

# INFORMATION REQUIREMENTS DEFINITION FOR E-COMMERCE DEVELOPMENT

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## ABSTRACT

*This paper provides an analysis of the consumer buying process and discusses its impacts and implications for web designer. The paper begins with a brief overview of the consumer buying process, extracts desirable characteristics for an e-commerce site, and evaluates a number of e-commerce sites for characteristics incorporation. The implications for software engineers are to analysis the decision buying process and incorporate the requirements into the e-commerce solution. This will leads to a positive buying experience for the customer and effects the overall site presentation.*

**Keyword:** E-commerce, information requirement analysis, web design

## INTRODUCTION

System development is a complicated and time-intensive process. Many methods and processes have been identified and used, but they all share the basic components: requirements identification, feasibility study, system analysis, design and development, testing, implementation, and maintenance. The first few phases- requirements definition, feasibility study and systems analysis – traditionally have included interviewing the users through meetings, questionnaires, and observations.

With the inception of the Internet, many common practices are requiring the development of new procedures. Interactions with the user (or consumer) necessitate the realization that previous limitations (geography, communications, etc.) may no longer exist, and therefore different methods must be considered. This paper examines the similarities and differences of information requirements analysis pertaining to e-commerce and web design. We first examines the consumer buying process, the process is then used to develop a set of web design characteristics that can positively influence a company's ability to be successful in the Internet age. Several web sites were examined and evaluated as to whether the proposed design ideas are present and useful. Finally, this information is summarized with recommendations on how to use this information to transform the software engineering efforts of businesses wanting to focus on e-commerce.

## CONSUMER BUYING DECISION PROCESS

For years marketing experts have studied the buying patterns and trends of consumers. It is generally recognized that there are five factors that consumer considers, consciously and unconsciously, when making buying decisions. These five factors are (Hisrich, 2000):

- Need recognition
- Information Search
- Information Evaluation
- Purchase Decision
- Post-purchase Behavior

### **Need Recognition**

Need recognition occurs when the customer recognizes a need or want. These needs may vary in importance from critical inputs to keep the system functioning, such as food and drink, to those that are more discretionary. It is important to remember that this “arousal” can be both in form of a need or a want.

### **Information Search**

Once the initial problem has surfaced, the consumer will acquire information. The customer identifies available alternatives and determines their individual abilities to satisfy the various dimensions of needs and wants related to the need.

### **Information Evaluation**

While all stages of the buying process are important, the evaluation stage is often the most critical point. Consumers evaluate the quality and characteristics of various products based on certain characteristics such as speed, strength, safety, or long product life that vary with particular consumers. The consumer’s goal is to obtain the best quality and most benefit within a certain cost.

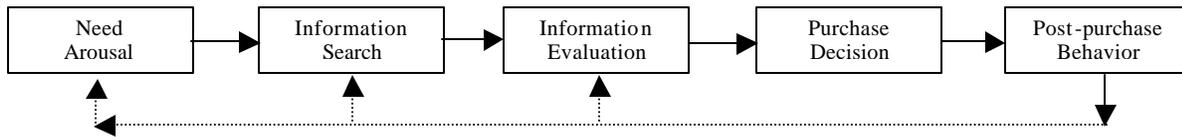
### **Purchase Decision**

Even after the consumer has made their evaluation, he or she may not buy the product selected. Social factors and anticipated conditions can influence this purchase intention. Social factors involve considering the reaction to the purchase by others. Anticipated conditions reflect the consumer’s expectations of what external conditions will be like. For example, an upcoming economic recession may influence a consumer to delay a purchase.

### **Post-purchase Behavior**

During the purchase phase, the consumer will ask, “will I like this”, or “Is this a good deal”. Also after the purchase these questions become “do I like this” or “did I get a good deal”. If the purchase requires a substantial financial outlay, then the questions can become wrought with emotion. This triggers the condition known as buyer’s remorse. Consumers that return to specific store or manufacturer for repeat purchases have often been influenced that their prior purchases “were” a good deal. This reinforcement can come in the form of a commercial or other form of advertisement.

Each of the phases works together to form the total consumer purchase process. Capon and Hubert (2001) use the diagram below to show the relationship between the phases in the process.



**Figure 1. Five Stages of Consumer Buying Process**

Notice that aside from the normal process flow, there is a return flow following the purchase. This indicates that the consumer's current buying process effects future buying experiences.

## **E-COMMERCE DESIGN CHARACTERISTICS**

Based on the above discussion, ten web design characteristics are identified:

### **Draw attention to unsatisfied need – banner advertising**

To achieve starting the buying decision process an unsatisfied need to be brought to the attention of the buyer.

REQ 1 – A\_G\_ADS - Provide attention-getting ads to highlight unsatisfied needs.

### **Easy availability of information for buyer in passive search – one click to information**

During the information search stage, the buyer needs information without becoming actively involved, in the passive search mode.

REQ 2 – USE\_INFO - Provide the buyer useful information in the attention getting ads.

### **Link to detailed information**

In the information gathering mode when the buyer becomes active

REQ 3 – DETAIL\_LINK - Provide links and mechanisms to get to detailed information.  
Possible solution is to pre-load the search engine.

### **Search engine**

While seeking information, the buyer will be searching for information the e-commerce solution should have key words located for search engines to find.

REQ 4– KEY\_WORD - Provide key-word identifiers for search engines.

### **Provide endorsements or opinions from others**

Another source of information for the buyer is endorsements from others. This can range from individual endorsements to comparison reports.

REQ 5 – ENDORSE\_LINK - Provide mechanisms to link to locations that provide comparisons or endorsements.

**Provide features to evaluate that are similar across the products**

When the buyer moves into the evaluation of alternative stage they need information to evaluate. The easiest way is to provide features in the descriptions of the product.

REQ 6 – PROD\_FEATURE - Provide features to evaluate that are similar across the products.

**Provide quantifiable characteristics to evaluate**

While evaluating alternative product description need to have quantifiable characteristics that can be evaluated, such as size weight, speed, etc.

REQ 7 – QUANT\_CHAR - Provide product description with quantifiable characteristics.

**Provide some form of money back guarantee to reduce effect of risk**

While deciding to purchase the customer can become afraid of the risk of the purchase and decide against the purchase. To overcome this, some method of reducing that perceived risk needs to exist such as a money back guarantee.

REQ 8 - MONEY\_BACK - Provide some form of money back guarantee to reduce effect of risk

**Provide a way to get additional information on purchase**

During the post-purchase behavior stage, the buyer may find a gap between actual and expected performance of the product. This may be overcome by having information available to reset the customer's expectations.

REQ 9 – ADD\_INFO - Provide an easy way to get additional information on product performance.

**Provide a way for satisfied customers to state their satisfaction see five above.**

In the post-purchase behavior stage, the buyer may be fully satisfied and would like to tell others of their satisfaction. This is source information for requirement discussed in five above. (REQ – ENDORSE\_LINK)

REQ 10 – ENDORSE\_INPUT - Provide a way for satisfied customers to state their satisfaction

**METHODOLOGY**

Content Analysis was used as the research method in this study. As defined by Berelson, "(Content Analysis) is a research technique for the objective, systematic and quantitative description of the manifest content of communication (Carney, 1972)." Kerlinger also suggested that content analysis "can be applied to available materials and to materials especially produced for particular research problems (Kerlinger, 1973)."

Three steps are involved in content analysis. These are (1) Categorization, (2) Counting, and (3) Analysis.

## **Categorization**

The first step in content analysis is to define the universe of the content to be analyzed (Kerlinger, 1973). In this study, the universe of content is the Web design characteristics. Ten categories defined earlier serve as the coding scheme for reviewing the web sites. They are:

- REQ 1 – A\_G\_ADS - Provide attention-getting ads to highlight unsatisfied needs.
- REQ 2 – USE\_INFO - Provide the buyer useful information in the attention getting ads.
- REQ 3 – DETAIL\_LINK - Provide links and mechanisms to get to detailed information.
- REQ 4– KEY\_WORD - Provide key-word identifiers for search engines.
- REQ 5 – ENDORSE\_LINK - Provide mechanisms to link to locations that provide comparisons or endorsements.
- REQ 6 – PROD\_FEATURE - Provide features to evaluate that are similar across the products.
- REQ 7 – QUANT\_CHAR - Provide product description with quantifiable characteristics.
- REQ 8 - MONEY\_BACK - Provide some form of money back guarantee to reduce effect of risk
- REQ 9 – ADD\_INFO - Provide an easy way to get additional information on product performance.
- REQ 10 – ENDORSE\_INPUT - Provide a way for satisfied customers to state their satisfaction.

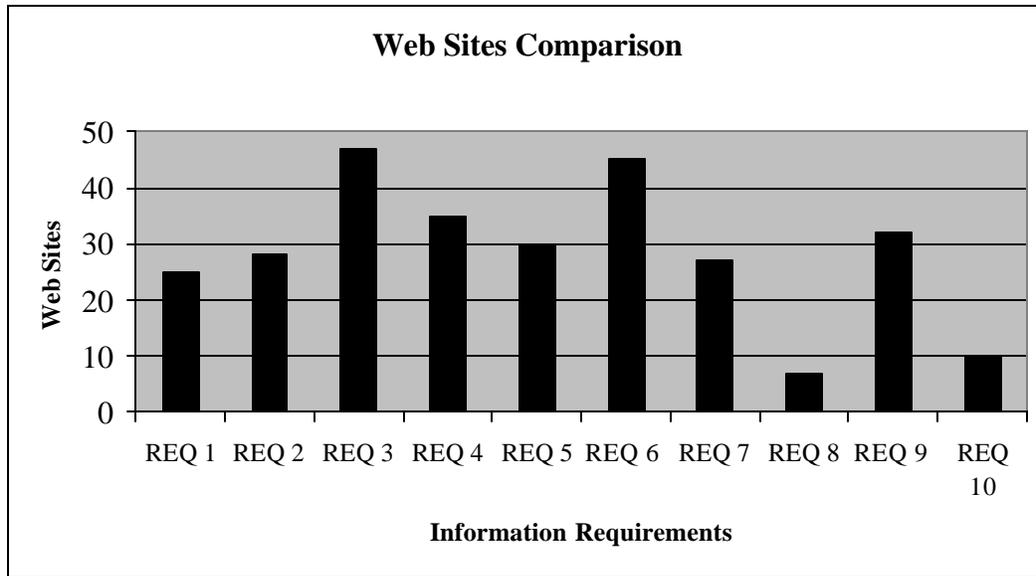
## **Counting**

The second step is the review of web sites. Fifty web sites were randomly selected from a list of Fortune 500 companies in the Fortune Magazine's web sites. Historically, large organizations tend to provide leadership in the use of information technology (Li, etc. 1993). The use of the Fortune 500 companies as the target group for e-commerce study seemed appropriate. Web sites were analyzed by a research team consists of graduate students at the author's school. These 50 web sites are coded for the 10 web design characteristics.

## **RESULTS AND ANALYSIS**

The result of the content analysis is shown in Figure 2. It shows the 50 web sites evaluated by the 10 information requirement design features.

The most often-used design features are: provide links to get to detailed information (REQ 3) and provide product features to evaluate (REQ 6). More than 80 percent of the web sites analyzed have those design features. Other design features such as: provide key-word identifier for search engines (REQ 4), provide endorsements from others (REQ 5), and provide a way to get additional information on purchase (REQ 9) also are common design features for most of the web sites (more than 60 percent). However, less than 20 percent of the web sites analyzed offer some form of money back guarantee to reduced effect of risk (REQ8) or to provide a way for satisfied customers to state their satisfaction (REQ 10).



**Figure 2. Web Sites Comparison**

In terms of the consumer buying process, most of the large companies are aware of the importance of “information search” and “information evaluation” on consumer’s buying decision process. Companies are providing search engine, detailed product information and endorsements links to attract customers. However, most of the companies need to improve or incorporate “need arousal” and “post-purchase behavior” of the consumer buying process in their e-commerce design effort. Organization should take a closer look at the consumer behavior while designing an e-commerce site.

## CONCLUSION

E-commerce has introduced a whole new ways of buying that offers timesaving, convenience, and greater selection and comparison options to a much broader audience. Everything from clothing to food, and computers to travel arrangements are available at the click of a mouse. While these attributes are great for consumers and imply that e-commerce is a profitable industry, companies are cautioned to be skeptical. It is true that consumers are spending a great deal of money on the Internet, but the ease of comparison shopping demands e-businesses is extremely competitive. The variety and number of search engines and shopping indexes make switching from one site to another fast and easy, not to mention free. For these reasons, companies are forced to evaluate the traditional methods of determining consumer behavior and decision-making, and provide applicable design characteristics to appeal to consumers.

There are two lessons learned from this study with implications to software engineers and information systems managers for e-commerce development. The lessons are: understand buyer decision process; and organize e-commerce site to support the process.

### **Understand the decision buying process**

Software engineers need to start with an analysis of the decision buying process. This analysis leads to a set of requirements similar to the one derived in this study. What is essential here is to think about what customer wants to accomplish and assist the customer in achieving that objective. Avoid the problem of getting overwhelmed with the information that needs to be organized and delivered. Using the decision buying process can keep you focused.

### **Incorporate requirements into the e-commerce solution**

This leads to a positive buying experience for the customer and effects the overall site presentation. When these requirements are included in the design criteria, a simpler and easier process definition for implementation results. The fundamental implications for software engineers are to analysis the decision buying process and incorporate the requirements into the e-commerce solution.

The sample web sites drawn from this study are mainly large Fortune 500 companies. Several of them are not really retailers (i.e., they don't sell product or service directly to consumers). This has limited the validity of this study. Although the result provide some important guideline for e-commerce development, further study focus on Internet retailers is needed. The result cannot be generalized to all size of business either. Small businesses are increasingly using Internet to reach their customers. Given the limited resources small business has, effective web design can play an even important role for them. Further research on small business web development can provide important insights for small business owner.

## **REFERENCES**

Carney, T. F. *Content Analysis: A Technique for Systematic Inference from Communications*, University of Manitoba Press, Winnipeg, Canada, 1972.

Capton, N. & Hulber, L. (2001). *Marketing Management in the 21<sup>st</sup> Century*, Prentice-Hall: New Jersey.

Hisrich, R. (2000). *Marketing*. Barrons: New York.

Kerlinger, F. N. *Foundations of Behavior Research*, Holt Saunders, 2<sup>nd</sup> edition, 1973.

E. Y. Li, R. McLeod, J. C. Rogers, Marketing Information systems in the Fortune 500 companies: past, present, and future, *Journal of Management Information Systems*, 10 (10), 1993, pp. 165-192.