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A BRANDING MODEL FOR WEB SEARCH ENGINES

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Lu Zhang

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The thesis of Lu Zhang was reviewed and approved * by the following:

Bernard J. Jansen

Associate Professor of Information Sciences and Technology

Thesis Advisor

Anna S. Mattila

Marriott Professor of Hospitality Management

Hubert B. Van Hoof

Department Head and Professor of Hospitality Management

Signatures are on file in the Graduate School

Abstract

In this work, we conduct a comprehensive investigation of branding of Web search engines, examining the effects of brand logos, brand awareness, brand image, brand knowledge, and brand relationship. Our research aim is to investigate the effect of brands on users' perception of search engine performance in order to provide insights on search engines as services in this unique marketplace. We use a survey of 207 participants for data collection and a mixed method of quantitative (structural equation modeling) and qualitative (open coding) approaches for the data analysis. Our findings revealed users' brand relationship with a search engine has a direct effect on their perception of performance by increasing satisfaction and trust, whereas their brand knowledge about a search engine has an indirect effect by combining with the existence of a brand relationship. This finding indicates that customers value their relationship with certain brands more than the users' knowledge of that brand when evaluating the performance of search engines. Our results revealed that the impact of trust on performance perception for search engines is not as significant as satisfaction, although trust is a major element in relationship marketing. Findings also show that some search engines have brand logos that result in confusion or negative brand perceptions. Brand image also varies among the top search engines, with consumers possessing extremely positive or negative brand opinions. Google elicited a string of positive comments from the participants, with several uses of the term 'love.' AOL, Ask, and Yahoo! had a mix of positive and negative comments. Most of the other search engines had primarily negative terms associated with them. The study has implications for academics investigating the search engine marketplace as well as user perspectives of search engines and practitioners in the search engine area of established and emerging search engine companies.

Keywords: Brand knowledge, Brand relationship, Search Engine, Performance perception

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Chapter 1. INTRODUCTION

Introduction

End user searching (Ojala, 1986) behavior has changed the manner in which customers get information about products and services, which has led to studies of customer information searching (c.f., Joo & Park, 2008; Murray, 1991; Pires, Stanton, & Rita, 2006; Waite & Harrison, 2002; Wolinsky, 1993). There are several ways for customers to conduct a product information search; one of the most popular tools is a Web search engine. From a technological perspective, studies report that, in terms of performance and interfaces, most major search engines are practically the same (Eastman & Jansen, 2003). Typically, performance is measured by precision, which is the ratio of relevant documents to the total number of documents returned at some point in the results listing. However, overall search engine performance is not quite as straightforward as these algorithmic metrics would have us believe. Users' relevance judgments can be affected by a variety of subjective, affective, cognitive, and contextual factors. Users have different perceptions of search engine performance and distinct responses to each engine. Brand awareness is one factor that can change users' evaluation of the searching process, as demonstrated by Jansen, Zhang, and Schultz (2009). There are some other important branding concepts beyond awareness, such as brand relationship, brand knowledge, and brand image. However, the investigation of how these concepts affect consumer perception of Web search engine is extremely limited.

What is the level of brand awareness for the various search engine companies? How do the designs of search engine logos influence users' perception of the search engine? How does brand knowledge impact users during the search process? Does the brand relationship between a user and search engine affect the perceived performance? What are the implications of branding in the search engine market? These are some of the questions that motivate our research.

To answer these questions, this article is organized as follows. We first reviewed the literature in marketing and Internet research areas to identify the gaps that we can bridge with new research. Three broad research questions are specified in the second section, along with related hypotheses. Our main research question investigates a model of brand knowledge and brand relationship in the search engine area. This is followed by a discussion of the methodologies we used to test our hypotheses empirically. After analyzing the data, we summarize the results from surveying 207 participants, testing our model of search engine branding. We then explain the theoretical and managerial implications for academic and

practical usage of the findings. The last section explores the limitations, strengths, and research directions for further studies.

Chapter 2. LITERATURE REVIEW

Literature Review

Brands have a significant impact on consumers' perception and choices of a product, and branding is a top management priority due to the realization that brands are a firm's most valuable intangible assets (Keller & Lehmann, 2006). A brand is the intangible sum of an organization's attributes. Therefore, effective branding can result in customer loyalty and a positive image of a firm's products and services. Brands can be understood from various perspectives. A narrow brand perspective centers on tangible brand features, such as name, design, or symbol, while intangible features, such as values, ideas, and personality, are included in a broader brand perspective (de Chernatony & Riley, 1998; de Chernatony & Riley, 1998; Haigh & Knowles, 2004; Stern, 2006).

In this section, we review the components of branding that we investigate in this research, and relate them to the domain of Web searching. Some key concepts in the area of branding will be discussed, including brand knowledge (composed of brand awareness and brand image), brand relationship (composed of brand satisfaction and trust), and brand commitment.

Brand knowledge

Branding research traditionally focuses on investigation of brand knowledge, which is conceptualized by an associative network memory model of two components, *brand awareness* and *brand image* (Keller, 1993).

Brand awareness is related to the strength of the brand node or trace in memory, as reflected by consumers' ability to identify the brand under different conditions (Percy & Rossiter, 1992). Brand awareness consists of brand recognition and brand recall. Brand recognition is the consumers' ability to confirm prior exposure to the brand when given the brand directly as a cue. Brand recall relates to consumers' ability to retrieve the brand when given the product category, the needs fulfilled by the category, or some other type of probe as a cue (Keller, 1993). Therefore, brands desire to be recognized and recalled by customers, aided or unaided.

Brand image (a.k.a. brand perception or brand opinion) is built on consumers' brand associations and attitudes and has been considered an integral component of brand equity. Brand image has been widely employed in various brand equity frameworks (c.f., Aaker, 1996; Agarwal & Rao, 1996; Feldwick, 1996; Keller, 1993; Park & Srinivasan, 1994; Srivastava & Shocker, 1991). However, there is less agreement on

the precise definition of brand image (Dobni & Zinkhan, 1990). Keller (1993) defined brand image as “perceptions about a brand as reflected by the brand associations held in consumer memory.” Some scholars claimed that brand image is associated with recent consumption experience (Johnson, Gustafsson, Andreassen, Lervik, & Cha, 2001). Jansen, Zhang, and Schultz (2009) investigated the effect of search engine brand image on user evaluation of search engine performance. They reported that a positive brand image is worth a 10 to 15 percent positive perception of search engine performance. Performance perception was measured in terms of four aspects: (1) search engine selection, (2) results page evaluation, (3) individual link evaluation, and (4) evaluation of landing page. Conversely, a negative brand image incurs a 10 to 15 percent dip in perception of search engine performance. However, in contrast, Bailey, Thomas, and Hawking (2007) found that users do not appear to be strongly influenced by the brand image associated with the search engine, even if that brand name is totally unknown. In general, brands want their image to be positive and healthy, and deliver the correct messages to the right audiences.

An important sub-component of brand image is the actual brand logo. A logo refers to the graphic design image that a company uses, with or without its name, to identify itself or its products (Bennett, 1995; Robert & Hulland, 1994). A logo is the shorthand for everything that the brand stands for (Rowley, 2004). Logos are significant company assets that firms spend enormous amounts of time and money promoting (Rubel, 1994). Logos help consumers and potential consumers transcend international boundaries and language barriers because logos communicate visually (Kohli, Suri, & Thakor, 2002). Yet, there is little systematic research on the effect of logo design on brand evaluation and preference (Pittard, Ewing, & Jevons, 2007). In the online domain, the immediate availability of the Internet is making logo design more important than ever before. For example, top management is turning its focus to how people respond to company logos seen on the computer screen (Davies, 1996). Powerfully and especially attractively logos may be expected to attract the attention of potential customers (Check-Teck, 2001). Therefore, for search engines especially, the logo is one of the most important associations of brand image as a visual cue.

Along with brand knowledge, another important field of academic and industry endeavor is brand relationship. The history of relationship marketing is long and voluminous (Gronroos, 1999); therefore, we just briefly discuss the basic definitions and relevant research in the literature.

Brand relationships

It is important to consider how companies build brand relationships with consumers. Research on brand relationships states that brands affect consumers because of the knowledge systems and the concepts consumers store in memory. Brands are part of a psycho-social-cultural context (Esch, Langner, & Bernd H. Schnmitt, 2006; Fournier, 1998). Consumers engage in relationships with brands, similar to the personal and intimate relationships consumers form with other people. The brand relationship process can generate cognitive benefits as well as a positive effect that result in a bond between the brand and the consumer (Fournier, 1998).

Brand relationships include both exchange and communal aspects, which are represented by brand satisfaction and brand trust, and interdependence between the entities, reflected by brand commitment. Exchange aspects of brand relationship involve economic factors and offer primarily utilitarian benefits (Esch et al., 2006), which are primarily represented by brand satisfaction. As an important predictor of consumers' future behavior, brand satisfaction is a significant determinant of repeat sales, positive word of mouth, and consumer loyalty (Bearden & Teel, 1983). Traditionally, brand satisfaction research was mostly cognitive in nature. In the mid-1990s, research started not only criticizing the overwhelming dominance of this paradigm (Hunt, 1993) but also increasingly investigated effective antecedents of satisfaction. Rather than treating brand satisfaction as a simple one-dimensional construct, some researchers have attempted to study satisfaction at a deeper level, arguing that satisfaction is multi-dimensional and incorporates cognitive and emotional elements (Liljander & Strandvik, 1997; Strauss & Neuhaus, 1997; Wirtz & Mattila, 2001; Yu & Dean, 2001). Naturally, brands want customer satisfaction to be based not only on a cognitive evaluation of product quality but also on an effective response with little or no information processing.

Communal aspects of a relationship involve feelings about other people (Esch et al., 2006), and trust is the primary positive result of such relationships. Trust can be defined in many ways, including as the generalized expectancy that an individual holds that the word of another can be relied on (Rotter, 1967); the extent that a person is confident in and willing to act on based on the words, actions, or decisions of others (McAllister, 1995); and, uniquely in the consumer domain, as the willingness of the average consumer to rely on the brand to perform its stated function (Chaudhuri & Holbrook, 2001). In the relationship marketing literature, trust is defined as the perception of confidence in the exchange partner's future actions (Morgan & Hunt, 1994). Trust is the basic mechanism used to build and maintain a relationship and fosters a long-term orientation in marketing relationships (Morgan & Hunt, 1994). Because the conduct of e-commerce across jurisdictional boundaries involves risk, the issue of trust is

arguably of greater importance for online exchanges compared to traditional exchanges (Ratnasingham, 1998; Walther, 1995).

The essence of a relationship is some kind of interdependence between the entities involved (Esch et al., 2006). For this research, we adopt commitment as a reflection of interdependence over time. Morgan and Hunt (1994) argued that commitment is central to relationship marketing. Relationships are built on the foundation of mutual commitment (Berry & Parasuraman, 1991). Commitment is “an enduring desire to maintain a valued relationship” (Moorman, Zaltman, & Deshpande, 1992). Commitment in its various forms fosters stability by implicating the self in relationship outcomes and by encouraging derogation of alternatives in the environment (Johnson & Rusbult, 1989). It is believed to be associated with motivation and involvement (Mowday, Steers, & Porter, 1979), positive effect and loyalty (Kanter, 1968), and performance and obedience to organizational policies (Angle & Perry, 1981).

Table 1 summarizes the various components of a brand and provides a short definition of each component.

Table 1. Summary of important constructs.

<i>Branding Component</i>	<i>Definition</i>
Brand logo	Part of brand image; refers to the graphic design image that a company uses, with or without its name, to identify itself or its products (Bennett, 1995; Robert & Hulland, 1994).
Brand knowledge	An associative network memory model of two components, brand awareness and brand image (Keller, 1993).
<i>Brand awareness</i>	Related to the strength of the brand node or trace in memory, as reflected by consumers’ ability to identify the brand under different conditions (Percy & Rossiter, 1992). Brand recognition - consumers’ ability to confirm prior exposure to the brand when given the brand directly as a cue (Keller, 1993). Brand recall - consumers’ ability to retrieve the brand when given the product category, the needs fulfilled by the category, or some other type of probe as a cue (Keller, 1993).
<i>Brand image</i>	Keller (1993) defined brand image as “perceptions about a brand as reflected by the brand associations held in consumer memory.”

<i>Branding Component</i>	<i>Definition</i>
Brand relationship	Consumers tend to engage in certain types of relationships with brands, which are similar to the personal and intimate relationships consumers form with other people.
<i>Brand satisfaction</i>	Exchange aspects of a relationship involve economic factors and offer primarily utilitarian benefits (Esch et al., 2006). Brand satisfaction is the primary positive result of exchange relationships.
<i>Brand trust</i>	Communal aspects of a relationship involve feelings about other people; they transcend self-interest (Esch et al., 2006). Trust is the primary positive result of such relationships. Trust is defined as the perception of confidence in the exchange partner's future actions (Morgan & Hunt, 1994).
<i>Brand commitment</i>	"An enduring desires to maintain a valued relationship" (Moorman et al., 1992, p. 316).

It is obvious that branding is well researched in the general marketing literature. However, the effect of branding in the search engine area has received scant attention (Ha & Perks, 2005; Sicilia, Ruiz, & Reynolds, 2006), although the effect has received some acknowledgement. For example, Jansen et al. (2009) investigated the effect of brand awareness, and Bailey et al. (2007) examined brand name influences users' preference. In addition, some researchers have discussed building profitable online customer-brand relationships (Chaston & Mangles, 2003; Fink, Zeevi, & Te'eni, 2008; Thorbjomsen, Supphellen, Nysveen, & Pederson, 2002; Vriens & Grigsby, 2001). Brand trust and loyalty are also significant constructs in the Internet marketing literature (Falk, Sockel, & Warren, 2007; Reicheld & Schefter, 2000; Turban, Lee, King, & Chung, 2001). Brand attitude (Balabanis & Reynolds, 2001) and brand familiarity (Park & Stoel, 2005) have also received some attention in the Internet marketing literature.

Regarding branding effects on search engines, Jansen, Zhang, and Schultz (2009) extended the existing literature by investigating the effect of brands, specifically brand awareness, on the process of evaluating search engines during Web searches. The authors found that branding affects Web searches during four stages: (1) search engine selection, (2) search engine results page evaluation, (3) individual link evaluation, and (4) evaluation of the landing page. Jansen et al. (2009) state that a positive search engine brand is worth approximately 10 to 15 percent in user perception of performance (i.e., defined by user judgment of relevant results). However, their research involved only one aspect of branding, which is

brand awareness. Contrary to their findings, Bailey et al. (2007) reported no significant preference for one brand name label over the other. They did two experiments, comparing results labeled “Google” relative to those labeled “Yahoo!” (first experiment) and “WebKumara” (a fictitious name) relative to “Yahoo!” (second experiment). The results, however, were branded only with a name, rather than, for example, colors and logos. Except for these two articles, we located no published works investigating brands in the Web search engine area.

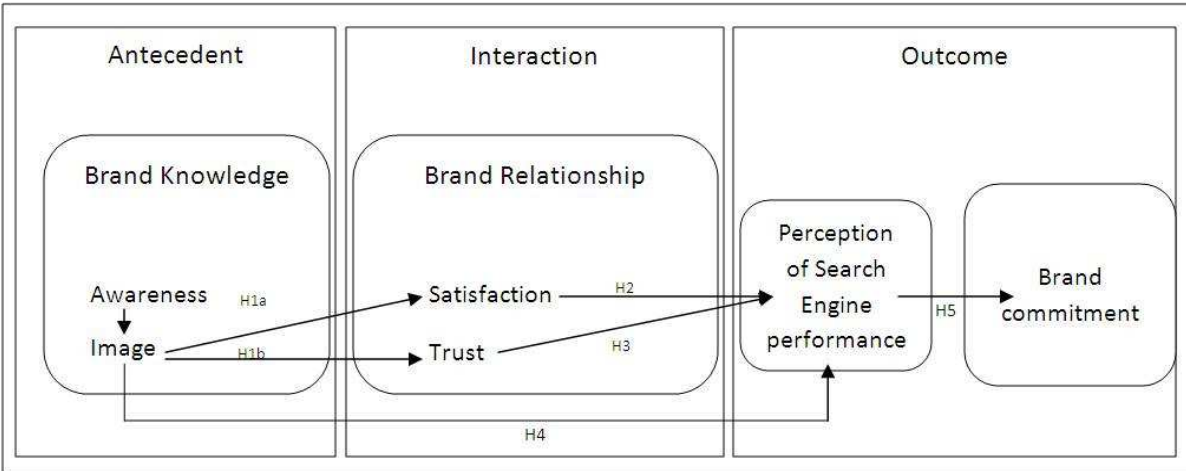
In the present study, we generally extend existing research by developing a conceptual model and conducting empirical research to investigate the impact of brand knowledge and brand relationships on users’ overall search processes. We also investigate aspects of brand awareness in the overall search engine marketplace, the reaction to Web search engine logos, and brand perception among major search engines. Therefore, we present a more comprehensive examination of search engine branding than currently exists.

Research Questions

This research has two main goals. First, we explore the influence of brand knowledge and brand relationship on users’ perceptions of search engine performance. Second, we examine consumer reactions to search engine brand logos, the role of brand awareness, and the effect of brand image on consumer perceptions of Web search engines.

To achieve our first goal, this study develops a comprehensive model that combines brand knowledge and brand relationship perspectives and links brand knowledge and relationships to current and future purchases. Our model is adopted from Esch et al. (2006). In their study using tangible products, the authors found that brand knowledge alone is not sufficient for building strong brands in the long term. Brand relationship factors must be considered as well. Unlike strictly tangible goods, search engines are a mix of technology and service (i.e., tangible and intangible). Hence, it is possible that branding effects might differ in this context due to a higher level of uncertainty and risk. Therefore, the current study refined Esch et al.’s (2006) model to test the importance of brand relationships in an online branding environment (see Figure 1 below).

Figure 1. Conceptual model.



Esch et al. (2006) found that the indirect effects of brand knowledge via brand relationships on behavioral outcomes are larger than its direct effects, which indicates that brand relationship variables are critical for predicting future behaviors. This implies that a familiar brand with a positive image must build a positive brand relationship with the consumer to secure future purchases. Direct effects mean a straight relationship between brand knowledge and behaviors. The higher the brand knowledge, the higher the possibility that the consumer will make a purchase. Indirect effects suggest another path between brand knowledge and future behaviors, which has brand relationship as a mediator. Specifically, this path is that brand knowledge has a positive effect on brand relationship, and brand relationship has a positive effect on behavior outcomes. Therefore, brand knowledge has an indirect effect on behaviors. Without a positive relationship, brand knowledge itself has less power influencing consumers' purchasing behaviors. In our study, we want to test their proposition in a different context, specifically the Web search engine area.

Therefore, our first research question is: *Is brand relationship a significant factor compared to brand knowledge in predicting users' perception of search engine performance?*

To investigate this research question, we first look at the function of brand knowledge and how it can influence customer satisfaction and trust. Searching memory for product-related information is fast and requires relatively little cognitive effort (Punj & Staelin, 1983). Moreover, consumer knowledge about specific brands tends to reduce the need for additional information (Moorthy, Ratchford, & Talukdar, 1997). According to Esch et al. (2006), brand knowledge is an antecedent to brand relationship. Unless a consumer has a representation of the brand in memory (including awareness and a positive image), he or she cannot be satisfied by the brand or trust the brand. The positive relationship between brand

knowledge and users' perception of Web search engines has not been investigated in the Web searching area. Therefore, for search engines as both tangible and intangible products, we predict the following:

H1. *Brand knowledge has a positive effect on brand relationship.*

H1a. *Brand image has a positive effect on brand satisfaction.*

H1b. *Brand image has a positive effect on brand trust.*

Hess and Story (2005) proposed that satisfaction primarily leads to functional connections between customers and brands while trust builds into personal connections. The authors found that customer relationships travel through many iterations, from functionally (satisfaction) to personally (trust) based, and perhaps back again, as customers experience the brand's products, modify trust, and re-evaluate accrued costs and benefits of the relationship. The combination of functional and personal connections results in better perception of brand's products. In this study, we believe that satisfaction and trust lead to a sense of greater search engine performance.

H2. *Brand satisfaction has a positive effect on users' perception of search engine performance.*

H3. *Brand trust has a positive effect on users' perception of search engine performance.*

The positive relationship between brand awareness and user perception of searching performance has already been shown by Jansen et al.'s (2009) laboratory experiment. However, they did not examine the effect of brand image on performance perception. In line with the theory of cognitive psychology, Andreassen and Lindestad (1998) demonstrated that brand image can function as a filter in the perception of quality, value, and satisfaction and as a simplification of the decision-making process when consumers choose where to purchase services. The study indicated that brand image may have a direct effect on users' perception of search engine performance, rather than just an indirect effect through brand relationship. If this hypothesis is supported, companies can acquire better performance perception in the market by just establishing a positive brand image. It is unnecessary to build a relationship with customers. In the current study, we propose the following:

H4. *Brand image has a direct positive effect on users' perception of search engine performance.*

Since the effect of brand satisfaction on brand attachment was not supported in Esch et al.'s study (2006), we use brand commitment to replace attachment in the present conceptual model. Commitment is recognized as an essential ingredient for successful long-term relationships (Dwyer, Schurr, & Oh, 1987;

Morgan & Hunt, 1994). In the context of brands, it has been shown that commitment to a brand saves a customer the cost of seeking new relationships with other brands (Chaudhuri & Holbrook, 2001). After clarifying the importance of brand commitment, we predict that positive perception of search engine performance will increase commitment to certain brands:

H5. *Greater perception of search engine performance will lead to higher level of brand commitment.*

After the discussion of these hypotheses above, which are based on our conceptual model, the next section explores some qualitative research questions, which are not related to the model, to address consumer reactions to search engine brand logos and the role of brand awareness and brand image in consumer perceptions of Web search engines.

Research question 2: *Do different search engine logos cause different brand responses?*

For this research question, we were interested in a narrow focus of brand, specifically a potential customer's reaction to a search engine logo. A logo can evoke both positive and negative reactions to the brand with little or no processing of information (Schechter, 1993). Henderson and Cote (1998) showed that design characteristics affect customers' reactions to logos before any promotional activity being implemented. Successful logo designs could speed recognition of a company or brand (Peter, 1989); elicit familiarity and positive effective reactions, which can transfer from the logo to the product or company (Henderson & Cote, 1998); and evoke the same intended meaning across people (Durgee & Stuart, 1987; Kropp, French, & Hilliard, 1990; Vartorella, 1990).

Research question 3: *What are different levels of brand awareness for the various major search engines?*

Brand awareness plays an important role in consumer decision making. Brand awareness increases the likelihood that the brand will be a member of the consideration set (Keller, 1993), the handful of brands that receive serious consideration for purchase; influences the formation and strength of brand associations in the brand image; and affects decisions even if there are essentially no other brand associations. In the search engine area, we propose that brand awareness can influence customers' selection of Web search engines when consumers think about the product category.

To measure brand awareness, there are three major methods: *top of mind*, *spontaneous*, and *aided recall*. Top of mind was one of the first brand awareness measures to receive attention, emerging as one of the

best ‘predictors’ of choice in Axelrod’s (1968) longitudinal study (Romaniuk, Sharp, Paech, & Driesener, 2004). Dickson and Sawyer (1990) suggested top of mind should be applied to low-involvement impulse purchases, which is exactly the category to which search engine selection belongs. Percy and Rossiter (1992) argued that when options are present at the time of purchase (e.g., brands on a supermarket shelf) then aided recall is relevant. When options are not available, spontaneous awareness should be used. Beyond the decision-making point of search engine selection, no options are present for users. Therefore, in this study, spontaneous recall rather than aided recall was adopted. In conclusion, top of mind and spontaneous recall are the methods we use to measure brand awareness.

The fourth and last research question is: *What are the brand perceptions for different search engines?*

While branding may be acknowledged for its importance in marketing of products and services, there has been little research investigating the brand effect on the evaluation of search engine performance. This lack of research is surprising. In the cognitive psychology area, brand image has been shown to stimulate certain areas of the human brain (Born, Meindl, Poeppel, Schoenberg, & Reiser, 2006; Plassmann et al., 2006). In the marketing literature, researchers have conducted extensive research on brand-related topics from various perspectives (Danaher, Conroy, & McColl-Kennedy, 2008; Hess & Story, 2005). For this research question, we are interested in branding from the customer’s or brand recipient’s perspective. For a brand recipient, such as a Web search engine user, a brand may exert an identification image, a discrimination function, a quality assurance, a prestige, or a trust function (Keller, 2007).

Chapter 3. METHODOLOGY

Data Collection

To empirically test our hypotheses and address our research questions, we surveyed 207 college students at a large public US university. Prior research has showed that 18-34 year olds are the heaviest users of the Internet compared with other groups in the population (comScore, 2004). In fact, Lee and Johnson (2002) reported that college students are particularly likely to be potential Internet shoppers. Therefore, student samples are appropriate for research concerning online behaviors, and accordingly, students are commonly used (Li, Browne, & Wetherbe, 2007). Before collecting the actual survey data, we conducted two pilot tests with 15 undergraduate students and 12 graduate students, respectively, to check the validity and reliability of the measurement items. After the first pilot test, we made minor wording changes and order changes to the instrument and then administered the instrument in a second round of pilot testing, after which we were satisfied with the instrument.

The survey was administered in an undergraduate university course that has 250 students, with 207 responding for a response rate of 82.8 percent. Respondents were given incentives to participate by winning prizes.

Measurement

The survey was composed of three main sections (see Appendix I). In the first section, the participants had to picture themselves in the scenario, report which search engine they would use for the task (i.e., *spontaneous awareness*), and why. Selecting a flower supplier was the task due to the following reasons: (1) e-commerce is one of the largest categories of Web searches (Spink, Jansen, Wolfram, & Saracevic, 2002), and (2) flower suppliers have less of a branding effect relative to other businesses. Chen (2001) found that when branding is less strong (e.g., flower purchasing), the customer may simply search by product category instead of searching for suppliers by brand name (e.g., BMW dealers in the area).

The participants were then asked to list their three favorite search engines that they currently use (i.e., *top-of-mind awareness*). To clarify the reasons for choosing a self-selected search engine, we generated a list of potential reasons, composed of items such as dependable, reputation, and trustworthy, by examining previous literature (Jansen & McNeese, 2005), and generalized the results of a pre-survey during our pilot study. This provided a participant's top search engines (three or less) and perceived factors for continued use of these search engines.

The participants were then asked a series of questions to evaluate our search engine branding model (see Figure 1). All of the measurement items were adapted from the previous research to ensure their reliability and validity. Each item was measured using a 1- to 7-point Likert scale, except for brand awareness, which is qualitative in nature. Table 2 provides the survey constructs, the survey items, and appropriate literature for part 1 of the survey.

Table 2. Measurements.

<i>Constructs</i>	<i>Items</i>	<i>Source</i>
Brand awareness	1. Spontaneous awareness 2. Top-of-mind awareness	(Laurent, Kapferer, & Roussel, 1995)
Brand image	1. Bad/Good 2. Negative/Positive 3. Dislike/Like 4. Unfavorable/Favorable	(Garretson & Burton, 1998; Goodstein, 1993; MacKenzie, B., & Belch, 1986; Miniard, Bhatla, Lord, Dickson, & Unnava., 1991)
Satisfaction	1. In general, I believe this search engine does a good job for me. 2. Overall, I am satisfied with this search engine. 3. This is one of the best search engines I have encountered.	(Swan & Oliver, 1989) (Swan & Oliver, 1989) (Westbrook & Oliver, 1981)
Trust	1. This search engine cannot be trusted at times. 2. This search engine can be counted on to do what is right. 3. This search engine has high integrity.	(Morgan & Hunt, 1994)
Commitment	1. I feel a sense of attachment to this search engine. 2. I care about the long-term success of this search engine. 3. I am a loyal patron of this search engine.	(Garbarino & Johnson, 1999)
Perception of search engine performance	1. This search engine is simple to use, even when using it for the first time. 2. Links provided by this search engine are more relevant than those provided by some other search engines. 3. Result pages provided by this search engine have better quality than those provided by some other search engines.	(Flavian & Guinaliu, 2005) (Items 2 and 3 are created by the researchers based on Jansen et al.'s (2009) study.)

In the second portion of the survey, participants were exposed to 10 search engine logos. The logos from nine search engines were taken from actual Websites of search engines, and one logo was a fake search engine.

The 10 search engines logos we employed are as follows:

- A9: <http://www.a9.com/>
- AI²RS: the fake search engine
- AlltheWeb: <http://www.alltheweb.com/>
- AOL search: <http://search.aol.com/aol/webhome>
- Ask.com: <http://www.ask.com/>
- Dogpile: <http://www.dogpile.com/>
- Google: www.google.com
- Live search: www.bing.com
- Mahalo: <http://www.mahalo.com/>
- Yahoo!: www.yahoo.com

Two questions adopted from Henderson and Cote (1998) measured meaning consensus and effective impressions of the search engine. Specifically, *Please provide the first meaning or association that comes to your mind by looking at the logo?* addressed the reaction to the search logo. The section question, *What is your overall impression of the search engine?* addressed aspects of brand perception. The participants were asked whether they had ever used the search engine, and whether they currently use the search engine, which provided us with an indication of the brand awareness and brand marketplace penetration of each.

The final portion of the survey involved demographic information (gender, age, and ethnicity), as well as background information concerning the students' ability to use search engines. According to information system (IS) researchers, technology experience is a strong predictor of both attitudes and behavior toward the technology (Thompson, Higgins, & Howell, 1994). Several studies have found that experts and novices use IS differently (King & Xia, 2007) to determine the nature of search engine use by students, questions addressed their frequency of search engine use, and online purchasing behaviors.

Data Analysis

We used a mixed method of quantitative and qualitative approaches.

To evaluate our model for research question 1 (*Is brand relationship a significant factor compared to brand knowledge in predicting users' perception of search engine performance?*), we employed structural equation modeling (SEM).

SEM is a multivariate data analysis technique that combines aspects of multiple regression (structural path analysis) and factor analysis (measurement of latent constructs with multiple items) to estimate a series of interrelated dependence relationships (Kline, 2005). Social scientists and marketing academics use SEM to investigate complex relationships underlying human decision making, purchase behavior, and other phenomena of research interest (Bollen, 1989).

The internal consistency of the scales was assessed by determining the Cronbach alphas for each scale. The Cronbach alpha coefficients were 0.912 for brand image, 0.918 for satisfaction, 0.755 for trust, 0.794 for commitment, and 0.769 for perception, suggesting high internal validity. An examination of the item-to-total correlations for closeness and relationship-specific investments were conducted. None of the items were lower than 0.40; therefore, all were retained.

Table 3. Reliability and validity test.

<i>Scale Items</i>	<i>Correlated item-Total Correlation</i>	<i>Cronbach Alpha</i>	<i>Factor Loading</i>	<i>Factor Loading (after 2 items were deleted)</i>
Image		.912		
Image1	.830		.851	.855
Image2	.766		.834	.838
Image3	.802		.831	.834
Image4	.844		.870	.874
Satisfaction		.918		
Satisfaction1	.850		.828	.840
Satisfaction2	.870		.811	.835
Satisfaction3	.789		.743	.754
Trust		.755		
Trust1	.459		.401	Deleted
Trust2	.652		.691	.688
Trust3	.674		.713	.704
Commitment		.794		
Commitment1	.599		.712	.733
Commitment2	.646		.855	.861
Commitment3	.672		.795	.795
Perception		.769		
Perception1	.492		.661	.671
Perception2	.669		.644	.631

<i>Scale Items</i>	<i>Correlated item- Total Correlation</i>	<i>Cronbach Alpha</i>	<i>Factor Loading</i>	<i>Factor Loading (after 2 items were deleted)</i>
Perception3	.672		.562	Deleted

We conducted an exploratory factor analysis to identify dimensions of branding effect using principal component analysis with varimax rotation. Factor loadings of each item ranged from 0.401 to 0.870. We deleted the first item measuring trust, since it did not exceed the minimum loading criterion of 0.50, and the third item measuring perception because it almost equally loaded under two dimensions (0.562 and 0.488). After these two items were deleted, all items exceeded the minimum loading criterion (see Table 3). For dimensions of the branding effect, five factors (brand image, satisfaction, trust, attachment, and perception) were expected. Yet, the exploratory factor analysis produced a three-factor solution. This result was acceptable considering that brand satisfaction and trust were under the broader umbrella of brand relationship.

An initial confirmatory factor analysis was specified using AMOS 17.0 to determine the measurement properties of the scales and composite measures, as well as to determine whether any adjustments were needed to enhance model parsimony (Anderson & Gerbing, 1988; Hair, Anderson, Tatham, & Black, 1998). Using the standardized parameter estimates for the observed items, composite reliability was calculated for the latent variables (Hair et al., 1998). Results showed that the composite reliability for attachment is negative, because the error term for the second item measuring attachment exceeded 1. Therefore, attach2 was excluded from the measurement model. After this item was dropped, a second revised confirmatory factor analysis was specified. The results can be summarized as follows. The overall model χ^2 is 167.8 with 63 degrees of freedom ($p < 0.001$). The comparative fit index (CFI) is 0.942. The overall goodness of fit index (GFI) is 0.896, and the root mean square error of approximation (RMSEA) is 0.09. The parsimony normed fit index (PNFI), which is useful in comparing model fits, is 0.736. Therefore, the model was demonstrated to fit the data reasonably well.

Because retaining each item as a reflective indicator of its constructs would result in identification problems, we followed Sujan, Weitz, and Kumar's (1994) recommendation and combined the items measuring each construct into a single indicator measure. The error for each construct was set at one minus the composite reliability.

Sentiment analysis

To investigate research questions 2 (*Do different search engine logos cause different brand responses?*), 3 (*What are different levels of brand awareness for the various major search engines?*), and 4 (*What are the brand perceptions for different search engines?*), we performed a sentiment analysis (Pang & Lee, 2008) on the participant comments on the logos and search engines. Specifically, we open coded (Gibbs, 2002) the responses for positive, negative, and neutral sentiments and conducted a term and two-term phrase analysis. Labels for the sentiment responses were defined as follows:

- **Positive:** Purely positive in tone and wording. May have the smallest negative word, but the comments have almost totally great-sounding phrases. For example, “awesome,” “good,” and “it’s the best.”
- **Negative:** Practically pure negative overall feelings of the comments. For example, “bad,” “low quality,” and “hard to use.”
- **Neutral:** Has no feeling words or special punctuation, matter-of-fact sounding, or just a mention. For example, “Chemistry,” “okay, social search engine,” and “never saw before.”

Term analysis

A linguistic analysis of the participant comments was performed. A term analysis helps define a set of terms that describe a logo’s impression or the perception of a search engine in the mind of a set of respondents. We uploaded all comments into a relational database and generated a term table and a term co-occurrence table for each set of comments. The term table contained fields for terms, the number of that term’s occurrence in the complete data set, and the probability of that term’s occurrence. The co-occurrence table contains fields for term pairs, the number of times that pair occurs within the data set irrespective of order, and the mutual information statistic (Church & Hanks, 1990).

The mutual information statistic formula measures term association and does not assume mutual independence of the terms within the pair. We calculated the mutual information statistic for all term pairs within the data set. Frequently, a relatively low-frequency term pair may be strongly associated (i.e., if the two terms always occur together). The mutual information statistic identifies the strength of this association. The mutual information formula used in this research is as follows:

$$I(w_1, w_2) = \ln \frac{P(w_1, w_2)}{P(w_1)P(w_2)}$$

where $P(w_1)$ and $P(w_2)$ are probabilities estimated by relative frequencies of the two words and $P(w_1, w_2)$ is the relative frequency of the word pair (order is not considered). Relative frequencies are observed frequencies (F) normalized by the number of the queries:

$$P(w_1) = \frac{F_1}{Q'}; P(w_2) = \frac{F_2}{Q'}; P(w_1, w_2) = \frac{F_{12}}{Q'}$$

Both the frequency of term occurrence and the frequency of term pairs are the occurrence of the term or term pair within the set of queries. However, since a one-term query cannot have a term pair, the set of queries for the frequency base differs. The number of queries for the terms is the number of non-duplicate queries in the data set. The number of queries for term pairs is defined as follows:

$$Q' = \sum_n^m (2n - 3) Q_n$$

where Q_n is the number of queries with n words ($n > 1$), and m is the maximum query length. So, queries of length one have no pairs. Queries of length two have one pair. Queries of length three have three possible pairs. Queries of length four have five possible pairs. This continues up to the queries of maximum length in the data set. The formula for queries of term pairs (Q') accounts for this term pairing.

Results

The analysis of 207 respondents' demographic information reveals that 54.1 percent of the respondents were female. For age, 94.2 percent reported an age of 18-24, 5.3 percent were 25-32, and one respondent was 47. For racial make-up, 77.3 percent respondents were White, 15.9 were Asian, 4.3 percent Hispanic, and 2.4 percent were African American. In terms of the other characteristics of respondents, 98.4 percent of respondents claimed high frequency of search engine usage (≥ 4), and 54.1 percent reported high frequency of online shopping (≥ 4); only 5 out of 207 rated their search ability as not really skilled (< 4).

We used SEM to address research question 1 (*Is brand relationship a significant factor compared to brand knowledge in predicting users' perception of search engine performance?*). The model was estimated using the maximum likelihood method. Table 4 presents the standardized path coefficients for the model.

Table 4. Standardized path coefficients.

<i>Hypothesis</i>	<i>Paths</i>	<i>Standardized Coefficient</i>	<i>Significance Level</i>
H1a	Image→Satisfaction	0.777	p<0.001

H1b	Image→Trust	0.804	p<0.001
H2	Satisfaction→Perception	0.462	p<.0001
H3	Trust→Perception	0.207	p<0.01
H4	Image→Perception	0.022	p=0.846
H5	Perception→attachment	0.617	p<0.001

One of the tested paths (brand image → perception of search engine performance) was not statistically significant ($p > .1$). Therefore, hypothesis 4 was not supported. This indicates that brand image did not have a direct influence on users' perception of search engine performance. However, the indirect effect of brand image on perception via the relationship path was significant, although trust has a total effect of only 0.207 on perception. This is reasonable considering the tremendous discussion of trust issues in the Internet research area (Bart, Shankar, Sultan, & Urban, 2005; Belanger, Hiller, & Smith, 2002; Yoon, 2002). All other paths were significant ($p < 0.001$); therefore, hypotheses 1a, 1b, 2, 3, and 5 are supported.

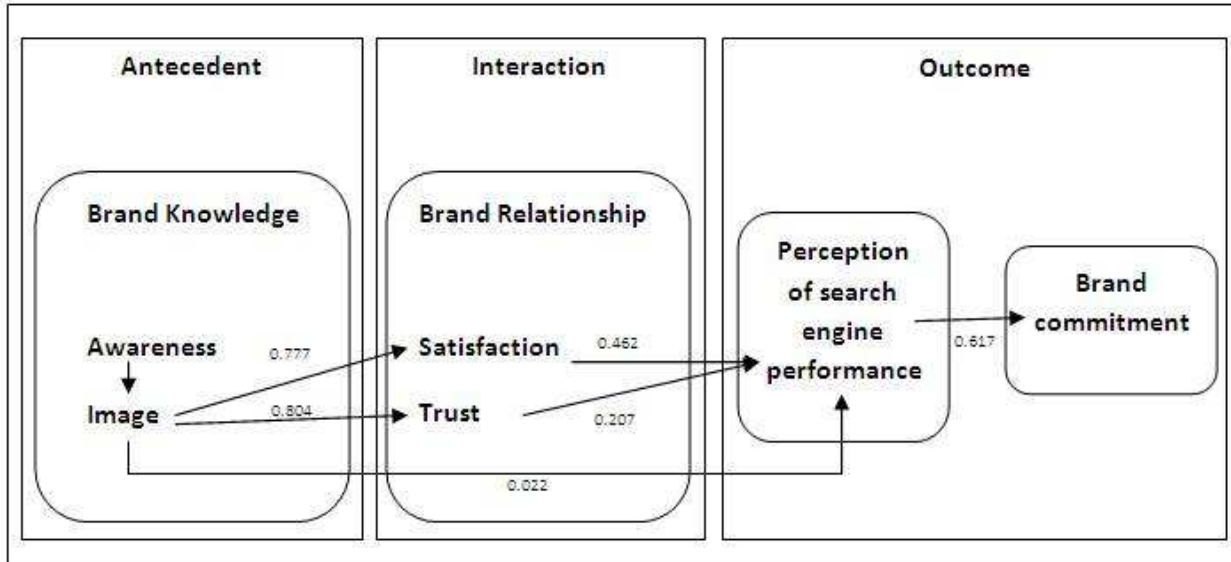
Specifically, the model explains 77.7 percent of the variance in customer satisfaction, 80.4 percent of the variance in trust, 66.2 percent of the variance in users' perception of search engine performance, and 61.7 percent of the variance in customer attachment to certain search engine brands. These findings suggest that brand image positively influences users' satisfaction and trust, and these two variables in turn lead to a better perception of performance. Greater performance perception will further increase users' attachment to certain search engine brands.

The SEM results support most of our hypotheses about the inner model relationships. Our findings show that *brand relationship* between search engines and their customers has a strong and significant impact on perception of search engine performance. Specifically, higher levels of *satisfaction* and *trust* result in a significantly greater increase in the brand's positive perception. Based on the data analysis, it is not difficult to notice that brand relationship variables (*satisfaction* and *trust*) are critical for predicting users' perception of search engine performance rather than brand knowledge variable (*brand image*).

The conceptual model presented in this study offers the best explanation of the relationships among the constructs included in this research. The model provides evidence supporting four of the five proposed hypotheses. The results show that the perception of brand image has a significant, direct impact on customer satisfaction and trust on search engine brands, in support of H1a and H1b, but brand image does not affect performance perception directly, which leads us to reject H4. The results of the current study also show that change in customer satisfaction and trust have a significant effect on performance perception, but trust explains only 20.7 percent of the variance in performance perception, in full support

of H2 and partial support of H3. Consistent with our expectations, perception of search engine performance has a direct relationship with brand attachment; therefore, H5 is supported.

Figure 2. Conceptual model with path loadings.



This conceptual model not only supports the relationship between classic marketing concepts, such as brand awareness, brand image, and brand satisfaction, but also incorporates relationship-based variables (trust and commitment) in the context of intangible products such as search engines.

For research question 2 (*Do different search engine logos cause different brand responses?*), the results from our sentiment analysis are shown in Table 5.

Table 5. Sentiment analysis of search engine logos.

Search Engine Logo	Positive	%	Negative	%	Neutral	%	Confusing	%	No response	%	Total
Google	131	63.3%	1	0.5%	28	13.5%	1	0.5%	46	22.2%	207
Yahoo!	79	38.2%	17	8.2%	53	25.6%	1	0.5%	57	27.5%	207
Ask	55	26.6%	15	7.2%	81	39.1%	0	0.0%	56	27.1%	207
AlltheWeb	53	25.6%	51	24.6%	35	16.9%	4	1.9%	64	30.9%	207
Dogpile	39	18.8%	55	26.6%	48	23.2%	4	1.9%	61	29.5%	207
AOL	30	14.5%	29	14.0%	89	43.0%	0	0.0%	59	28.5%	207
A9	22	10.6%	16	7.7%	64	30.9%	20	9.7%	85	41.1%	207
Mahalo	21	10.1%	21	10.1%	83	40.1%	7	3.4%	75	36.2%	207
MSN Live	18	8.7%	32	15.5%	81	39.1%	2	1.0%	74	35.7%	207

AI ² RS	9	4.3%	96	46.4%	33	15.9%	8	3.9%	61	29.5%	207
Total	456	22.0%	333	16.1%	595	28.7%	47	2.3%	638	30.8%	2070

Note: The highest value in each column is **bolded**.

A cross tab analysis ($\chi(60)=2730.605$, $p<0.01$) clearly shows that there were different brand responses among the search logos. Several search engine logos elicited positive sentiment, including Google (63 percent), Yahoo! (38 percent), and Ask (27 percent). These three logos elicited mainly positive sentiment with little negative sentiment. This is in contrast to logos that elicited considerable negative sentiment, including AI²RS (46 percent) and Dogpile (27 percent). One logo generated positive and negative comments, AlltheWeb (26 percent positive and 25 percent negative). The logo for A9 was confusing to many respondents, who said the logo reminded them of AOL or a dog.

The logo with the most negative sentiment by far was the AI²RS logo, which many participants associated with math or science due to the superscript. Dogpile also received a significantly negative reaction due to its close similarity to a phrase meaning canine feces, with comments such as “*bad name because gives the idea the answers are shitty.*” AlltheWeb also received a significantly negative reaction due to its logo design, which, according to users’ comments, is too cluttered.

It is worthwhile to note that this ranking of responses to brand logos (from positive to negative) exactly reflected the marketplace ranking of the search engines. As well-known search engine brands, Google, Yahoo!, and Ask evoked the most positive sentiment; meanwhile, they are the three of the biggest market share holders. On the other hand, less-well-known ones, such as Mahalo, A9, and AI²RS (fictitious), share a small (to zero) portion of the market in reality. Moreover, it is interesting to see MSN Live, which changed its name to Bing recently (May 28, 2009), at such a lower ranking. This may hint at a problem existing in the brand name or logo design.

We conducted a term analysis of participant comments, by conducting a term frequency analysis of all participant comments. Table 6 shows the results along with the probability of the term occurring in the set of participants.

Table 6. Term analysis of search engine logos comments.

A9			AI ² RS			AlltheWeb			AOL		
Terms	Freq	%	Terms	Freq	%	Terms	Freq	%	Terms	Freq	%
Never	13	5.1	Math	30	9.3	search	11	2.6	aol	54	16.7
Search	11	4.3	Complicated	10	3.1	find	10	2.3	search	17	5.2
Engine	10	4.0	Never	8	2.5	everything	9	2.1	aim	17	5.2
Amazon	9	3.6	Like	7	2.2	engine	9	2.1	engine	11	3.4
Like	8	3.2	Looks	6	1.9	logo	6	1.4	good	7	2.2

Heard	8	3.2	scientific	6	1.9	never	6	1.4	mail	5	1.5
Looks	6	2.4	Engine	6	1.9	Web	6	1.4	use	5	1.5
Idea	5	2.0	Know	5	1.6	good	5	1.2	reliable	4	1.2
a9	4	1.6	Search	5	1.6	Internet	5	1.2	instant	4	1.2
Nothing	4	1.6	Science	4	1.2	computer	4	0.9	america	3	0.9
Dogpile			Google			Mahalo			MSN Live		
Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%
Dogs	21	5.5	Search	23	7.0	hawaii	47	21.9	windows	33	13.6
Dog	17	4.5	Google	21	6.4	never	11	5.1	microsoft	22	9.1
Search	10	2.6	Engine	16	4.9	beach	8	3.7	search	11	4.5
Engine	8	2.1	Best	10	3.0	heard	7	3.3	engine	9	3.7
Funny	7	1.8	Reliable	9	2.7	hawaiian	5	2.3	boring	9	3.7
Name	7	1.8	Good	8	2.4	pretty	4	1.9	msn	6	2.5
Pile	6	1.6	Use	8	2.4	search	4	1.9	live	6	2.5
Animals	6	1.6	Popular	7	2.1	tropical	3	1.4	reliable	5	2.1
Shit	5	1.3	awesome	5	1.5	vacation	3	1.4	computer	3	1.2
Info	5	1.3	Familiar	5	1.5	cute	3	1.4	familiar	3	1.2
Ask			Yahoo!								
Terms	Freq.	% (%)	Terms	Freq.	% (%)						
Ask	36	9.4	yahoo	24	7.9						
Jeeves	30	7.8	search	14	4.6						
Question	25	6.5	engine	10	3.3						
Question	20	5.2	good	10	3.3						
Answer	7	1.8	fun	7	2.3						
Search	7	1.8	popular	5	1.6						
Engine	6	1.6	commercial	5	1.6						
Good	5	1.3	reliable	5	1.6						
Answers	5	1.3	2nd	5	1.6						
Helpful	3	0.8	favorite	4	1.3						

Table 6 shows some interesting associations with some of these logos. The most notable is Google, with a string of very popular term identifiers. Yahoo! also has many positive terms associated with its logo, although there were several comments relating to the Yahoo! television commercial. There were several logos where some other aspect was associated with the logo rather than general search. For example, math with Al²RS, questions with Ask, dogs with Dogpile, and Hawaii with Mahalo. It indicates that the design of a search engine logo can raise not only positive effects but also negative and neutral effects. There were some cross-brand associations with AOL (with AIM) and MSN Live (with Windows). Well-designed logos should elicit consensually held meanings and evoke a positive effect (Peter, 1989; Vartorella, 1990). Managers should consider redesigning logos if the meanings the managers want to express are different from consumers' perceptions.

We also conducted a phrase analysis (two terms), as presented in Table 7. The phrase and frequency are shown as well as the mutual information statistic, which shows the strength of the term relationship (the higher the better).

Table 7. Phrase analysis of search engine logos comments.

A9			A ² RS			AlltheWeb			AOL		
Phrase	Freq.	MIS	Phrase	Freq	MIS	Phrase	Freq	MIS	Phrase	Freq	MIS
search engine	9	3.35	search engine	5	3.90	search engine	8	3.02	search engine	10	2.58
never heard	8	3.29	don't know	5	3.90	find it	5	1.80	aol search	4	0.08
no idea	10	3.66	never heard	3	3.61	everything find	4	3.01	up aim	3	2.68
never seen	9	3.29	no idea	3	3.90	you find	4	2.90	not good	3	3.28
no clue	8	3.66	never seen	3	3.61	don't know	3	1.69	use aol	3	1.01
Dogpile			Google			Mahalo			MSN Live		
Phrase	Freq	MIS	Phrase	Freq	MIS	Phrase	Freq	MIS	Phrase	Freq	MIS
search engine	8	3.32	search engine	15	2.70	never heard	6	3.05	search engine	7	2.89
dog shit	3	2.28	best search	3	1.93	never seen	3	3.21	don't use	3	4.44
something dogs	3	2.29	easy use	3	3.31	hawaii hello	2	1.76	don't know	2	4.44
middle school	3	4.52	good search	3	2.15	never used	2	3.21			
dog pile	2	1.69	I love	2	2.91	travel site	2	4.91			
Ask			Yahoo!								
Phrase	Freq	MIS	Phrase	Freq	MIS						
ask jeeves	17	1.49	search engine	10	3.01						
ask question	8	1.14	my favorite	2	3.57						
question you	7	2.51	yahoo like	2	1.78						
search engine	5	3.51	2nd favorite	2	3.35						
ask questions	5	0.45	good search	2	1.74						

In Table 7, we see that the Google logo elicited some extremely positive phrases with Yahoo! logo eliciting some also. The A9 logo provided no contextual clue for many participants (e.g., *no idea*, *no clue*), as did the A²RS logo. The Ask logo was routinely associated with question asking and the company's previous logo, Ask Jeeves. Dogpile was linked to a dog search engine or dog feces, and Mahalo was linked to a search engine for Hawaiian information or Hawaiian travel. Obviously, these are not the brand images that these companies want associated with their logos. Keller (1993) argued that marketing stimuli should communicate one clear message that is difficult to misinterpret. As one of the

most important visual stimuli, a logo should be able to deliver a clear and consensual meaning to the users. An appropriately designed logo can bring considerable benefits to the company.

Concerning research question 3 (*What are different levels of brand awareness for the various major search engines?*), we investigated this at various levels.

Table 8. Brand awareness (top-of-mind).

<i>Search Engine</i>	<i>Occurrences</i>	<i>%</i>
Google	195	94.2
Yahoo	10	4.8
Ebate	1	0.5
Glowers	1	0.5
Total	207	100

Table 8 shows the results of the brand name that first came to the users' minds when users were asked to identify a search engine to search for an online flower store. In Table 8, we see that Google was the first brand recalled in response to the product category cue. Of the users, 94.2 percent prefer Google when they need to search for certain information. Yahoo! possesses the second position, but only 10 users chose Yahoo! in the experimental scenario. Some customers went directly to specific Websites (e.g., Ebate and Glowers) instead of using a general purpose search engine. The absence of MSN and Ask is surprising, which suggested that they are not the first choices when users conduct a search. In fact, some users switch to a different search engine when they cannot complete their task by using the one they first selected, but most users revealed that they will give up after searching on their first choice, for example, "things [that] cannot be found on Google cannot be found anywhere."

Table 9. Brand awareness (spontaneous recall).

<i>Search Engine</i>	<i>1st Choice</i>	<i>%</i>	<i>2nd Choice</i>	<i>%</i>	<i>3rd Choice</i>	<i>%</i>
Google	197	95.2	12	5.8	5	2.4
Yahoo	10	4.8	118	57.0	25	12.1
<i>blank</i>			22	10.6	83	40.1
Ask			20	9.7	44	21.3
AOL			6	2.9	12	5.8
MSN			8	3.9	10	4.8
Dogpile			4	1.9	5	2.4
Firefox			1	0.5	4	1.9
Wikipedia			2	1.0	3	1.4
AltaVista			1	0.5	3	1.4
Naver			3	1.4	1	0.5
Baidu			3	1.4		
Comcast			2	1.0	1	0.5

<i>Search Engine</i>	<i>1st Choice</i>	<i>%</i>	<i>2nd Choice</i>	<i>%</i>	<i>3rd Choice</i>	<i>%</i>
Amazon					2	1.0
Internet Explorer			1	0.5	1	0.5
AIM					1	0.5
AlltheWeb					1	0.5
Daum					1	0.5
Good Search					1	0.5
Icerocket			1	0.5		
Mamma					1	0.5
Safari			1	0.5		
Search.com					1	0.5
Sogou					1	0.5
Vivisimo					1	0.5
Webmo			1	0.5		
Yamli.com			1	0.5		
Total	207	100	207	100	207	100

Note: The highest value in each column is **bolded**.

Table 9 measures different levels of brand awareness but with spontaneous recall as the particular measure. Participants were asked to list three their most favorite search engines (the ones the participants actually use).

The results showed that 95.2 percent users listed Google as their most favorite search engine, and the other 4.8 percent chose Yahoo!, which is consistent with the results shown in Table 8. In terms of the second favorite search engine, the distribution is more spread out. Yahoo (57.0 percent), Ask (9.7 percent), and Google (5.8 percent) were the three most popular search engines in this category. It is interesting to note that, among these 12 users who chose Google, 10 listed Yahoo! as their first choice, which indicated the competitive relationship between these two brands. Regarding the third favorite search engine, most participants left it blank (40.1 percent). Some foreign brands, such as Baidu (Chinese), Naver (Korean), and Yamli (Arabic) were mentioned. This is likely due to the different ethnic backgrounds of the research participants.

The results in Tables 8 and 9 clearly demonstrate the impact of brand awareness on search engine users' perceptions. For example, Google, which possesses the largest market share, was ranked as the favorite search engine brand when users were asked to recall those search engine brands, and consistently, 94.2 percent of users identified Google as the search engine they used for information search. This suggests that users tend to choose the brand that they are more aware of, is easily to recall, and are more familiar with for performing a searching task.

When presenting the 10 search engine logos to each participant, we also asked whether the participants had used the search engine before (Table 10) and whether they currently used the search engine (Table 11).

Table 10. Participants' prior use of the search engine.

Search Engine	Used Before				Total
	Yes	%	No	%	
Google	199	96.1%	8	3.9%	207
Yahoo!	188	90.8%	19	9.2%	207
Ask	168	81.2%	39	18.8%	207
AOL	133	64.3%	74	35.7%	207
Dogpile	62	30.0%	145	70.0%	207
MSN Live	54	26.1%	153	73.9%	207
AlltheWeb	6	2.9%	201	97.1%	207
Mahalo	4	1.9%	203	98.1%	207
A9	2	1.0%	205	99.0%	207
AI ² RS	0	0.0%	207	100.0%	207

Note: The highest value in each column is **bolded**.

In Table 10, we see two groupings emerge. One group is the search engines that had very little brand usage from the participants (A9, AI²RS, AlltheWeb, and Mahalo). The other group are the search engines with high percentages of brand usage (AOL, ASK, Dogpile, Google, MSN Live, and Yahoo!). In the second group, there are two tiers, a very high usage tier (AOL, Ask, Google, and Yahoo!) and a second tier (Dogpile and MSN Live). Again, the inclusion of MSN Live in the second tier is somewhat surprising. Also surprisingly, some participants (nearly 4 percent) have never used Google. The high prior usage of Yahoo!, Ask, and AOL reflected previous market share, when these search engine companies possessed higher portions of the market than nowadays. However, the demographic characteristics of our study participants may bring some bias. Yahoo! may have had a higher position if more middle-aged participants had been recruited in the present study.

Table 11. Participants currently using the search engine.

Search Engine	Currently Use				Total
	Yes	%	No	%	
Google	197	95.2%	10	4.8%	207
Yahoo!	116	56.0%	91	44.0%	207
Ask	50	24.2%	157	75.8%	207
AOL	22	10.6%	185	89.4%	207
Dogpile	14	6.8%	193	93.2%	207
MSN Live	8	3.9%	199	96.1%	207
Mahalo	2	1.0%	205	99.0%	207

Search Engine	Currently Use				Total
	Yes	%	No	%	
A9	0	0.0%	207	100.0%	207
AI ² RS	0	0.0%	207	100.0%	207
AlltheWeb	0	0.0%	207	100.0%	207

Note: The highest value in each column is **bolded**.

It is interesting to compare what users have tried (Table 11) to what they are currently using (Table 12). We see Google maintaining a consistent market share (i.e., nearly the same percentage of users who tried Google and currently using Google), while all other search engine usage drops, notably from AOL, Ask, MSN Live, and Yahoo!. The comparison of prior and current usage shows the change in market share in the search engine industry. The decrease in the number of users of Dogpile and MSN Live is significant, which is 23.2 percent and 22.2 percent. The decreasing trend also holds true for AlltheWeb and A9, but is not significant. Furthermore, it deserves to be notify that the number of participants who reported currently using Ask (24 percent) and Yahoo! (56 percent) is quite high, much higher than the reported search market share (comScore, 2009).

For research question 4 (*What are the different search engines brand perceptions?*), the results from our sentiment analysis for the various search engines are shown in Table 12.

Table 12. Sentiment analysis of search engine comments.

Search Engine	Positive	%	Negative	%	Mixed	%	Neutral	%	No Response	%	Total
Google	180	87.0%	1	0.5%		0.0%		0.0%	26	12.6%	207
Yahoo!	123	59.4%	12	5.8%	33	15.9%		0.0%	39	18.8%	207
Ask	109	52.7%	31	15.0%	24	11.6%	4	1.9%	39	18.8%	207
AOL	81	39.1%	44	21.3%	25	12.1%	5	2.4%	52	25.1%	207
Total	788	38.1%	438	21.2%	153	7.4%	118	5.7%	573	27.7%	2070
Dogpile	75	36.2%	38	18.4%	17	8.2%	9	4.3%	68	32.9%	207
Mahalo	66	31.9%	32	15.5%	16	7.7%	16	7.7%	77	37.2%	207
AlltheWeb	54	26.1%	68	32.9%	7	3.4%	18	8.7%	60	29.0%	207
MSN Live	46	22.2%	56	27.1%	14	6.8%	13	6.3%	78	37.7%	207
A9	30	14.5%	63	30.4%	8	3.9%	27	13.0%	79	38.2%	207
AI ² RS	24	11.6%	93	44.9%	9	4.3%	26	12.6%	55	26.6%	207

Note: The highest value in each column is **bolded**.

A cross tab analysis ($\chi(50)= 2681.02, p<0.01$) clearly shows that there are different brand responses to the search engines. In terms of brand perception of the search engines, we see that Google has far and away the highest positive brand perception (87 percent) with comments such as “*Ahh, love sweet home,*” with Yahoo! (59 percent) and Ask (53 percent) also having healthy positive brand perception. It is obvious the brand “Google” conveys a clear and strong meaning to users with zero percent mixed and neutral

responses. This may be due to Google’s brand equity associations as a whole, including high awareness, positive image, and well-established relationship with customers. Less-well-known brands, such as Dogpile, Mahalo, and AlltheWeb, have almost equally distributed positive and negative responses with fewer mixed and neutral responses. In between, some popular search engine brands (e.g., Ask, AOL, and Yahoo!) possess high mixed responses. This may due to their vague market positioning strategy and lack of characteristics that differentiates them from other companies/products. Yahoo!’s mixed sentiment was generally along the line of a good search engine but not as good as Google (e.g., *what came before google* and *used to use it until I met google*). Mahalo had some mixed comments, such as “*Internet 2.0, trendy, short-lived.*”

We conducted a term analysis of participants’ comments on the search engines, by conducting a term frequency analysis of all participant comments. Table 13 shows the results along with the probability of the term occurring in the set of participants. A term analysis helps define a set of terms that define the impression of a search engine in the mind of a set of respondents.

Table 13. Term analysis of search engine comments.

A9			Al ² RS			AlltheWeb			AOL		
Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%
Dislike	19	7.1%	Dislike	40	10.1%	low	24	7.4%	Good	45	13.0%
Interesting	19	7.1%	Uninteresting	25	6.3%	interesting	22	6.7%	Like	40	11.5%
Distinctive	18	6.7%	distinctive	19	4.8%	dislike	20	6.1%	Distinctive	24	6.9%
Low	17	6.3%	Never	13	3.3%	like	19	5.8%	Dislike	18	5.2%
Uninteresting	11	4.1%	interesting	13	3.3%	distinctive	17	5.2%	Qual	18	5.2%
Bad	11	4.1%	Low	10	2.5%	qual	14	4.3%	High	17	4.9%
Quality	10	3.7%	Bad	10	2.5%	good	13	4.0%	Low	17	4.9%
Like	8	3.0%	Know	9	2.3%	quality	12	3.7%	Quality	13	3.7%
Never	7	2.6%	Like	9	2.3%	uninteresting	11	3.4%	Uninteresting	10	2.9%
Qual	7	2.6%	High	9	2.3%	bad	9	2.8%	Ok	8	2.3%
Dogpile			Google			Mahalo			MSN Live		
Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%	Terms	Freq.	%
Like	31	10.1%	Like	81	15.0%	interesting	33	12.1%	Good	23	8.8%
Interesting	23	7.5%	High	64	11.9%	distinctive	22	8.1%	Dislike	22	8.5%
Distinctive	23	7.5%	Good	61	11.3%	like	18	6.6%	Uninteresting	20	7.7%
Good	15	4.9%	Qual	42	7.8%	good	15	5.5%	Distinctive	17	6.5%
Dislike	14	4.6%	distinctive	25	4.6%	dislike	9	3.3%	Like	15	5.8%
low	11	3.6%	Love	22	4.1%	low	9	3.3%	Bad	13	5.0%
bad	10	3.3%	interesting	20	3.7%	bad	8	2.9%	Low	8	3.1%
qual	8	2.6%	Use	13	2.4%	never	6	2.2%	High	7	2.7%
used	5	1.6%	Quality	12	2.2%	quality	5	1.8%	Quality	6	2.3%

name	4	1.3%	Reliable	8	1.5%	qual	4	1.5%	Qual	6	2.3%
Ask			Yahoo!								
Terms	Freq.	%	Terms	Freq.	%						
good	51	12.3%	Good	53	16.8%						
Like	48	11.6%	Like	46	14.6%						
Distinctive	20	4.8%	High	16	5.1%						
High	18	4.4%	Qual	15	4.7%						
dislike	17	4.1%	Distinctive	13	4.1%						
Qual	15	3.6%	Interesting	12	3.8%						
Interesting	14	3.4%	Quality	9	2.8%						
Bad	10	2.4%	Use	5	1.6%						
Low	8	1.9%	Low	4	1.3%						
quality	7	1.7%	Dislike	4	1.3%						

On the positive side, we see that Google elicited a string of positive comments from the participants. In fact, 22 participants actually used the term ‘love’ in their responses. AOL, Ask, and Yahoo! also have many positive terms, although there was some negative term usage also. Most of the other search engines had primary negative terms associated with them. A9, AI²RS, and MSN Live have an especially notable usage of negative terms. The results for A9 and AI²RS might be somewhat expected, given their lack (or absence) of visibility. However, MSN Live is a well-known brand, so the high concentration of negative terms was surprising. A limitation of the term analysis needs to be pointed out is the high frequency of using like/dislike, good/bad, high/low quality, distinctive/not distinctive, interesting/uninteresting by participants, which are the prompts we provided on the questionnaire. Participants may have simply described their perception of search engines with these prompts without any deep thoughts.

We also conducted a phrase analysis (two term), as presented in Table 14. The phrase and frequency are shown as well as the mutual information statistic that shows the strength of the term relationship (the higher the better).

Table 14. Phrase analysis of search engine comments.

<i>A9</i>			<i>AI²RS</i>			<i>AlltheWeb</i>			<i>AOL</i>		
Phrase	Freq.	MIS	Phrase	Freq.	MIS	Phrase	Freq.	MIS	Phrase	Freq.	MIS
not distinctive	12	2.66	not distinctive	10	2.28	not distinctive	11	2.83	like good	14	1.25
low quality	7	2.58	dislike uninteresting	9	1.04	low qual	11	2.62	like high	11	1.99
low qual	6	2.79	don't know	8	3.15	low quality	10	2.68	not distinctive	11	1.87
never used	5	3.83	never used	7	3.05	like interesting	6	1.79	not distinctive	10	2.40
dislike distinctive	4	2.33	I don't	6	2.76	like good	5	2.14	low qual	8	2.47
Dogpile			Google			Mahalo			MSN Live		
Phrase	Freq.	MIS	Phrase	Freq.	MIS	Phrase	Freq.	MIS	Phrase	Freq.	MIS

like distinctive	8	1.24	high qual	41	2.28	not distinctive	7	1.87	not distinctive	7	2.51
not distinctive	7	2.24	like good	39	1.63	distinctive interesting	6	0.85	dislike low	6	2.42
like interesting	7	1.11	like high	33	1.41	like good	6	1.84	dislike bad	6	1.93
distinctive interesting	6	1.25	good high	29	1.56	interesting good	5	1.06	low uninteresting	5	2.33
like good	6	1.38	like qual	20	1.33	like interesting	5	0.87	bad low	5	2.76
Ask			Yahoo!								
Phrase	Freq.	MIS	Phrase	Freq.	MIS						
like good	15	0.70	like good	18	0.98						
like high	10	1.34	high qual	11	2.81						
like distinctive	10	1.23	like interesting	10	1.88						
high qual	8	2.28	distinctive interesting	7	2.79						
like interesting	7	1.23	like distinctive	7	1.44						

For this part, we asked users' overall impression of the search engine, which is expected to be slightly different from their first meaning or association by just referring to the logos. However, from the phrase analysis, three search engines stand out on the positive side, Ask, Google, and Yahoo!, with nearly all positive phrases. On the negative side, A9, AI²RS, and MSN Live all had negative phrases. This suggests that part of users' responses to search engines is based on users' reactions just to the logos, especially for brands that are unfamiliar. In addition, similar to the last analysis, the negative dominant impression of A9 and AI²RS is to be expected, but for MSN, it is a dangerous sign. The other search engines were mixed with general negative phrases but some positive also.

Interesting, there was not always a correlation between the brand response to either the logo or whether or not a participant had or not used or was currently using the search engine. For example, A9 and Mahalo had very little brand recognition but also relatively low negative logo brand responses, which indicated that logos can evoke a negative effect without being recognized. In contrast, MSN Live and AOL had high brand recognition and relative low negative brand logo responses. Google and Yahoo! had very high positive brand responses to the logos and high usage rates, which is the desirable circumstance. There was, as expected, a correlation between the positive perception of the search engines themselves and the rate of usage of that search engine. This can be explained by the effect of brand awareness. A higher level of familiarity of search engine brand can increase the positive perception of performance. Product choices made with low levels of interest or involvement are strongly influenced by brand awareness (Pittard et al., 2007).

Chapter 4. DISCUSSION

Summary of Results

The SEM results support most of our hypotheses about the inner model relationships. Our findings show that the *brand relationship* between search engines and their customers has a strong and significant impact on the perception of search engine performance. Specifically, higher levels of *satisfaction* and *trust* result in a significant increase in the brand's positive perception. Based on the data analysis, it is not difficult to notice that brand relationship variables (*satisfaction* and *trust*) are critical for predicting users' perception of search engine performance rather than brand knowledge variable (*brand image*). The conceptual model presented in this study offers the best explanation of the relationships among the constructs included in this research. It provides evidence supporting four of the five proposed hypotheses. The results show that the perception of brand image has a significant, direct impact on both customer satisfaction and trust of search engine brands, in support of H1a and H1b, but brand image does not affect performance perception directly, which leads us to reject H4. The results of the current study also show that changes in customer satisfaction and trust have a significant effect on performance perception, but trust explains only 20.7 percent of the variance in performance perception, in full support of H2 and partial support of H3. Consistent with our expectations, perception of search engine performance has a direct relationship to brand attachment; therefore, H5 is supported.

The main aim of this study is to empirically examine some critical concepts in relationship marketing, and test their impact on users' perception of search engine performance. Overall, most of our hypotheses were supported by the study results, except hypothesis 4, which proposed that brand image has a direct effect on performance perception. Both quantitative and qualitative research methods were adopted to address some important branding issues in the search engine area. This study not only has theoretical implications for academic researchers but also provides managerial implications for industry practitioners.

Theoretical implications

The purpose of this study is to examine branding in the Web search engine area. Specifically, we developed and experimentally tested a conceptual model of how brand knowledge and relationship influence customer perception of search engine performance, and we examined brand awareness and perception of current Web search engines. The model and results of this research contribute significantly to our theoretical understanding of the branding effect that influences consumer perception of search engine performance.

First, we fill an important gap in the search engine branding literature by providing empirical evidence of the importance for Web search engines of establishing brand relationship with search engine users. Certain product categories, by nature, lend themselves to relationship formation (Hess & Story, 2005). This is particularly true in categories where product failure is costly and transactions imply lengthy interaction (ownership period), or those in which brand use is relatively exclusive. Therefore, search engines are not relationship-oriented products. However, according to our findings, brand relationship rather than brand knowledge can trigger positive perceptions of search engine performance. Customer relationships have become very popular in the branding literature. Morgan and Hunt (1994) proposed that relationship marketing (establishing, developing, and maintaining successful relational exchanges) constitutes a major shift in marketing theory and practice. Relationship principles have virtually replaced short-term exchange notions in both marketing thought and practice, precipitating what has been considered a paradigm shift for the field as a whole (Fournier, 1998). Our study is the first to provide a direct test of the effect of brand relationship for Web search engines.

Second, our findings suggest that, for search engine brands, trust has less power than customer satisfaction in influencing users' perception of search engine performance. Customer trust has been studied widely in the social exchange literature (Sun, Lin, & Sun, 2002). Trust is particularly acknowledged as important in the online context because customers increasingly rely on the Internet for information and purchases and can be more loyal online (Shankar, Smith, & Rangaswamy, 2003). Supposedly, to create long-term customer relationships, firms need to build customer trust (Dwyer et al., 1987). It can effectively reduce uncertainty and risks in an online environment.

Despite the significance of trust in Internet strategy emphasized by previous academic studies (Hoffman, L, & Peralta, 1999; Urban, Sultan, & Qualls, 2000), the results of our study show that the impact of trust on performance perception for search engines is not as significant as satisfaction. One possible explanation is that potential determinants of trust for search engines are different from those for other types of Websites. Bart et al. (2005) identified several Website and consumer characteristics as drivers of online trust, for instance, privacy, security, and customer familiarity with the Website. However, for search engines, other than the quality of their links and result pages, trust might also be influenced by the quality of the Web pages linked to the result pages. Therefore, for this information providing Websites, trust may be closely associated with quality of performance.

Managerial implications

The SEM results showing that positive perception of search engine performance is affected mainly by brand relationship with users, rather than brand knowledge, have important implications for practitioners. In brand management practice, brand image and brand awareness are considered the central variables for ensuring the effectiveness of marketing campaigns, and considerable resources have been spent on measuring these two variables (Esch et al., 2006). However, our study demonstrates the importance of brand relationship and its significant influence on customer perceptions in the search engine market. Positive performance perception is influenced by brand relationship directly and brand knowledge indirectly. Positive performance perception indicates that, in the search engine industry, a familiar brand with a positive image is just the entrance to this market. To secure a good perception of product performance and a greater level of commitment, search engine companies, which expect a leading position in the market, need to establish a positive relationship with users. Therefore, it is critical for managers to develop strategies to increase customer satisfaction and trust, which will lead to a better perception of search engine performance and a feeling of attachment to this brand.

In addition, our examination of 10 search engine logos and users' responses clearly suggests that a search engine brand, as presented by the logo, can have a significant effect on how potential customers perceive the search engine. Many of the logos in our survey (e.g., AI²RS, Ask, Dogpile, and Mahalo) evoked incorrect perceptions of the search engine. AI²RS was perceived as being for math or science searches, Ask was only for questions, Dogpile was a dog search service, and Mahalo was a Hawaiian search service.

Two major reasons for failure are identified. First, some logos failed to evoke a positive effect, such as Dogpile and AI²RS. According to Henderson and Cote (1998), the creation of positive effective reactions is critical to a logo's success because the effect can transfer from the logo to the product or company. The evaluation of the quality of the product will be influenced by the evaluation of logos, even the initial impression of the logo design. Second, some logos failed to elicit a consensual meaning among a group, (e.g., Ask and Mahalo). The message delivered by the logos should be intended and clear. There is a danger in these mixed logo messages, especially when the service does not attract the correct audience or does not live up to the customer's expectation. For example, many participants expect Ask to respond to questions. So, when it does not, it creates a negative brand perception, such as "*doesn't give the answers, bad experiences, dislike, and bad and low quality.*" Therefore, managers should be more careful about designing and selecting a logo for their company or product.

Concerning the usage of the search engines themselves, it is clear that breaking into search engine marketing or gaining a significant positive brand perception is not an easy task. The search engines with

the most positive image were typically the ones with already high rates of usage and relative early entry into the market (AOL, Ask, Google, and Yahoo!). The late entries into the market, A9, Mahalo, and MSN Live, and the fake search engine, AI²RS, suffer from negative brand perception. However, some established search engines, AlltheWeb and Dogpile, also had mixed brand perceptions. Several reasons can explain the current situation, including that users are satisfied with what they are using and reluctant to try new search engines. Another noteworthy fact is the effect of branding. Those market leaders, such as Google and Yahoo!, are familiar and popular among student groups. Participants responded with comments such as “all my friends are using it.” It is difficult for new search engine brands to establish themselves as market leaders in this situation, considering how hard it is to compete with these leaders in almost every brand equity association. Under these circumstances, the search engines’ marketing strategy is more critical than ever. The present study provided some suggestions, for example, conveying a positive and correct brand image by designing logos appropriately and building a long-term and mutual trustworthy relationship with customers.

Last but not least, there is a positive correlation between search engine perception and search engine usage. Assuming that the search engine performance is generally the same or better in response to user searches relative to other search engines (Eastman & Jansen, 2003), it would indicate that if a search engine can get a customer to use its service for a period of time, the response may be positive brand perception and, therefore, continued usage either as a primary or secondary search service. This is consistent with the results from Bailey et al.’s (2007) study. They found that there is no significant preference for result rankings associated with a well-known search engine over those from an unknown one. However, how to get the first trial is always a problem for marketing managers. Search engine companies can increase their attraction through developing creative functions for searching and taking advantage of the branding effect. Hopefully, this study provides a holistic view of branding to managers in the search engine industry.

Limitations

Although our findings expand the existing knowledge on branding effect in the online environment, there are limitations associated with this study. First, we use cross-sectional data rather than a laboratory design. The usage of a survey provides a holistic view of users’ perception of branding effects for search engines, but it remains unclear about users’ future behavioral intentions and actual searching and purchasing behaviors. Surveys are an important instrument in marketing research. However, laboratory-based research on consumer information search behavior can be more realistic than survey-based research (Peterson & Merino, 2003). Although some scholars have argued that external validity is compromised in

a laboratory setting, previous studies have shown there are few or no differences in the subjects' behavior on information search in laboratory settings and Web settings, especially on those tasks using keywords (Epstein, Klinkenberg, Wiley, & McKinley, 2001; Schulte-Mecklenbeck & Huber, 2003). The authors of this study are considering combining these two instruments to test branding effect and its influence on users' behavioral outcomes.

Second, in the current study, we consider a number of aspects of customer characteristics, such as the frequency of search engine usage and online shopping experiences, and their self-rated searching skills. Other customer characteristics that may also have influence on the construction of brand relationship are ignored. Two qualitative studies (Hillebrand & Bloemer, 2004; Noble & Phillips, 2004) revealed that not all customers want to engage in a relationship. Concerns have previously been raised about the appropriateness of forming customer relationships (Dowling, 2002; Dowling & Uncles., 1997; Sheth & Parvatiyar, 1995), leading to calls for understanding of factors that might influence the desire that consumers have to maintain long-term relationships with firms (Bendapudi & Berry, 1997). Danaher, Conroy, and McColl-Kennedy (2008) compared a comprehensive set of factors simultaneously and to categorize consumers on the basis of relationship expectations. They identified four types of customers: relationship adverse, relationship indifferent, relationship seeker, and relationship keen. The universal prevalence of a relationship-keen segment is mirrored by an almost equal-sized relationship-indifferent group for each of the three service types (phone companies, banks, and doctors).

Future Research

Future research can broaden the results by taking different customer types into consideration and rethinking the strategy and process of brand relationship building. The next stage of our research will focus on searching behavioral effects of search engine branding in a laboratory setting. Continuing our investigations in the lab will allow us to investigate search engine users' actual searching behaviors (i.e., query reformulation, use of system assistance, rate of organic and sponsored click through, etc.), while controlling for brand image and knowledge.

Chapter 5. CONCLUSION

In this research, we investigated a spectrum of branding components, including brand awareness in the search engine market, brand logo reaction, brand opinion, and how brand knowledge and brand relationship affect users' perception of search engine performance. Findings indicate that the impact of branding on Web search is by no means clear-cut. Brand relationship plays a more important role than brand knowledge in influencing customers' perception of the quality of Web search engine products. Therefore, search engine companies should be encouraged to develop more relational exchanges with users, such as actions for increasing the level of satisfaction and trust. There is a continuum of customer relationships, ranging from transactional to relational orientations (Dwyer et al., 1987). Macneil (1980) stated that relational exchanges are characterized by cooperative actions and mutual adjustment of parties, a sharing of the benefits and burdens of the exchange, and planning for future exchanges. Greater interaction between products and customers will be especially valuable for brands that would like to build a long-term relationship with their users and organizations that would like to develop a relational partnership with their customers. Theories of partnering propose that customers with strong relationships not only have higher levels of trust and commitment, but trust and commitment also become central in the customers' attitude and belief structures (Morgan & Hunt, 1994). Such a relationship will enhance users' perception of search engine performance and commitment to certain brands.

Brand trust, one of the key constructs in relationship marketing area, has attracted considerable attention in previous research (Gefen, Karahanna, & W. Straub, 2003; Li et al., 2007; Morgan & Hunt, 1994). This research revealed that trust can decrease perceived risks and uncertainty, discourage switching behavior, increase users' perception of product quality, and further promote customer commitment. However, users seemed hesitant to put their faith in search engines. This may result from a lack of motivation, which suggested that customers do not care about this product and its long-term development.

In addition, it is obvious that search engine companies should be more careful about designing logos. Logos are an important component of Web search engine interfaces, given that these search interfaces are usually very simple, and search engine logos can cause different brand responses. Poor design of logos can directly lead to negative impressions of search engine quality, especially among potential customers who have little brand awareness. Another aspect of brand knowledge, brand awareness, was also demonstrated to have different levels of impact on users' perceptions of major search engine brands. This

result is consistent with previous literature (Jacoby, Syzabillo, & Busato-Schach, 1977; Roselius, 1971), which showed that consumers tend to adopt a decision rule to buy only familiar, well-established brands.

In summary, managers should view brand relationship as a more efficient tool for enhancing performance perception of search engines among users, rather than measuring and evaluating brand awareness and image alone.

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Appendix

Imagine that you want to buy flowers online for a special person. Identify a search engine that you would most likely use to search for an online store or place to buy these flowers.

Please answer the following questions:

What is the name of the search engine that you identified above?

Why did you choose this one?

List your three favorite search engines (list only the one(s) you actually use)

1 – most favorite;

2 – next favorite,

3 - next favorite

(1) _____ (2) _____ (3) _____

Why do you use these search engines and not others? (Check all that apply)

- | | | | |
|--|--|---|--------------------------------------|
| <input type="checkbox"/> Can sort results | <input type="checkbox"/> Dependable | <input type="checkbox"/> Ease to Use | <input type="checkbox"/> Familiarity |
| <input type="checkbox"/> Gives lots of results | <input type="checkbox"/> Reputation | <input type="checkbox"/> Habit | <input type="checkbox"/> Interface |
| <input type="checkbox"/> My friends use it | <input type="checkbox"/> Popular | <input type="checkbox"/> Powerful | <input type="checkbox"/> Trustworthy |
| <input type="checkbox"/> Searching Features | <input type="checkbox"/> Useful Results | <input type="checkbox"/> Credible | <input type="checkbox"/> Fast |
| <input type="checkbox"/> Only ones that I know | <input type="checkbox"/> Gives me results that I expect | <input type="checkbox"/> Gives me new results | |
| <input type="checkbox"/> Relevant Results | <input type="checkbox"/> Happy with these, no need to try others | | |

Other(s)

Based on your experiences with the one you ranked as your most favorite search engine, your overall impression of this search engine's brand image is ...

Bad								Good
	1	2	3	4	5	6	7	

Negative								Positive
	1	2	3	4	5	6	7	

Dislike								Like
	1	2	3	4	5	6	7	

Unfavorable								Favorable
	1	2	3	4	5	6	7	

1=Strongly disagree 7=Strongly agree

In general, I believe this search engine does a good job for me.								
	1	2	3	4	5	6	7	

Overall, I am satisfied with this								
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search engine.	1	2	3	4	5	6	7
----------------	---	---	---	---	---	---	---

This is one of the best search engines I have encountered.	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

This search engine cannot be trusted at times.	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

This search engine can be counted on to do what is right.	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

This search engine has high integrity.	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

1=Strongly disagree

7=Strongly agree

I feel a sense of attachment to this search engine.	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

I care about the long-term success of this search engine.	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

I am a loyal patron of this search engine.	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

This search engine is simple to use, even when using it for the first time.	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---


Links provided by this search engine are more relevant than those provided by some other search engines.	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

Result pages provided by this search engine have better quality than those provided by some other search engines.	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

Search Engine Logo	Directions: Look at the logo. Based on your experiences with the search engine, if any, and the logo, ...
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>

Search Engine Logo	Directions: Look at the logo. Based on your experiences with the search engine, if any, and the logo, ...
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>

Search Engine Logo	Directions: Look at the logo. Based on your experiences with the search engine, if any, and the logo, ...
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>

Search Engine Logo	Directions: Look at the logo. Based on your experiences with the search engine, if any, and the logo, ...
	<p>Please provide the first meaning or association that comes to your mind by looking at the logo.</p> <p>What is your overall impression of the search engine? (For example, like/dislike, good/bad, high/low quality, distinctive/not distinctive, and interesting/uninteresting)</p> <p>Have you used this engine before? (circle) Yes / No If yes, do you currently use this engine? (circle) Yes / No</p>

Demographic and Search Engine Use Information

What is your gender? Male Female

How old are you? _____ Years

What is your race/ethnicity? White White, non-Hispanic African-American
 Hispanic Pacific Islander Native American
 Asian Other _____

frequently
day)
1=Very rarely
(once a month) 7=Very
(multiple times a

How often do you use search engines? 1 2 3 4 5 6 7

frequently
online)
1=Very rarely
(seldom buy online) 7=Very
(usually buy

How often have you ordered commercial products online during the past twelve months? 1 2 3 4 5 6 7

7=Expert
searcher)
1=Novice
(Not really skilled) (Skilled

How would you rate your searching ability? 1 2 3 4 5 6 7