A branding model for web search engines

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Abstract: In this research, we conduct a comprehensive investigation of branding of web search engines, examining the effects 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 structural equation modelling. 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 also show 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. The study has implications for those investigating the search engine marketplace and practitioners of established and emerging search engine companies.

Keywords: brand knowledge; brand relationship; brand image; search engine performance perception.

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1   Introduction

One of the most popular tools for customers to conduct a product information search is a web search engine, with impact on both sales and product branding (Lim, 2009). From a technological perspective, studies report that, in terms of performance and interfaces, most major search engines are practically the same (Eastman and 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 this algorithmic metric would have us believe.

Users' relevance judgements 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. Consumers use search engines for specific shopping motivations (Ruiz-Mafe and Sanz-Blas, 2009). Brand awareness is one factor that can change users' evaluation of the searching process, as demonstrated by Jansen et al. (2009). We also know that branded terms on search engine results pages have effects on click through rates (Jansen et al., 2011) and that the brand of a website effect customer perceptions (Voorveld et al., 2009). There is an expected relationship among advertising and consumer shopping (Korgaonkar and Wolin, 2002). 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.

How does brand knowledge affect 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, we first reviewed the literature in marketing and ecommerce areas to identify the gaps that we can bridge with new research. Our research question is specified in the second section, along with related hypotheses, that 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 analysing the data, we summarise 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.

2 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 realisation that brands are a firm's most valuable intangible assets (Keller and Lehmann, 2006). A brand is the intangible sum of an organisation'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 centres 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 and Riley, 1998).

In this section, we review the components of branding that we investigate in this research, and relate these 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.

2.1 Brand knowledge

Branding research traditionally focuses on investigation of brand knowledge, which is conceptualised 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 and 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 recognised 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 (Keller, 1993). Keller (1993) defined brand image as "perceptions about a brand as reflected by the brand associations held in consumer memory". Jansen, et al. (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% 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

4   evaluation of landing page.

Conversely, a negative brand image incurs a 10% to 15% dip in perception of search engine performance. In general, brands want their image to be positive and healthy, and deliver the correct messages to the right audiences.

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

2.2   Brand relationship

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 (Fournier, 1998; Esch et al., 2006). 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. These factors can effect a consumers loyalty to a brand, with Garnier (2009) exploring issues of search engine loyalty, reporting that search engines can offer affective value to users in order to enhance loyalty. 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 behaviour, brand satisfaction is a significant determinant of repeat sales, positive word of mouth, and consumer loyalty (Bearden and Teel, 1983). Traditionally, brand satisfaction research was mostly cognitive in nature. In the mid-1990s, research started not only criticising the overwhelming dominance of this paradigm (Hunt, 1993) but also increasingly investigated affective 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 and Strandvik, 1997; Strauss and Neuhaus, 1997). 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 generalised 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 and Holbrook, 2001). In the relationship marketing literature, trust is defined as the perception of confidence in the exchange partner's future actions (Morgan and Hunt, 1994). Trust is the basic mechanism used to build and maintain a relationship and fosters a long-term orientation in marketing relationships (Morgan and 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 and Parasuraman, 1991). Commitment is "an enduring desire to maintain a valued relationship" (Moorman et al., 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 and Rusbult, 1989). It is believed to be associated with motivation and involvement (Mowday et al., 1979), positive effect and loyalty (Kanter, 1968), and performance and obedience to organisational policies (Angle and Perry 1981).

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

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 and Perks, 2005; Sicilia et al., 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. Brand trust and loyalty are also significant constructs in the internet marketing literature (Falk et al., 2007). Brand attitude (Balabanis and Reynolds, 2001) and brand familiarity (Park and Stoel, 2005) have also received some attention in the internet marketing literature.

The research reported here addresses the lack of research in the area, as noted by (Ha and Perks 2005; Sicilia et al., 2006). Jansen et al. (2009) and Bailey et al. (2007) examined the brand effect of a search engine on search result results evaluation by users, but they did not examine how this branding attribute was developed. Falk et al. (2007) examined internet marketing but did not investigate search engine branding. Balabanis and Reynolds (2001) studied brand attitude for multichannel retailers. Park and Stoel (2005) investigated brand familiarity in the online purchase domain. As such, from a review of literature, there is a clear need for understanding the building of the search engine branding.

Table 1   Table summary of important branding constructs

Branding component	Definition
Brand knowledge	An associative network memory model of two components, brand awareness and brand image (Keller, 1993).
Brand awareness	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 and 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).
Brand image	Keller (1993) defined brand image as "perceptions about a brand as reflected by the brand associations held in consumer memory".
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.
Brand satisfaction	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.
Brand trust	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 and Hunt, 1994).
Brand commitment	"An enduring desires to maintain a valued relationship" [Moorman, et al., (1992), p.316].

Regarding branding effects on search engines, Jansen et al. (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

4   evaluation of the landing page.

Jansen et al. (2009) stated that a positive search engine brand is worth approximately 10% to 15% in user perception of performance (i.e., defined by user judgement 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, even if that brand name is totally unknown.. They did two experiments, comparing results labelled 'Google' relative to those labelled '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, colours and logos. So, this may indicate that these additional branding elements have an effect on user evaluation of search engine results.

Except for these two articles, we could locate no other published works investigating brands in the web search engine area. Given the impact of web search engines on consumer behaviour, the dissemination of information, and the commercial success of many businesses, an understanding of the branding effects of major search engines will increase our insight of this critical marketplace.

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. Therefore, we present a more comprehensive examination of search engine branding than currently exists.

3 Research questions

This research has the main goal to explore the influence of brand knowledge and brand relationship on users' perceptions of search engine performance.

Therefore, our 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 and its associated hypotheses, 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 and Staelin, 1983). 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.

H1(a)   Brand image has a positive effect on brand satisfaction.

H1(b)   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's et al. (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's et al. (2006) study, we use brand commitment to replace attachment in the present conceptual model. Commitment is recognised as an essential ingredient for successful long-term relationships (Dwyer et al., 1987; Morgan and 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 and Holbrook, 2001). After clarifying the importance of brand commitment, we predict that positive perception of search engine performance will increase commitment to certain brands:
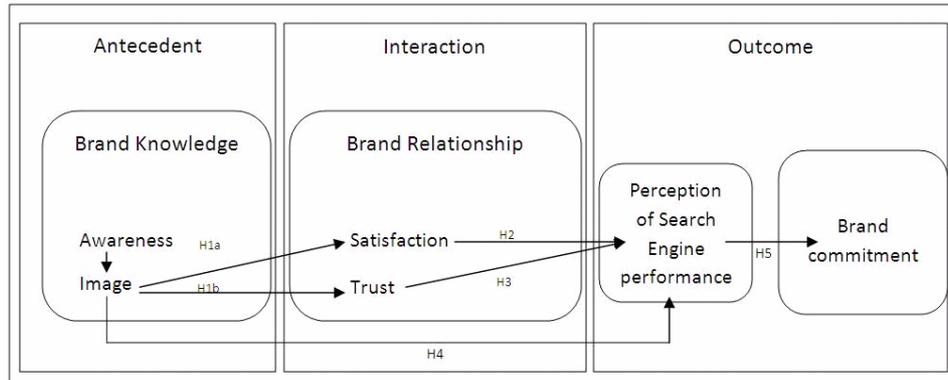
H5   Greater perception of search engine performance will lead to higher level of brand commitment.

To achieve our 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 refines and adapts Esch's et al. (2006) model to test the importance of brand relationships in an online branding environment (see Figure 1).

   Esch et al. (2006) found that the indirect effects of brand knowledge via brand relationships on behavioural outcomes are larger than its direct effects, which indicates that brand relationship variables are critical for predicting future behaviours. 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 behaviours. 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 behaviours, 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 behaviour outcomes. Therefore, brand knowledge has an indirect effect on behaviours. Without a positive relationship, brand knowledge itself has less power influencing consumers' purchasing

behaviours. In our study, we want to leverage this proposition in the web search engine area.

Figure 1 Conceptual model of search engine branding

4 Research design

4.1 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 to 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 behaviours. 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%. Respondents were given incentives to participate by winning prizes.

4.2 Measurement

The survey was composed of three sections (see Appendix). 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 et al., 2002)

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 favourite 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 and McNeese, 2005), and generalised 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.

Table 2   Measurements

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

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 behaviour toward the technology (Thompson et al., 1994). Several studies have found that experts and novices use IS differently (King and Xia, 2007) to determine the nature of search engine use by students, questions addressed their frequency of search engine use, and online purchasing behaviours.

4.3 Data analysis

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

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 and Gerbing, (1988), pp.700–751; Hair et al., 2009]. Using the standardised parameter estimates for the observed items, composite reliability was calculated for the latent variables [Hair et al., (2009), pp.700–751]. 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 summarised as follows. The overall model X^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.

Table 3   Reliability and validity test

Scale items	Correlated item-total correlation	Cronbach alpha	Factor loading	Factor loading
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
Perception3	.672		.562	Deleted

Because retaining each item as a reflective indicator of its constructs would result in identification problems, we followed Sujan's et al. (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.

5   Results

The analysis of 207 respondents' demographic information reveals that 54.1% of the respondents were female, so we have a good gender balance. For age, 94.2% reported an age of 18 to 24, 5.3% were 25 to 32, and one respondent was 47. For racial make-up, 77.3% respondents were White, 15.9 were Asian, 4.3% Hispanic, and 2.4% were African American. In terms of the other characteristics of respondents, 98.4% of respondents claimed high frequency of search engine usage (≥ 4), and 54.1% reported high frequency

of online shopping (≥4); only 5 out of 207 rated their search ability as not really skilled (<4).

Addressing our research question, the model was estimated using the maximum likelihood method. Table 4 presents the standardised path coefficients for the model.

Table 4　　　Standardised path coefficients

Hypothesis	Paths	Standardised coefficient	Significance level
H1a	Image → Satisfaction	*0.777*	$p < 0.001$
H1b	Image → Trust	*0.804*	$p < 0.001$
H2	Satisfaction → Perception	*0.462*	$p < 0.001$
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 ($p > 0.1$). 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. Specifically, the totally effect of brand image on perception via satisfaction is .38(.022 + 777 * .462). And the total effect of brand image on perception via trust is .19(.022 + 804 * .207).Note that trust has a direct effect of only 0.207 on perception. This is reasonable considering the tremendous discussion of trust issues in the internet research area (Bart et al., 2005). All other paths were significant (p < 0.001); therefore, Hypothesis 1(a), Hypothesis 1(b), Hypotheses 2, 3, and 5 are fully supported.
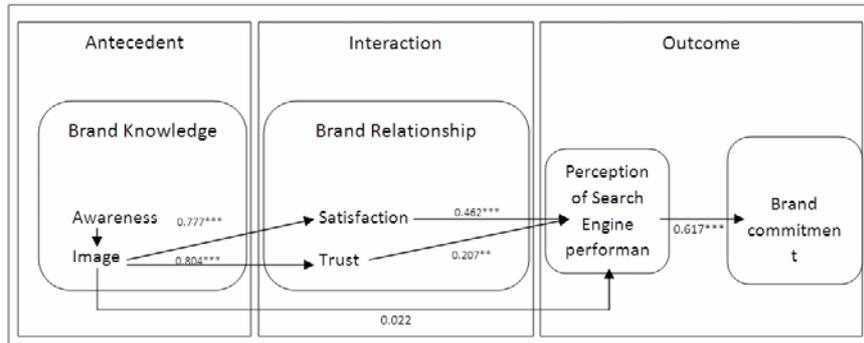
Specifically, the model explains 77.7% of the variance in customer satisfaction, 80.4% of the variance in trust, 66.2% of the variance in users' perception of search engine performance, and 61.7% of the variance in customer attachment to certain search engine brands. These findings suggest that brand 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 H1(a) and H1(b), 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% 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

Note: *$p < .05$; **$p < .01$; *** $p < .001$.

This conceptual model (see Figure 2) 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.

6   Discussion

6.1   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. The conceptual model presented in this study offers a valid representation of the complex interaction between a person and a search engine. The results show that the perception of brand image has a significant, direct impact on both customer satisfaction and trust of search engine brands, but brand image does not affect performance perception directly. 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% of the variance in performance perception. Consistent with our expectations, perception of search engine performance has a direct relationship to brand attachment.

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 one hypothesis proposing 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.

6.2 Theoretical implications

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, this research addresses a critical 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 and 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 practise. Relationship principles have virtually replaced short-term exchange notions in both marketing thought and practise, precipitating what has been considered a paradigm shift for the field as a whole (Fournier, 1998). This 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 et al., 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 et al., 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 emphasised by previous academic studies, 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, trust may be closely associated with quality of performance for search engines as information providing websites.

6.3 Managerial implications

The research 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 practise, 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 to a less degree trust, which will lead to a better perception of search engine performance and a feeling of attachment to the search engine brand.

6.4   Limitations

Although our findings expand the existing knowledge on branding effect in the online environment, there are limitations associated with this study. Primarily, 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 behavioural intentions and actual searching and purchasing behaviours. Surveys are an important instrument in marketing research. However, laboratory-based research on consumer information search behaviour can be more realistic than survey-based research. 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' behaviour on information search in laboratory settings and web settings, especially on those tasks using keywords. The authors of this study are considering combining these two instruments to test branding effect and its influence on users' behavioural outcomes.

7   Conclusions and future research

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. 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 organisations that would like to develop a relational partnership with their customers.

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 behavioural 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 behaviours (i.e., query reformulation, use of system assistance, rate of organic and sponsored click through, etc.), while controlling for brand image and knowledge.

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 favourites search engines (list only the one(s) you actually use)

1   most favourite_____   2   next favourite_____

3   next favourite_____

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

[ ]Can sort results   [ ]Dependable   [ ]Ease to use

[ ]Familiarity

[ ]Gives lots of results   [ ]Reputation   [ ]Habit

[ ]Interface

[ ]Friends use it   [ ] Popular   [ ] Powerful   [ ]Trustworthy

[ ]Searching features

[ ]Useful results   [ ]Credible   [ ]Fast   [ ]Only ones that I know

[ ]Gives me results that I expect   [ ]Gives me new results

[ ]Relevant result

[ ]Happy with these, no need to try others

Other(s) _____

Based on your experiences with the one you ranked as your most favourite 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

Unfavourable

Favourable

              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 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

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

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   [ ]Pacific Islander

[ ]African-American   [ ]Hispanic

[ ]Native American   [ ] Asian

Other_____

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

How often do you use search engines?

1   2   3   4   5   6   7

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

How often have you ordered commercial products online during the past 12 months?

1   2   3   4   5   6   7

7 = Expert (skilled searcher)   1 = Novice (not really skilled)

How would you rate your searching ability?

1   2   3   4   5   6   7