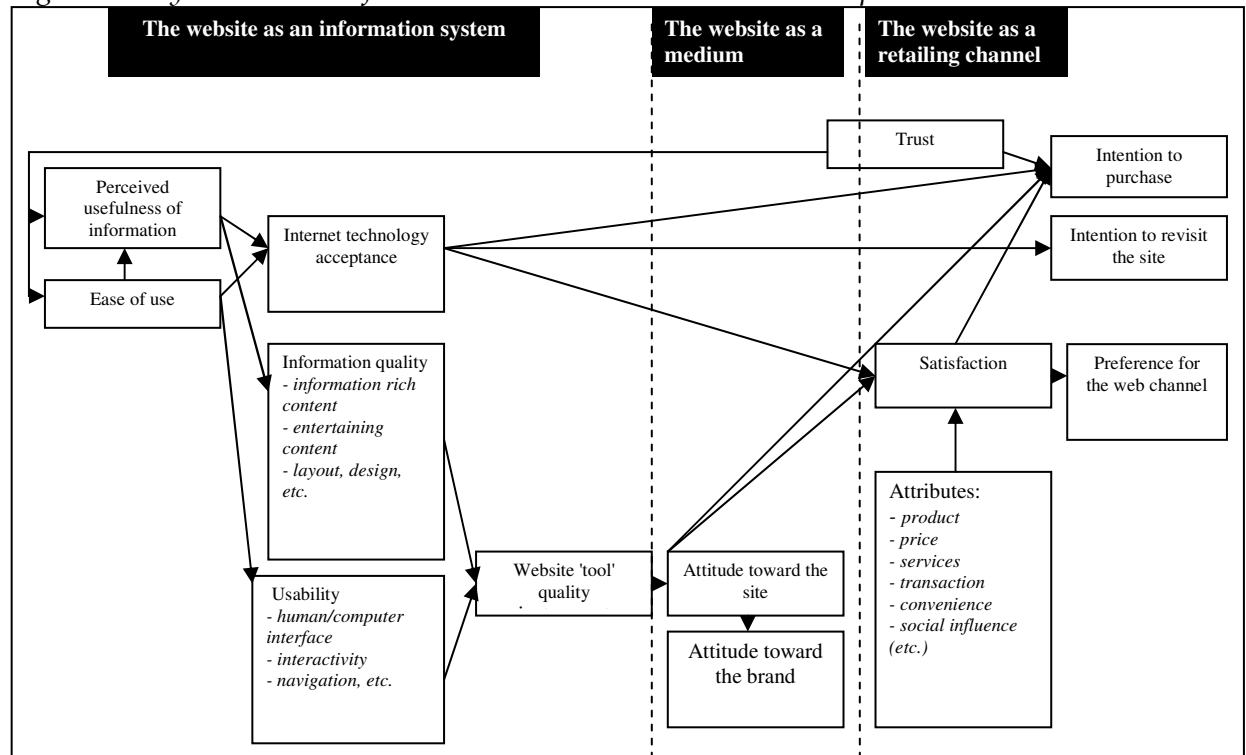
As we have just shown, at present there is no single method to evaluate websites. All depends on the role assigned to the site – information flow, advertising channel, retailing channel – and on the company's strategic choices, for example in terms of channels. The results will then depend on collection mode, whether factual or perceptual, the sites analyzed, real or experimental, the size of the business and how long it has been in the market, the features of the merchandise, as well as its cultural background, profile, degree of experience, utilitarian or hedonic orientation of the customers.

Each method will therefore call on different concepts to describe the phenomena and measure their impact. Even within a single approach, it is difficult therefore to compare the relevance of the evaluations or to evaluate the general influence the whole of these constructs might have on intentions to purchase.



On the basis of the links previous literature has established between the main concepts described above, figure 1 contributes to a convergence of concepts and measurements; it shows the successive layers enabling evaluation of a website in all its technical and commercial dimensions.

Figure 1 – Synthetic view of main website evaluations with conceptual links



Because of their cross-relevance, the theory of media richness as well as those of virtual affordances and of flow could also contribute to bringing together all or some of the different research approaches, thus improving their implementation. We propose to give a brief sketch of the links which have already been established between these concepts and Internet site evaluation.

### V.1. MEDIA RICHNESS

Whether it is video mail, video catalogues, or Web TV, rich media appears today as the easiest and quickest way to make a website stand out and it will soon be a prerequisite.

Although it is always tricky to transpose a theory from one realm – that of organizations and managers – to another – that of markets and customers – and even more so to a new technology which is by nature still unstable in its uses (Reix, 2003; Kalika et al., 2007), nevertheless, the theory of media richness (Daft and Lengel, 1986; Steuer, 1992) deserves to be used more often:

- first because the Internet, as a new medium, has already been the subject of a body of research in an organizational context (Dennis and Kinney, 1998)

- secondly because, ever since Doody and Davidson (1967) published their ground breaking article on e-commerce, the quantity and quality of information available seem to be the main source of differentiation between one website or another and traditional commerce. This added value of the Internet which, by acting on several dimensions (Li et al., 2003), consists in improving decision by "complex, non-linear and non-oriented questions" (Koufaris et al., 2001), could provide an incentive for Internet users to visit and revisit a site (Rice, 1997)
- finally, because the distinction between high task-relevant / low task-relevant information has already permitted to link up intrinsic and extrinsic motivations of Internet users (Eroglu et al., 2001) and model the impact of "webmosphere" on the behavior of cyber-buyers (Richard, 2005).

## **V.2. VIRTUAL AFFORDANCES**

The concept of virtual affordances, defined by Li et al. (2003) as "what a 3D product can offer for the inspection of the consumer" appears equally promising at the dawn of Second Life, to develop new typologies of products adapted to e-commerce, but also to compare the advantages of the Internet medium over those of televised advertising, as much in terms of attitude toward the brand as of purchase intentions, for geometric or mechanical objects, but not for tactile products (Li et al., 2003).

In an Internet environment, visual imagery takes precedence over other types of imagery – mental, aural, tactile, olfactory, taste, and motor-sensorial (Gavard-Perret and Helme-Guizon, 2003; Bergadaa et al., 2004). The capacity to generate these types of affordances in 3D could "compensate for the lack of physical contact" (McKinney et al., 2002) and frustration which is all the stronger as the Internet combines great ease of use with great perceived risk (Koufaris et al., 2001). However, although image seems to beat text as an incentive to buy familiar products, it is less the case for less familiar products (Chau and Au Kar Yan Tam, 2000).

By combining "interactivity, life and mental imagery", the virtual affordances generated by 3D visualizations could even overtake perceived affordances by increasing the "sense of presence" (Li et al., 2003).

## **V.3. FLOW**

The third concept which would enable us better to integrate the different research approaches studied above is flow. This extremely intense quasi-hypnotic state, characterized by the individual being totally absorbed in a task deliberately undertaken along with a loss of consciousness of the surroundings

(Csikszentmihalyi, 1997), was adapted to hypermedia navigation environment by Hoffman and Novak (1996).

Aside from better retention of what the Internet user experiences and sees on the screen (see Attitude toward the website), flow may increase the appeal of the website, reduce sensitivity to price and influence purchasing behavior (Mathwick and Rigdon, 2004).

This concept has given rise to such diverse conceptualizations that it makes definition difficult (Koufaris, 2002): Ilsever et al. (2007) for example, suggested a model in which users' cognitive characteristics (concentration, satisfaction) along with website characteristics (Internet system quality, structure and visibility of content) are antecedents of flow and customer loyalty.

But, so far, the concept of flow has hardly been tested empirically except for Hausman and Siekpe (2008), who have shown its positive impact on intention to purchase and intention to return, and by Agarwal and Karahanna (2000) who integrated flow into the broader concept of cognitive absorption. Although the two tests lead to the same results in terms of final behavior, they are in opposition in the role of flow in attitudes: flow is considered by most writers (including Hausman and Siekpe, 2008) as a consequence of perceived utility and ease of use, while Agarwal and Karahanna (2000) rather see in it an antecedent of the two constructs, when it accompanies the enjoyment construct. Furthermore, the role of flow on impulse purchases has yet to be validated (Koufaris, 2002).

This calls for further experimentation. Yet we can but regret the fact that the concept of flow should today essentially, and sometimes abusively, be used in experiential evaluations in terms of webmosphere. Novak et al. (2003) have retracted their 2000 claim, and suggest that the state of flow is not strictly restricted to autotelic behavior. Two things stem from the above.

On a practical level, web designers should not only try to stimulate experiential behavior in Internet users with spellbinding presentations, they should also seek to create a state of flow in goal-oriented Internet users by respecting their demands for ease of use and navigation (Novak et al., 2000; Huizingh and Hoekstra, 2003). Thus, in matters of e-satisfaction, Koufaris et al. (2001) insist on the capacity of the website to implement functionalities reinforcing as much feelings of perceived dominance (goal-centered behavior) as feelings of pleasure (experiential enjoyment) in order to increase the rate of revisits.

On a theoretical level, the research, which tends to relativize or even reject the role of experiential criteria in the context of online purchasing (e.g. Zeithaml et al., 2002), cannot reject the role of flow at the same time, on the pretext that it may only be experiential. In this regard, taking into account the two cognitive and affective psychological paths (Filser, 2001), which guide online visits and purchases, would enable us better to adjust the determining characteristics of

websites. According to Huffman and Houston (1993), goal-centered individuals seem more "capable of concentrating and learning efficiently than those who have no goal, or have several".

## **VI. CONCLUSION, CONTRIBUTIONS AND LIMITATIONS**

Our attempt at establishing a critical review cannot claim to be exhaustive, and its main objective is to accelerate, or at least to facilitate sedimentation of research on e-commerce website evaluation. Hence the purpose of the suggested classification is not purely academic in that it does not aim at compartmentalizing new research into an existing trend; on the contrary, it is meant to encourage cross-fertilization between these different evaluation approaches.

We have seen that e-commerce websites were first analyzed as information systems. With the emphasis mainly on the conditions of adoption of the technology and on the ergonomics of the site, this approach dipped in heavily objectively measurable behavioral data as well as expert opinions, running the risk of giving too prominent a place to normative and cognitive aspects.

Often neglected or diluted by literature reviews, a second approach evaluated websites as a distribution and advertising channel, introducing new affective dimensions and adapting the measurements of attitude toward advertising to this new medium; the significant growth of brand websites should, in all logic, take this research well beyond a simple evaluation of website personality.

Finally, a third and last approach, which is becoming increasingly prevalent as more businesses join online selling, evaluates e-commerce websites as retailing channels, measuring e-satisfaction and "webmosphere" while website image and online experience evaluations are still rare.

### **VI.1. CONTRIBUTIONS AND AREAS FOR FUTURE RESEARCH**

With this panorama which we hope was representative of the research carried out in the last ten years, our contribution is essentially theoretical. As the Internet matures, our work seeks to encourage research to set up build between the different approaches we have identified. This can be done by testing the relationship between existing concepts, as we started to sketch in Figure 1, but also by defining some common indicators to the different approaches in order to construct, then test, a global model. Increasing use of pluridisciplinary concepts such as media richness, flow and virtual affordances could greatly contribute to achieving this.

From a managerial point of view, this synthesis shows businesses with e-commerce websites or brand websites that they would do well to integrate the specific dimensions of their activity into their evaluations. Too many e-commerce websites are still evaluated by means of conventional technical

criteria of ergonomics and usability (graphic identity, visual paths, ease of navigation...), and this leads to ignoring or even erasing competitive differences.

## **VI.2. LIMITATIONS**

As a critical review, our research has three main limitations. The first one resides in the number of articles studied, the second in the proposed classification, and the third one stems from our initial challenge, which consisted in summarizing the main website evaluations as well as their conceptual links already tested in the literature, without proposing a global conceptual model to be tested.

## REFERENCES

- Agarwal R., Karahanna E. 2000. Time flies when you're having fun: cognitive absorption and beliefs about information technology usage, *MIS Quarterly*, **24**(4) 665-694.
- Agarwal R., Venkatesh V. 2002. Assessing a firm's web presence: a heuristic evaluation procedure for the measurement of usability, *Information Systems Research*, **13**(2) 168-186.
- Alpar P., Porembski M., Pickerodt S. 2001. Measuring the efficiency of web site traffic generation, *International Journal of Electronic Commerce*, **6**(1) 53-74.
- Azzone G., Bianchi R., Noci G. 2001. Corporate websites: the drivers of their different configurations, *Electronic Markets*, **11**(2) 126-138.
- Baker J., Parasuraman A., Grewal D, Voss G. 2002. The influence of multiple store environment cues on perceived merchandise value and patronage intentions, *Journal of Marketing*, **66** 120-141.
- Bellaaj M. 2005. Evaluation de l'impact de l'utilisation d'un site web commercial: une revue critique de la littérature, *Actes du colloque de la 1ère conférence du E-business*, Hammamet Tunisie, 316-328.
- Bergadaa M., Coraux G. 2004. L'attitude à l'égard d'Internet, du shopping et le comportement des internautes, *Cahier des recherches 2004.04 Université de Genève*, 1-44.
- Belvaux B., Labbé-Pinlon B. 2007. Les effets persuasifs de la recherche d'information pré-achat par Internet, *22ème Congrès de l'Association Française du Marketing*, Nantes, 1-25.
- Bressolles G., Nantel J. 2007. Vers une typologie des sites web destinés aux consommateurs, *Revue Française de Marketing*, **213**(3/5) 41-55.
- Bruner II G., Kumar A. 2000. Web commercials and advertising hierarchy-of-effects, *Journal of Marketing Research*, January, 35-42.
- Chae M, Kim J., Kim H., Ryu H. 2002. Information quality for mobile internet services: a theoretical model with empirical validation, *Electronic Markets*, **12**(1) 38-46.
- Chandon J-L., Müller B. 2007. Qualité du site web, attitude envers le site et attitude envers la marque: rôle modérateur de la familiarité avec la marque, *Actes du colloque des 12èmes Journées de Recherche en Marketing de Bourgogne*, 56-72.
- Chau P., Au Kar Yah Tam G. 2000. Impact of information presentation modes on online shopping: an empirical evaluation of a broadband interactive shopping service, *Journal of Organizational Computing & Electronic Commerce*, **10**(1) 1-22.
- Chen W-J., Lee C. 2005. The impact of web site image and consumer personality on consumer behavior, *International Journal of Management*, **22**(3) 484-496.
- Chen Q., Rodgers S. 2006. Development of an instrument to measure web site personality, *Journal of Interactive Advertising*, **7**(1) 47-64.
- Chen Q., Wells W. 1999. Attitude toward the site, *Journal of Advertising Research*, September-October, 27-37.

- Chen Q., Clifford S., Wells W. 2002. Attitude toward the site II: new information, *Journal of Advertising Research*, March-April, 33-45.
- Childers T., Carr C., Peck J., Carson S. 2001. Hedonic and utilitarian motivations for online retail shopping behavior, *Journal of Retailing*, **77** 511-535.
- Csikszentmihalyi M., 1997. Finding flow, *Psychology Today*, July-August, **30**(4) 46-71.
- Daft R., Lengel R. 1986. Organizational information requirements, media richness and structural design, *Management Science*, **32** (5) 554-571.
- Dailey L. 2004. Navigational web atmospherics: explaining the influence of restrictive navigation cues, *Journal of Business Research*, **57** 795-803.
- Davis F. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology, *Mis Quarterly*, September, 319-340.
- Davis F., Bagozzi R., Warshaw P. 1989. User acceptance of computer technology: a comparison of two theoretical models, *Management Science*, **35**(8) 982-1003.
- DeLone W., McLean E. 2004. The DeLone and McLEAN Model of Information Systems Success: a ten-year update, *Journal of Management Information Systems*, **19**(4) 9-30.
- Dennis A., Kinney S. 1998. Testing media richness theory in the new media: the effects of cues, feedback and task equivocality, *Information Systems Research*, **9**(3) 256-274.
- Devaraj S, Fan M., Kohli R. 2002. Antecedents of B2C channel satisfaction and preference: validating e-commerce metrics, *Information Systems Research*, **13**(3) 316-332.
- Doody A., Davidson W. 1967. Next revolution in retailing, *Harvard Business Review*, May-June, 4-188.
- Ducoffe R. 1996. Advertising value and advertising on the web, *Journal of Advertising Research*, September-October, 21-35.
- Eighmey J. 1997. Profiling user responses to commercial web sites, *Journal of Advertising Research*, May-June, 59-66.
- Eroglu S., Machleit K., Davis L. 2001. Atmospheric qualities of online retailing: a conceptual model and implications, *Journal of Business Research*, **54** 177-184.
- Fang X., Holsapple C. 2007. An empirical study of web site navigation structures' impacts on web site usability, *Decision Support Systems*, **43** 476-491.
- Filser M. 2001. Commerce en magasin et e-commerce: les apports des modèles de choix du point de vente, *4ème Colloque Etienne Thil*, La Rochelle, 1-21.
- Flores L., Volle P 2005. Potentiel relationnel et impact du site de marque sur la performance marketing, *Décisions Marketing*, **40** 39-50.

- Galan J-P., Gonzalez C. 2001. Un cadre théorique de l'impact des éléments de conception du site web sur les réponses des consommateurs, *Cahier Centre de Recherche DMSP*, **293** 1-12.
- Galan J-P., Sabadie W. 2001. Evaluation du site Web: une approche par l'expérience de service, *17ème Congrès International de l'Association Française de Marketing*, Deauville, 1-26.
- Gavard-Perret M-L., Helme-Guizon A. 2003. L'imagerie mentale: un concept à (re)découvrir pour ses apports en marketing, *Recherche et Applications en Marketing*, **18**(4) 59-74.
- Gefen D. 2002. Customer loyalty in E-commerce, *Journal of the Association for I.S.*, **3** 27-51.
- Gefen D., Straub D. 2003. Managing user trust in B2C e-services, *E-Service Journal*, **2**(2) 7-18.
- Gefen D., Karahanna E., Straub D. 2003. Trust and TAM in online shopping: an integrated model, *Mis Quarterly*, **27**(1) 51-90.
- Griffith D., Krampf R., Palmer J. 2001. The role of interface in electronic commerce: consumer involvement with print versus on-line catalogs, *International Journal of Electronic Commerce*, **5**(4) 135-153.
- Hallegatte D., Nantel J. 2006. The intertwined effect of perceived usefulness, perceived ease of use and trust in a website on the intention to return, *The E-Business Review*, **6** 1-5.
- Hausman A., Siekpe J. 2008. The effect of web interface features on consumer online purchase intentions, *Journal of Business Research*, In Press, Corrected Proof, Available online 4 March 2008, 1-9.
- Helme-Guizon A. 2001. Le comportement du consommateur sur un site marchand est-il fondamentalement différent de son comportement en magasin? Proposition d'un cadre d'appréhension de ses spécificités, *Recherche et Applications en Marketing*, **16**(3) 25-38.
- Helme-Guizon A. 2002. Sources et conséquences de l'irritation ressentie au cours de la navigation sur un site marchand: une étude exploratoire, *Cahier de Recherche du CERAG, Série Recherche*, 2002-09, 1-25.
- Hoffman D., Novak T. 1996. Marketing in hypermedia computer-mediated environments: conceptual foundations, *Journal of Marketing*, **60** 50-68.
- Huizingh E. 2000. The content and design of web sites: an empirical study. *Information & Management*, **37**(3) 123– 34.
- Huizingh E., Hoekstra J. 2003. Why do consumers like websites?, *Journal of Targeting, Measurement and Analysis for Marketing*, **11**(4) 350-361.
- Huffman C., Houston M. 1993. Goal-oriented experiences and the development of knowledge, *Journal of Consumer Research*, **20** 190-207.
- Igbaria M., Parasuraman S., Baroudi J. 1996. A motivational model of microcomputer usage, *Journal of Management Information Systems*, **13**(1) 127-143.
- Ilsever J., Cyr D., Parent M. 2007. Extending models of flow and e-loyalty, *Journal of Information Science and Technology*, **3**(4) 1-15.



- Kalika M., Boukef Charki N., Isaac H. 2007. La théorie du millefeuille: de la non-substitution entre communications électroniques et face à face, *Revue Française de Gestion*, **172** 117- 129.
- Katterattanakul P., Siau K. 1999. Measuring information quality of Web sites: development of an instrument, *Proceedings of the 20th I.C.I.S*, Charlotte, 279-285.
- Katterattanakul P., Siau K. 20003. Creating a virtual store image, *Communications of the ACM*, **46**(12) 226-232.
- Keeney R. 1999. The value of internet commerce to the customer. *Management Science*, **45**(4) 533-542.
- Kim J., Lee J., Han K., Lee M. 2002. Business as buildings: metrics for architectural quality of internet business. *Information Systems Research*, **13**(3) 239-254.
- Korgaonkar P., Wolin L. 1999. A Multivariate Analysis of Web Usage, *Journal of Advertising Research*, March-April **39**(2) 53-68.
- Kotler P. 1973. Atmospherics as a marketing tool, *Journal of Retailing*, **49**(4) 48-64.
- Koufaris M., Kambil A., LaBarbera P. 2001. Consumer behavior in web-based commerce: an empirical study, *International Journal of Electronic Commerce*, **6**(2) 115-138.
- Koufaris M. 2002. Applying the Technology Acceptance Model and flow theory to online consumer behavior, *Information Systems Research*, **13**(2) 205-223.
- Ladwein R. 2000. Le web design et l'ergonomie des sites de e-commerce: vers l'élaboration d'un modèle, *actes du colloque « Le tendenze del marketing in Europa » de l'Universita Ca'Foscari Venezia*, 1-17.
- Li H., Daugherty T., Biocca F. 2003. The role of virtual experience in consumer learning, *Journal of Consumer Psychology*, **13**(4) 395-407.
- Liang T-P., Lai H-J. 2002. Effect of store design on consumer purchases: an empirical study of on-line bookstores, *Information & Management*, **39** 431-444.
- Liu C., Arnett K., Litecky C. 2000, Design quality of websites for electronic commerce: fortune 1000 webmasters' evaluations, *Electronic Markets*, **10**(2) 120-129.
- Lohse G., Spiller P. 1998. Electronic Shopping, *Communications of the Association for Computing Machinery*, **41**(7) 81-87.
- Lowengart O., Tractinsky N. 2001. Differential effects of product category on shoppers' selection of web-based stores: a probabilistic modeling approach, *Journal of Electronic Commerce Research*, **2**(4) 142- 156.
- Lynch J., Ariely D. 2000. Wine online: search costs affect competition on price, quality, and distribution, *Marketing Science*, **19**(1) 83-103.
- MacKenzie S., Lutz R. 1989. An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretesting context, *Journal of Marketing*, **53** 48-65.

- Madrid C., Monnoyer M-C. 2005. Vers un outil d'évaluation de l'intégration du site Internet marchand dans la stratégie et l'organisation de l'entreprise, *P.U.S.S Mesure(s) n° 12, collection Histoire, Gestion, Organisation*, 1-20.
- Mahfouz A. 2000. Web site interface design: external and internal factors, <http://www.ifs.unilinz.ac.at/ifs/staff/reich/ohs6/docs/pp/mahfouz/mahfouz.pdf>, 1-9.
- Mahfouz A. 2004. Interactive experiential ecommerce: an experimental study, *Proceedings of the 7th Annual Conference of the Southern Association for Information Systems*, 291-295.
- Mathieson K. 1991. Predicting user intentions: comparing the Technology Acceptance Model with the Theory of Planned Behavior, *Information Systems Research*, **2**(3) 173-191.
- Mathwick C., Rigdon E. 2004. Pay, flow and the online search experience, *Journal of Consumer Research*, **31**(2) 324-331.
- McKinney V., Yoon K., Zahedi F. 2002. The measurement of Web-customer satisfaction: an expectation and disconfirmation approach, *Information Systems Research*, **13**(3) 296-315.
- Müller B., Chandon J-L. 2004. The impact of a World Wide Web site visit on brand image in the motor vehicle and mobile telephone industries, *Journal of Marketing Communication*, **10** 153-165.
- Novak T., Hoffman D., Duhachek A. 2003. The influence of goal directed and experiential activities on online flow experience, *Journal of Consumer Psychology*, **13**(1/2) 3-16.
- Novak T., Hoffman D., Yung Y-F. 2000. Measuring the customer experience in online environments: a structural modeling approach, *Marketing Science*, **19**(1) 22-42.
- Palmer J., Griffith D. 1998. Information intensity: a paradigm for understanding web site design, *Journal of Marketing*, Summer, 38-42.
- Palmer J. 2002. Web site usability, design and performance metrics, *Information Systems Research*, **13**(2) 151-167.
- Pavlou P. 2003. Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance, *International Journal of Electronic Commerce*, **7**(3) 101-134.
- Reix R. 2003. Evaluation des sites Web: nouvelles pratiques, anciennes théories, *8ème colloque de l'AIM Grenoble 23 et 24 mai*, 1-12.
- Rice M. 1997. What makes users revisit a Web site? *Marketing News*, **31**(6) 12.
- Richard M-O. 2005. Modeling the impact of internet atmospherics on surfer behavior, *Journal of Business Research*, **58** 1632-1642.
- Rolland S., Wallet-Wodka D. 2003. La qualité des sites web marchands en distribution: proposition d'une échelle de mesure e-qual, *Actes du 6ème colloque Etienne Thil*, 1-21.
- Shankar V., Smith A., Rangaswamy A. 2003. Customer satisfaction and loyalty in online and offline environments, *Research in Marketing*, **20** 153-175.

- Shim J., Shin Y., Nottingham L. 2002. Retailer web site influence on customer shopping: an exploratory study on key factors of customer satisfaction, *Journal of the Association for Information Systems*, **3** 53-76.
- Singh S., Dalal N., Mihsra S., Patil V. 2005. A communication view of web page perception, *Journal of Current Issues and Research in Advertising* , **27**(1) 31-52.
- Song J., Zahedi F. 2005. A theoretical approach to web design in e-commerce: a belief reinforcement model, *Management Science*, **51**(8) 1219-1235.
- Soopramanien D., Robertson A. 2007. Adoption and usage of online shopping: An empirical analysis of the characteristics of "buyers", "browsers" and "non-internet shoppers", *Journal of Retailing & Consumer Services*, **14**(1) 73-82.
- Steuer J. 1992. Defining virtual reality: dimensions determining telepresence, *Journal of Communication*, 73-93.
- Straub D., Hoffman D., Weber B., Steinfield C. 2002a. Measuring e-commerce in net-enabled organizations: an introduction to the special issue, *Information Systems Research*, **13**(2) 115-124.
- Straub D., Hoffman D., Weber B., Steinfield C. 2002b. Toward new metrics for net-enhanced organizations, *Information Systems Research*, **13**(13) 227-238.
- Szymanski D., Hise R. 2000. E-satisfaction: an initial examination, *Journal of Retailing*, **76**(3) 309-322.
- Torkzadeh G., Dhillon G 2002. Measuring factors that influence the success of internet commerce, *Information Systems Research*, **13**(2) 187-204.
- Van der Heijden H., Verhagen T., Creemers M. 2003. Understanding online purchase intentions: contribution from technology and trust perspectives, *European Journal of Information Systems*, **12** 41-48.
- Van der Heijden H., Verhagen T. 2004, Online store image: conceptual foundations and empirical measurement, *Information & Management*, **41** 609-617.
- Venkatesh V. 1999. Creation of favourable user perceptions: exploring the role of intrinsic motivation, *MIS Quarterly*, **23**(2) 239-260.
- Venkatesh V., Davis F. 2000. A theoretical extension of the technology acceptance model: four longitudinal field studies, *Management Science*, **46**(2) 186-204.
- Venkatesh V., Agarwal R. 2006. Turning visitors into customers: a usability-centric perspective on purchase behavior in electronic channels, *Management Science*, **52**(3) 367-382.
- Volle P. 2000. Du marketing des points de vente à celui des sites marchands: spécificités, opportunités and questions de recherche, *Revue Française du Marketing*, **177/178** 83-100.
- Wolfenbarger M., Gilly M. 2001. Shopping online for freedom, dominance and fun, *California Management Review*, **4**(2) 34-55.

Zeithaml V., Parasuraman A., Malhotra A. 2002. Service quality delivery through web sites: a critical review of extant knowledge, *Academy of Marketing Science Journal*, **30**(4) 362-375.

Zhang X., Keeling K., Pavur R. 2000. Information Quality of commercial Web site home pages: an explorative analysis, *Proceedings of the 21th ICIS*, Brisbane, 164-1