Functional online store attributes: towards a classification of CDSS content

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1. Introduction

The relationships between online stores and consumer decision-making have received substantial attention in the literature. Various authors have discussed the impact of online stores on consumer purchase behavior (e.g. Hoffman, Novak and Chatterjee, 1995; Alba et al., 1997). Most of this research has been rather anecdotal in nature, mainly considering online stores as fruitful tools for commercial purposes like advertising, distribution and one-to-one marketing. Others have started to explore the relationships between online store characteristics and consumer purchasing empirically. Attention has been paid to the impact of perceived online store characteristics like trust, perceived risk, perceived privacy (e.g. Jarvenpaa, Tractinsky and Vitale, 2001; Pavlou, 2001), ease-of-use and usefulness (Moon and Kim, 2001) on attitudes towards purchasing and behavioral intentions.

From another point of view, researchers have started to consider the online store as 'instrument' to support consumers through their online decision processes. In this context, the online store is also referred to as customer decision support system or CDSS (O’Keefe and McEachern, 1998). From a CDSS perspective, online stores are used to guide and support customers through the stages of the online decision making process. As CDSS, online stores are expected to have a substantial effect on consumer purchase behavior. Building upon this statement, a few researchers have considered online store functions and features that can be applied to support the different stages of the consumer decision process (e.g. O’Keefe and McEachern, 1998; Liang and Lai, 2002). This resulted in several preliminary classifications of CDSS functions and features. The overviews are used to discuss the potentials of CDSS’s and function as starting point for empirical explorations.

The overviews can be seen as a contribution as is. However they contain two drawbacks. First, as mentioned above, the overviews available today are rather preliminary. They lack substantial theoretical or empirical underpinnings. Most of the included functions and features are based on observation. Although an useful step towards the development of a classification, more research is required. Second, the emphasis of the overviews in the literature has been on various forms of IT. We acknowledge IT forms the heart of any online store, and of CDSS’s in particular. However, online stores do contain many characteristics similar to traditional shopping systems. Most of these characteristics are non-technological. We believe a classification of online CDSS functions and features should encompass both traditional and IT related functions.

This paper can be seen as an attempt to contribute to the field of online CDSS’s. Based upon a literature study we will introduce a classification of CDSS content. For reasons mentioned above, our research will not be limited to ecommerce and IS literature. Retail literature will be part of our exploration as well. Building upon the CDSS content classification we will discuss key research
questions and possible metrics for further research. The derived insights aim to add to the context of online store theory in general, and provide a guideline for e-commerce practitioners.

The structure of this paper is as follows. In section two, we will provide a brief overview of research focusing on the relationships between online stores and consumer purchase behavior. The overview will be used to position our research. In section three we will discuss the online store as CDSS. Next, in section four we report on a theoretical study and introduce a classification of CDSS content. In section five, we conclude with a discussion of future key research questions and metrics.
2. Online store research: an overview

The relationships between online store characteristics and consumer decision-making are starting to be explored. In the literature two research perspectives can be identified: the technology-centered view and the consumer-oriented view (Jarvenpaa and Todd, 1996; Chen, Gillenson, and Sherel, 2002).

The technology-oriented view focuses on the relationships between observable, usually IT related, online store specifications and consumer purchasing. The observable store characteristics are also known as \textit{functional online store attributes}, a term derived from store image research in the 1960’s and 1970’s. Store image is the overall impression of a retail store. It is the way in which the store is defined in the shopper’s mind, partly by its functional attributes and partly by an aura of psychological attributes (Martineau, 1958). Functional store attributes refer to tangible aspects and physical properties like merchandise selection, price ranges, store layout, enough sales help, credit policies, speedy checkouts and quick/easy repairs (Lindquist, 1974; Oxenfeldt, 1974). Functional store attributes can be more or less objectively compared with those of competitors (Lindquist, 1974, p.30). Derived from research in traditional settings, functional store attributes are characterized for virtual settings as well (cf. Lohse and Spiller, 1999). Functional online store attributes are the observable online store properties that replace the tangible store attributes of physical outlets. They include system features like customer information bases, payment systems and reference libraries (Lang and Whinston, 1999), usability (Nielsen, 2002), accessibility (Wells, Fuerst and Choobineh, 1999), navigation (Lohse and Spiller, 1999) and security and privacy measures (Ranganathan and Ganapathy, 2002). Roughly, functional online store attributes can be differentiated in online store content and online store design. Content concerns the information, features, or services that are offered whereas design refers to the way the content is made available for Web visitors (Huizingh, 2000, p.123).

In contrast to the technology-oriented view, the emphasis of consumer-oriented research is on \textit{psychological online store attributes}. In a traditional shopping context, psychological store attributes refer to intangible store characteristics like helpfulness, cleanliness, friendliness and trust (Oxenfeldt, 1974). They form the subjectively judged image of the store (Mazursky and Jacoby, 1986). Although aspects like cleanliness are restricted to physical stores, many psychological store attributes apply for an online setting as well. These psychological online store attributes receive increasing attention within consumer-oriented online store research. Several authors have explored the relationships between psychological online store attributes and online decision-making behavior. Psychological online store attributes that have been examined include perceptions of trust (Jarvenpaa, et al., 2000; Pavlou, 2001), ease-of-use, usefulness (Moon and Kim, 2001), perceived risk (Jarvenpaa et al., 2000)
and satisfaction (Szymanski and Hise, 2000). Usually, these perceptions have been related to constructs like attitudes, customer preference, behavioral intentions and overt behavior.

Both perspectives and their most important characteristics are summarized in the table below.

<table>
<thead>
<tr>
<th>Research perspective</th>
<th>Focus</th>
<th>Aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Oriented Research</td>
<td>Functional online store attributes/ objective</td>
<td>Online store content</td>
</tr>
<tr>
<td>Consumer Oriented Research</td>
<td>Psychological online store attributes / subjective</td>
<td>Trust, quality, reputation, risk</td>
</tr>
</tbody>
</table>

In this paper, we build upon the concept of functional online store attributes to construct a classification of CDSS content. This is not to say that design is not important or irrelevant. Confining ourselves to content merely reflects our interests. We believe studying content as functional online store attribute will provide some interesting results that are likely to add to the existing body of knowledge.
3. The online store as CDSS

Since the rise of the World Wide Web as medium for consumer purchasing, increasing attention has been paid to online stores’ ability to support the process consumers go through to purchase a product. In the literature this process is known as the consumer decision process. The consumer decision process is “a problem solving activity in which consumers move through a series of stages in order to solve a problem” (Mowen, 1988, p.16). While going through these stages consumers engage in rational problem solving behavior. Although other perspectives to study consumer decision making exist (e.g. impulse purchasing, behavioral influence perspective) this rational point of view is the most dominant perspective to consider consumer decision-making (Mowen, 1988). A widely accepted rational decision-making model is the general consumer decision-making model of Engel, Miniard and Blackwell (1995). It holds for both off- and offline purchasing (Kalakota and Whinston, 1997; O’Keefe and McEachern, 1998). The model contains seven stages consumers go through in order to purchase a product. First, consumers recognize a need. If this need is sufficiently important and the solution to the need is within the consumer’s means consumers enter the decision-process to purchase a product in order to satisfy the recognized need. Need recognition is followed by the search for information, which implies that consumers look for information about potential purchases. After the search for information, consumers enter the pre-purchase evaluation stage. During this stage consumers select and evaluate choice alternatives to meet their needs. The outcome of this process might be an intention to purchase a specific product/brand. However, it might well be an open-ended intention, which needs the search for further information. The intentions function as input for the fourth step in the process: the purchase decision-making stage. This stage can be seen as a decision-making process on its own. During the purchase decision-making stage formed intention(s) are translated into purchase behavior. Next to the decision what to purchase consumers also decide whether to purchase, where to purchase, when to purchase and how to pay (p.236). Once all purchase decisions have been made and the product has been bought, consumers consume or use the purchased product. Consumption is usually followed by post-purchase alternative evaluation. Post-purchase evaluation leads to satisfaction if the purchase at least meets or exceeds expectations or to dissatisfaction if the purchase does not meet expectations. Finally, consumers enter the seventh and last stage of the consumer decision process: divestment. Divestment refers to the disposition of (a part of) the product after it has been chosen, bought and consumed (Engel et al., 1995).

Online stores can use a mixture of IT-related functions and features to support the stages described above. First generation online stores mainly provided information about the company, its products and offered several contact options. Based upon the rise of transaction-oriented business models combined with the possibilities of new forms of IT, second generation online stores have emerged. One of these
second-generation online stores is the online CDSS. An online CDSS is a system that connects a company to its existing or potential customers, by providing support for some part of the consumer decision process (O'Keefe and McEachern, 1998, p. 72). Online CDSS's aim to provide sufficient support to guide its (potential) customers towards the act of purchasing (pre-purchase) and might as well provide support after the completion of the transaction (post-purchase). By understanding and satisfying the needs consumer have while going through the online decision making process, CDSS's expect to build valuable relationships with its customers and differentiate themselves from competitors (Piccoli, Spalding and Ives, 2001).

With respect to the specific forms of IT that CDSS's use to support its (potential) customers several examples can be given. In the literature, the stages of the consumer decision process discussed above usually function as framework for such discussion. Building upon the activities consumers perform during these stages, forms of IT are assigned to the consumer decision process. These forms are also referred to as features or functions (Liang and Lai, 2002). For example, to support the search for (information about) products online stores might integrate search engines or links to other suppliers.

To enhance the evaluation of its products online stores can offer comparison modules. After the purchase product manuals and 'tips and tricks' can function as form of consumption support while a platform to discuss with other customers is likely to add to the post-purchase evaluation experience.

Building upon the few overviews available in the literature, the table below shows examples per stage of the decision process:

<table>
<thead>
<tr>
<th>Decision making stage</th>
<th>Form of supporting ICT</th>
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<tbody>
<tr>
<td>Pre-purchase</td>
<td>Banners</td>
</tr>
<tr>
<td>Need recognition</td>
<td>Wish lists</td>
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<tr>
<td></td>
<td>Purchase suggestions</td>
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<tr>
<td>Search for information</td>
<td>Search engines</td>
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<td></td>
<td>Intelligent agents</td>
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<td></td>
<td>Customized information</td>
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<tr>
<td>Pre-purchase alternative evaluation</td>
<td>Comparison modules</td>
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<td></td>
<td>Customer interaction</td>
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<td></td>
<td>Customer reviews</td>
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<tr>
<td>Purchase decision</td>
<td>Shopping carts</td>
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<tr>
<td></td>
<td>Online sales person</td>
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<tr>
<td></td>
<td>Intelligent agents</td>
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<tr>
<td>Post-purchase Consumption</td>
<td>Product manuals</td>
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<tr>
<td></td>
<td>Tips and tricks</td>
</tr>
<tr>
<td></td>
<td>Product return</td>
</tr>
<tr>
<td></td>
<td>Organizing buyer clubs</td>
</tr>
<tr>
<td>Post-purchase alternative evaluation</td>
<td>Virtual community</td>
</tr>
<tr>
<td></td>
<td>Feedback forms</td>
</tr>
<tr>
<td></td>
<td>Customer support via email or newsgroups</td>
</tr>
<tr>
<td>Divestment</td>
<td>Information about points of disposition</td>
</tr>
<tr>
<td></td>
<td>Information about disposition requirements</td>
</tr>
</tbody>
</table>

The relevance of applying IT to support the consumer decision process has been acknowledged by several authors. Kalakota and Whinston emphasize the importance of understanding the series of activities consumers go through to complete a transaction in order to construct appropriate electronic commerce software to satisfy customers (1997). Hanson (2000) argues that characteristics of the website as mechanism of purchase determine how satisfied consumer will be with the online store. By acting as digital sales clerk, online stores take care of sales and after-sales activities by providing support to its customers. Online stores might apply product information, technical support, user groups and the ability to remember and automatically fill in customer information. The implementation of these sales clerk representing components is likely to have a positive impact on both customer satisfaction and loyalty (pp.166-167). According to Silverman, Bachann and Al-Akharas (2001), current online stores require a decision support system approach to avoid interrupting users' buying steps. By helping consumers in making decisions online stores attract new prospects and stimulate customer retention. Since selling to a new customer might costs six times as much as selling to existing customers, providing efficient decision support is essential to the survival of online stores in general. In addition, an empirical study of Liang and Lai (2002) demonstrates that consumers are likely to visit and purchase at online stores that contain features that support the transaction processes of its customers. This implies that online stores that function as CDSS are expected to be more successful than non-transaction-oriented shopping systems.
4. Towards a classification of CDSS content

Despite the relevance of online decision process support, discussions so far contain one important drawback: the focus has solely been on (web-based) forms of IT. Although important as is, we believe an online CDSS discussion should encompass non-technological forms of functional support as well. Online CDSS’s are in many ways similar to offline stores. Several functional store attributes apply for both off- and offline settings. Remarkably, this issue has not been addressed by CDSS literature so far. In this section we report on an attempt to overcome this shortcoming. Building upon a well-known store attribute classification and works in the field of e-commerce, marketing and IS, we will arrive at a preliminary classification of CDSS content.

4.1 CDSS content: a theoretical exploration

An online CDSS can be considered as an online store applying content in a useful way to support the decision process of its visitors. The content of a CDSS ‘replaces’ traditional store attributes and adds attributes required for online shopping. Both aspects have to be taken into account when deliberating on CDSS content.

Traditional store attributes have been studied for decades. Within the field of store image research this resulted in several classifications. One of the most widely cited store attribute taxonomies is the meta-analysis of Lindquist (1974). Building upon 26 studies in the field of retailing, Lindquist identified the following store attributes: merchandise, clientele, physical facilities, convenience, promotion, store atmosphere, institutional factors, post-transaction satisfaction, and services. The intangible attributes clientele, store atmosphere, institutional factors, and post-transaction satisfaction mainly refer to psychological characteristics, and are therefore not applicable in the context of our functional online store attribute discussion. The attributes merchandise, physical facilities, convenience, promotion, and services represent the observable characteristics of a store. Although rooted into physical retailing these functional store attributes apply for an online setting as well. Lohse and Spiller (1999) were among the first to translate traditional store attributes to characteristics of online stores. A first examination of their work reveals that in an online setting, convenience is closely related to design aspects of online stores and will therefore be excluded for further consideration. The remaining functional store attributes merchandise, (physical) facilities, promotion and services are online represented by various forms of content. They will briefly be discussed below.

- Merchandise, also known as selection refers to the goods and services offered by the supplier.

As widely discussed in the literature (e.g. Jarvenpaa and Todd, 1996; Quinn, 1999; Hoffman,
Novak and Chatterjee, 1995), the Internet has enabled suppliers to bring together a large selection of goods and services. Not surprising, one of the most common incentives for customers to shop online is a relatively broad selection of products (Jarvenpaa and Todd, 1996). This is probably related to the fact that a large selection enhances the likelihood of ‘succeeding’ at the location selected. By offering a broad and/or a deep variety of products and/or services online CDSS’s are able to account for this decision-making related need.

- Also facilities apply for online settings. In a physical store they refer to physical arrangements such as elevators, restrooms, shopping carts and air conditioning. In a virtual environment facilities assist the consumer while going through the online decision-making process. A widely discussed example of an online facility is the shopping cart. Like a customer of a supermarket needs a shopping cart to bring his groceries to the counter, online shoppers need an electronic shopping cart to check in, register, put in (and remove) products of interest (Lang and Whinston, 1999). Other facilities include the ability to download software required to view certain documents and/or media files (document readers, media players) and the presence of calculators to compute sizes, weights, prices and conditions (Huizingh, 2002).

- Promotion is widely applied in online settings. Examples of promotional content are banners, buttons, adds and splash screens (Turban, King, Lee, Warkentin and Chung, 2002). Promotional content is mainly used by online CDSS’s to create purchase incentives, enhance the company’s image or augment the benefits of offered products (Coupey, 2001). In the literature, promotional content has been associated with the first stage of the consumer decision process (e.g. Liang and Lai, 2002; Simons and Bouwman, 2003).

Finally, both physical outlets and online CDSS’s offer several services to support both usage and functioning of the product bought. According to the marketing literature addressing after sales activities (e.g. Lele and Karmarkar, 1983; Levitt, 1983; Burger and Cann, 1995; Wilson, Boström and Lundin, 1999) the most important after-sales services include installation, instruction, maintenance, and recovery. Widely discussed in business-to-business settings for decades, these services apply for online business-to-consumer marketing as well (see for example Sterne, 1996; Hanson, 2000; Huizingh, 2002).

- Installation refers to setting up or installing the product purchased (Singh, 2002). Some products (e.g. kitchen equipment, washing machines) require installation by the seller. In addition, where product design allows it, customers themselves can install their purchases (Goffin, 1998). Online CDSS’s face the challenge of making this easy, especially for non-technically minded customers, by offering content such as installation guidelines.

- Instruction services teach customers using and applying the product. In order to use rather complex products like software packages, training courses and/or seminars are required.
Online CDSS's can either offer these instruction services themselves or refer to another party to take care of this form of support. For other products, instructions can easily be provided by using content like (technical) brochures, operating instructions, manuals and videos.

- To preclude a product from malfunctioning or from failing to do its service, maintenance services are offered. Examples of maintenance services are activities such as cleaning, renovating, or replacing parts of products that would be otherwise liable to fail (Alexander, Cross and Hill, 1969). Online CDSS's can offer these services or use several forms of information (e.g. warnings, maintenance instructions) as a cost-effective way to inform customers how to perform these activities themselves.

- Recovery services are applied to identify failures, resolve customer problems and repair malfunctioning products (Grönroos, 2001). Online CDSS's use content like online help desks and trouble shooting tools to support problem recovery (Turban et al., 2002). If further assistance is required, (emergency) repair on location can be offered. Moreover, compensation programs are used to regain customer confidence in case of unsolved problems.

Next to content closely related to traditional retailing, online CDSS's apply content distinctive for online settings. Some of this content is required for online decision-making since it remedies the lack of physical presence. Other forms refer to features and functions providing additional support to those purchasing in virtual environments. Mainly building upon e-commerce literature, the most important forms will be considered below.

- Purchase related *information* probably is one of most widely discussed content forms. As studied for decades in consumer behavior research, and by information processing theorists in particular (see for example Bettman, 1979), consumers build upon information as input for their purchase decisions. Access to greater amounts of information to support queries for consumer decision-making is an important benefit associated with marketing on the web (Hoffman et al., 1995). Online CDSS's offer various forms of information, including product descriptions, price information and information about the firm.

- *Interaction* options are another form of online CDSS content that have received substantial attention in the literature (e.g. Ghose and Dou, 1998). Interaction options enable consumers to communicate with the supplier, allowing consumers to request further information, to pose questions and to interact with the company in informal unstructured way (Lang and Whinston, 1999). Online CDSS's offering interaction content are likely to be relatively successful (Palmer, 2002). Examples of interaction content include consumer helpdesks, e-mail, query forms and "call me back" buttons.
• Furthermore, online CDSS's can enable the comparison of products. Comparison content like, for example, a sorting module or an electronic shopping agent is used to assist consumers while evaluating alternatives (Maes, Guttman and Moukas, 1999). This form of support is likely to be important in online settings since online suppliers usually bring together a large number of alternatives. By enabling the comparison of products and/or product attributes, consumers can relatively easy assess the performance of alternatives before applying decision rules.

• Another type of content that applies for online CDSS’s is aggregation content. Aggregation content refers to information and products that are related to, but not included in the purchase. Consumers are not only sold the core product, but are additionally offered a range of complementary information and products to maximize customer benefit (Schubert and Dettling, 2002). For instance, when selling airline tickets various forms of information about the destination can be provided including weather forecasts and residence information. Another example concerns a recommender system that checks the services and products a customer has already chosen and recommends related and complementary products and information that are likely to be of interest for the customer (Prassas, Pramataris, Pepaemmanouil and Doukidis, 2001).

• For purchases perceived as relatively complex or risky, online consumers are likely to demand for advice. According to Simons and Bouwman (2003) advice facilitates consumer decision-making by helping consumers to find out which product fits best to personal needs. Advice might be required during the search for information, the assessment of alternatives but also once the product has been bought. To advice its customers online CDSS’s can integrate real-time advice modules, interactive helpdesks or simply stick to self help tools.

• One of the disadvantages of purchasing at an online environment is that one cannot taste, smell or feel the products to be bought. To account for this drawback, online CDSS’s offer various forms of sensory stimulation content to enhance the experience of its products. Widely applied forms of sensory stimulation content include graphics, 3D-images, audio sound and video capabilities. Next to adding to a more positive shopping experience (Page and Lepkowska-White, 2002), consumers build upon these features and functions to arrive at adequate purchase decisions (Verhoef and Langerak, 2001).

• The Internet has introduced several new aspects to the consumer decision process. One of these functions is the ability to bargain on distance with the seller. Since location has become less of an issue, sellers and buyers are relative easily brought together. There is no doubt that bargaining plays an important role in consumer purchasing decisions (Liang and Doong, 2000). If prices and other attributes are fixed, bargaining usually is impossible. However in markets such as stocks, automobiles and fine art bargaining has a substantial influence on the customer decision-making process. To enable bargaining online CDSS’s implement functions
like bid-ask exchanges and auctions (Coupey, 2001). Additionally, in the near future one expects electronic shopping agents to bargain with agents of the seller on behalf of the customer (Maes, et al., 1999).

- Another relatively new form of content is the ability to assess opinions of experts, friends or experienced consumers about the product or the supplier. In the literature this is known as word-of-mouth (WOM). WOM plays an important role in the expectations customers develop when considering a purchase (Grönroos, 2001). Consumers use WOM content as input for final choice or to exchange experiences. Widely applied forms of WOM-content include customer comments, bulletin boards and virtual communities (Hagel and Armstrong, 1997).

- Online CDSS's offer various functions, features and options to personalize their offerings, procedures and information. Personalization refers to individualized offerings of content, like products and information, that matches the needs of individual consumers (Coupey, 2001, p. 276). The personalization of products is also known as customization: "it transforms a standard product or service into a specialized solution for an individual" (Hanson, 2000, p. 186). Due to the interactive nature of the Web combined with the emergence of new forms of web-based IT, customization has rapidly been adopted in many online businesses. Consumers are more likely to succeed at online locations where customization is offered. Customization can be accomplished through standard options but also by more advanced options like collaborative product development (Rust and Lemon, 2001). Next to the personalization of products, also information and procedures might be adapted to personal needs and settings. Either initiated by the seller or the consumer, widely adapted aspects include language, currency, payment settings, (confidential) information and personal recommendations. Protected by passwords, this form of personalization is often used to strengthen the relationship with the customer (Huizingh, 2002).

- Due to the lack of physical presence assurance content is a major concern for online CDSS's. Assurance content refers to the functions and features offered by the seller to convey trust and confidence (based upon Parasuraman, Zeithaml and Berry, 1988). For instance, the presence of privacy and security measures is expected to have a positive impact on consumer decision-making (Doney and Cannon, 1997; Page-Lepkowska-White, 2002). Another example concerns guarantees. Guarantees, in the literature known as explicit statements explaining what the customers can expect and what the firm will do if it fails to deliver (Wirtz and Shamdasani, 1994, p. 165), are assumed to positively influence consumer purchase behavior and consumer satisfaction. Forms of assurance content that are used by the majority of online CDSS's today are encryption techniques (e.g. SSL), password protection, inspection marks, privacy statements and warranties.

- Once the good or service has been selected for checkout, decisions have to be made concerning its payment, packaging and delivery. To support these decisions, online CDSS's
contain settlement content. A clear order process with various options reduces the risk that the consumer decision-making process is aborted. Moreover, well-supported order processes are likely to contribute to relatively many completed transactions (Swaminathan, Lepkowski-White and Rao, 1999). In order to adequately support the settlement process online CDSS’s make use of various features and applications, including payment methods, packaging modes, shipping options and return policies.

- Once the purchase has been made, consumers wants to be informed about the status of delivery, take possession of the product and inspect it before applying it for usage or consumption. Furthermore, if the delivered product fails to meet one’s expectations returning or replacing the product becomes an issue. CDSS’s offer fulfillment content to supports this part of the consumer decision process. Fulfillment encompasses delivering, shipping as well as processing returned goods (Lummuus and Vokurka, 2002). According to Liang and Lai (2002), fulfillment content like order tracking and options for product returns and/or replacements are essential enrichments to the customer decision-making process.

- After consuming or using the product the consumer faces several options, including converting it to serve a new purpose, store it, throw or give it away, rent it, trade it or sell (Jacoby, Berning and Dietvorst, 1977). Content that helps consumers making these decisions, or supports the consequences, is called retirement content. Examples of retirement content include online marketplaces structures, online re-sales, classified adds (Turban et al., 2002), and recycling and disposition instructions. Explicitly in situations where the seller rewards returning the product to be disposed by offering discounts on new purchases are expected to be successful.

4.2 A framework of CDSS content

In the previous section we introduced an overview of CDSS content. Some content is applicable to the entire consumer decision process since it supports consumers both before and after the purchase. Other forms apply to either the pre-purchase or the post-purchase phase of the consumer decision process. Our findings are summarized and subjectively allocated to the pre-purchase and post-purchase parts of the consumer decision process in the table below.

<table>
<thead>
<tr>
<th>Content form</th>
<th>Pre-purchase</th>
<th>Post-purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Interaction</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 3: a taxonomy of CDSS content
| Word-of-mouth (WOM) | X | X |
| Personalization | X | X |
| Aggregation | X | X |
| Advice | X | X |
| Facilities | X | X |
| Assurance | X | X |
| Promotion | X | |
| Comparison | X | |
| Selection | X | |
| Bargaining | X | |
| Sensory stimulation | X | |
| Settlement | X | |
| Fulfillment | | X |
| Installation | | X |
| Instruction | | X |
| Maintenance | | X |
| Recovery | | X |
| Retirement | | X |

The overview of CDSS content raises several interesting research questions. We will elaborate on some of these questions in the next section.
5. Discussion: key research questions and metrics

In this paper, we have tried to bring research in the e-commerce field one step further by bringing together a lot of material, and by placing it in a CDSS framework. We have focused on defining various functional content forms, and our literature review has yielded a relatively large number of those forms. It leads us to series of new questions. How to measure the presence and quality of content forms? How to measure their effect on consumer behavior? Are all content forms equally important? Does this vary per product, per store, or per customer? In this section we will identify a number of key research questions and metrics.

Content presence

Measuring the presence of the different content forms demands for a checklist to observe what kind of information, features and services online stores apply. For example, to measure *interaction*, one must first know (1) what features and applications of interaction exist on the web, such as e-mail, electronic forms for further inquiry, call-me-back options and the like, and (2) one must determine what content form(s) they support. Lohse and Spiller (1999) have constructed a standardized checklist for coding online store characteristics. From a CDSS perspective we need a checklist that provides researchers with the site’s profile in terms of content that may support the consumer’s decision process.

Effective content usage

The site profile shows the presence and quality of content forms in the online store, but it provides no insight in the effectiveness neither of that profile nor of the individual content forms. Lohse and Spiller (1999) used traffic (unique visitors per month) and sales (dollars per month) as measures of effectiveness, but doing so, they leave many questions about the precise relationships between content and traffic and sales measures unanswered. From a CDSS perspective, it would be interesting to address the effectiveness of the various content forms in supporting the consumers’ decision processes. This can be studied by asking consumers whether they experience certain content forms as being important or helpful. This type of research (subjective) could be done with online questionnaires for shoppers. It will provide insight in the effectiveness of individual content forms and of the site profile.

Consumer characteristics

As for online shopping systems in general, consumers will have different personal preferences for content forms and site profiles. These personal preferences may vary over time, depending on the shopper’s experience, age, gender, mood or situation (cf. Li, Kuo and Russel, 1999). It will be interesting to address the impact of personal and temporal differences on decision support perceptions.
and requirements. For example, less experienced consumers are likely to demand for more information, interaction and assurance content. When shoppers are in a hurry, they are expected to use less content then they would normally do. From a CDSS perspective it would be very interesting to explore these questions. It provides insight in the “bandwidth” of content use, and it will also help online storeowners in fine-tuning their store content.

**Decision making complexity**

The extent to which consumers use the stages of the decision process, and demand for corresponding decision support, depends to a large extent on decision-making complexity. If the decision-making complexity is high, for example when buying an insurance product, consumers are likely to be highly involved and therefore motivated to use all stages thoroughly (Engel et al., 1995). In contrast, when the complexity of decision-making diminishes, the purchase process is simplified (Howard and Sheth, 1969; Engel et al., 1995). An example of a less complex decision-making process is the buying of a book. The effectiveness of individual content forms may vary from one setting to another. Addressing this issue demands for comparing the effectiveness of content appliance across different levels of decision making complexity. Goods and services might be grouped in product categories, according to the resemblance of the complexity of their decision processes. Effectiveness studies will provide insight in the required decision support in various product categories.

**Sales and retention**

Ultimately, when online stores succeed to support the customers’ decision process by providing the required content forms, the question is still unanswered whether the customer is also willing to buy the product in this store. The customer may have decided *not* to buy the product at all, or not now, or not here but somewhere else. In this context, it is interesting to explore the relationships between decision support quality and sales or customer retention. Sales and retention measure like “dollars per month” or “traffic per month” are less suitable since they say too little about the effectiveness of the decision support. Measures like conversion rate (sales per unique visitor per month) and retention rate (sales per known customer per month) are preferred since both express the number of visitors or customers that have successfully been ‘guided’ throughout the stages of the decision process.

In the table below research questions and possible metrics are summarized.

<table>
<thead>
<tr>
<th>Table 4: online CDSS content: key research questions and metrics</th>
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</thead>
<tbody>
<tr>
<td><strong>Key research questions</strong></td>
</tr>
<tr>
<td>What information, features and services represent the different forms of CDSS content?</td>
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<tr>
<td>Question</td>
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<tr>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>To what extent does a website contain the different forms of CDSS content?</td>
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<tr>
<td>Which forms of CDSS content can be applied to affect consumer perceptions of the website?</td>
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<tr>
<td>Which forms of CDSS content forms do consumers perceive as ‘important’ when engaging in online purchase behavior?</td>
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<tr>
<td>What, and to what extent, do consumers actually use CDSS content forms?</td>
</tr>
<tr>
<td>What are the relationships between consumer demographics (e.g. age, gender, income, years of Internet experience) and effective usage of CDSS content?</td>
</tr>
<tr>
<td>What are the relationships between product type and effective usage of CDSS content?</td>
</tr>
<tr>
<td>What are the relationships between characteristics of the online purchase process and effective usage of CDSS content?</td>
</tr>
<tr>
<td>What are the relationships between using the different forms of CDSS content and website success?</td>
</tr>
</tbody>
</table>

We encourage researchers to address the research questions and develop and validate new measurement methods. We believe the introduction of new methods of measurement is especially commendable. The field can only advance beyond “normal” science through those who are willing to take such risks (Straub, Hoffman, Weber and Steinfeld, 2002, p.236).
References


