

Foundations and Trends® in Marketing  
Vol. 10, No. 1 (2016) 1–59  
© 2016 T. Erdem and J. Swait  
DOI: 10.1561/17000000041



## **The Information-Economics Perspective on Brand Equity**

Tülin Erdem  
New York University, USA  
terdem@stern.nyu.edu

Joffre Swait  
University of South Australia, Australia  
Joffre.Swait@unisa.edu.au

# Contents

---

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Theoretical Underpinnings of the Information-Economics Framework of Brand Equity</b>	<b>4</b>
<b>3</b>	<b>Information Theoretic Brand Equity Framework</b>	<b>8</b>
3.1	Proposed model based on signaling theory . . . . .	10
3.2	Testing the main theoretical implications of the information-economics brand-equity framework . . . . .	12
3.3	Dynamic structural models and the evolution of brand equity . . . . .	14
<b>4</b>	<b>Implications of the Information Theoretic Brand-equity Framework</b>	<b>22</b>
4.1	Price premia . . . . .	22
4.2	Consideration- and choice-set formation . . . . .	24
4.3	The role of brands in Customer Relationship Management (CRM) for relational service firms . . . . .	28
4.4	Brand-management implications: Brand extensions (umbrella branding), co-branding, brand alliances and brand-crisis management . . . . .	31

<b>5</b>	<b>Validation of the Information Theoretic Brand-Equity Framework Across Product Categories, Countries, and Time</b>	<b>34</b>
5.1	Generalizability over product categories and choice stages . . . . .	34
5.2	Generalizability over cultures and stages of economic development . . . . .	37
5.3	Generalizability over time: Brand-signaling framework temporal stability . . . . .	39
5.4	Summary . . . . .	44
<b>6</b>	<b>Links between the Information-Economics Perspective of Brand Equity and Other Conceptual Brand-Equity Frameworks</b>	<b>45</b>
6.1	Conceptual links . . . . .	45
6.2	Measurement links . . . . .	47
<b>7</b>	<b>Summary and Future Research</b>	<b>50</b>
	<b>References</b>	<b>55</b>

## Abstract

The focus of this monograph is the information-economics theoretic framework of brand equity. Adopting this view, [Erdem and Swait \[1998\]](#) argue that consumer-based brand equity is the value of a brand as a credible signal of a product's positioning. In their framework, the content, clarity, and credibility of the brand signal creates intangible benefits, enhances perceived quality, and decreases consumer-perceived risk and information costs, and hence increases consumer utility, which underlies the added value associated with a brand. The central (and motivating) construct in this view is the "credibility" of brands as signals.

---

T. Erdem and J. Swait. *The Information-Economics Perspective on Brand Equity*. Foundations and Trends<sup>®</sup> in Marketing, vol. 10, no. 1, pp. 1–59, 2016.

DOI: 10.1561/1700000041.

# 1

---

## Introduction

---

Brands have a very long history. Proto-brands date back to the early Bronze Age (2250–2000 BCE) in the form of trade seals used in the Indus Valley (where Harappan civilization flourished) and Mesopotamia (which at that time hosted several civilizations such as Sumeria and Akkadia) [Moore and Susan, 2008]. “Modern” brands, on the other hand, first appeared in the early 16th century on whiskey distillers’ barrels.

Brands serve two main functions. They are conveyors of information (e.g., origin, quality), are image builders, and serve as symbols of identity. As conveyors of information, brands reduce risk and information costs, and enhance consumer quality perceptions [Erdem and Swait, 1998], and as conveyors of identity and meaning, brands embody emotional/experiential and symbolic/self-expressive associations and benefits [Aaker, 1991, 1996, Keller, 1993].

In its broadest sense, brand equity is the added value with which a brand endows a product [Farquhar, 1989]. Cognitive psychological views of brand equity have emphasized constructs such as brand awareness, brand associations (and uniqueness, favorableness, and strength of these brand associations, Keller, 1993), perceived quality, and brand

loyalty as the main building blocks of brand equity [Aaker, 1991]. Although these frameworks have also emphasized the importance of emotional/experiential and symbolic/self-expressive associations in creating brand equity (and multiple dimensions of brand identity, such as anthropomorphic perceptions of brands, brand as symbols, and so on; see Aaker [1996]), the information-economics view of brand equity emphasizes the informational role brands play in the marketplace and the contribution of this role to overall brand equity [Erdem and Swait, 1998].

The focus of this monograph is the information-economics theoretic framework of brand equity. Adopting this view, Erdem and Swait [1998] argue that consumer-based brand equity is the value of a brand as a credible signal of a product's positioning. In their framework, the content, clarity, and credibility of the brand signal creates intangible benefits, enhances perceived quality, and decreases consumer-perceived risk and information costs, and hence increases consumer utility, which underlies the added value associated with a brand. The central (and motivating) construct in this view is the "credibility" of brands as signals.

In Section 2, we discuss the underpinnings of this framework of brand equity, and hence outline the analytical models of signaling under quality uncertainty, brand premia, and reputation. In Section 3, we outline this information-economics theoretic framework of brand equity in greater detail and discuss the empirical validation of the framework. In Section 4, we discuss the theoretical and empirical implications of the information-economic theoretic framework for various aspects of consumer decision-making, such as choice, consideration-set formation, choice dynamics, customer relationship management (CRM), formation of brand loyalty, and consumer price sensitivities and willingness to pay. Finally, in this section, we also discuss the implications for brand management, such as managing brand extensions, alliances, co-branding, and brand crisis. In Section 5, we discuss the validation of the basic framework across product categories and countries and over time. In Section 6, we conclude with avenues for future research.

# 2

---

## Theoretical Underpinnings of the Information-Economics Framework of Brand Equity

---

The information-economics literature proposed the earliest analytical models that have a bearing on branding. Researchers have stressed the importance of brand investments [Klein and Leffler, 1981] and brand reputation<sup>1</sup> for high quality [Shapiro, 1983] to ensure commitment to

---

<sup>1</sup>The academic literature has defined reputation in various ways. In the managerial literature, a definition commonly used is “the collective representation of multiple constituencies’ images of a company, built up over time and based on a company’s identity programs, its performance and how constituencies have perceived its behavior.” Managing a company brand is tightly linked to managing its reputation, because “a corporate brand creates expectations in the minds of consumers as to what the company will deliver, meeting those expectations creates the image in the minds of consumers that a company desires, which, in turn, enhances overall reputation.” [Argenti and Druckemiller, 2004, pp. 369, 374]. A considerable academic literature in non-economics and non-marketing fields of study also exists that provides methods for valuing corporate reputation as separate from corporate brand equity. One commonly used method is *Fortune’s* popular study of the “most admired companies,” released annually by the magazine since 1982. *Fortune’s* corporate reputation measure is calculated from survey-based responses to eight questions ranging from investment value to social responsibility. Additionally, Ponzi et al. [2011] proposed a framework for measuring corporate reputation that builds on insight from numerous academic approaches. The framework is branded as “RepTrak” and builds on survey-based perceptions of stakeholders on various organizational dimensions. In this monograph, we focus on brand equity and reputation,

high quality, and have argued that if firms “cheat” on consumers by promising high quality but delivering low quality, the return on brand investments made and their reputation for high quality would be compromised. The Klein–Leffler model is basically a model of moral hazard, with firms deciding between low and high quality in each period. In such models, a reputation equilibrium exists because each firm does not reduce its quality, because doing so would lead to loss of future profits.

A related literature in information economics focuses on signaling in product markets, and studies marketing-mix elements as quality signals. Spence [1974] defined signals as manipulable attributes or activities that convey information about the characteristics of economic agents (e.g., firms, consumers, job applicants). Not only do marketing-mix elements such as packaging, advertising, and warranties provide direct product information; they also convey indirect information about product attributes about which consumers are imperfectly informed and that may therefore serve as signals.

For example, advertising may demonstrate a firm’s commitment to its brand via consumers’ perceptions of advertisement costs (e.g., fly-by-night producers are much less likely to be able to afford expensive endorsers and spend a lot of money on advertising) and serve as a quality signal [e.g., Kihlstrom and Riordan, 1984, Milgrom and Roberts, 1986]. A high price may convey demand- or supply-related quality information, and thus function as a quality signal [e.g., Gerstner, 1985, Stiglitz, 1987]. More specifically, a high price may reflect either a high demand for superior quality or the high production costs associated with high quality [e.g., Spence, 1974, Tirole, 1990]. Warranties may signal manufacturers’ confidence in the quality of their products, because consumers often expect lower-quality producers not to match longer, more comprehensive warranties [Grossman, 1981, Lutz, 1989].

However, signals of quality are not always credible. Quality signals are credible only if sellers do not find value in “cheating” by conveying false market signals, for example, by charging higher prices for

---

rather than corporate reputation and equity, although insights gained from several approaches to equity and reputation would apply equally well to both.



lower quality. Sellers might refrain from cheating due to the desire for repeat sales or the presence of informed consumers [Farrell, 1980]. To illustrate, only high-quality firms may sustain a high price, because signaling high quality but offering low quality will not pay off in the long run. When sellers do not find value in cheating by conveying false market signals, and therefore low-quality and high-quality sellers find different strategies more profitable, buyers are then able to differentiate between the sellers by observing their signals. In this case, a separating equilibrium (where low-quality and high-quality sellers find different strategies more profitable) will exist and these signals will be credible.

However, sellers may find value in “cheating” and may lack incentives to choose different strategies. In such markets, buyers will not be able to differentiate between the sellers by using their signals. For example, the high costs associated with producing high-quality products may outweigh the positive effect of high quality on generating repeat sales [Tirole, 1990]. In this case, both low-quality and high-quality sellers may choose to advertise heavily. Consequently, consumers will not be able to use the advertising signal to differentiate between sellers.

Other signals may not be credible, because they are subject to adverse selection or moral hazard problems [Philips, 1988]. For instance, a full warranty offered by a contact lens firm may disproportionately attract consumers who know they will likely lose them (adverse selection), or may cause consumers to take less good care of their lenses (consumer moral hazard problem).

Finally, the signaling and reputation literatures also studied whether a brand extension can signal the quality of existing and new products. Sappington and Wernerfelt [1985] show that brand associations are transferred in the case of brand extensions,<sup>2</sup> whereas Wernerfelt [1988] shows that a brand extension signals the quality of existing

---

<sup>2</sup>A sizeable consumer behavior literature utilizes lab studies showing that such association transfer is present when a fit exists between the parent product and extension (e.g. Aaker and Keller 1990). Sullivan (1990, 1992) shows such spillover effects exist with secondary data, and Erdem [1998] finds evidence for such spillover effects with individual-level transactional data. Swaminathan et al. [2001] show evidence of decreased sales of the parent brand in the original product category when a food product with a large market share introduced a new product under the same brand name that failed.

and new products if one assumes extensions cost more than the introduction of a new brand. [Cabral \[2000\]](#) assumes cost neutrality and that old and new products are of the same quality; he finds that (a) a brand extension's signaling capacity is more limited than [Wernerfelt \[1988\]](#) suggested, but (b) a brand extension's signaling capability does indeed increase the probability of the products being perceived as high quality. [Moorthy \[2012\]](#) changed five assumptions of Wernerfelt's model and assumes (1) the new brand costs more than the extension, (2) positive, negative, and zero correlation may exist between the firm's old and new products, rather than just zero correlation, (3) instead of all consumers observing the firm introducing a new brand, some do and some do not, (4) firms in fact know the performance of their previous products, and (5) good products may occasionally perform poorly. Moorthy shows that a model with the first two assumptions mentioned above can yield Wernerfelt's signaling result, but the existence of a separating equilibrium depends on various restrictions on the model, including an upper bound on the brand extension's cost advantage and a ban on perfect positive correlation (the condition under which [Cabral, 2000](#), obtained his result). [Cabral \[2009\]](#) shows that maintaining high quality is easier for a monopolist when it sells more than one product in a model with imperfect observability of quality by consumers.

# 3

---

## Information Theoretic Brand Equity Framework

---

Consumers understand they are at a certain disadvantage relative to the firm, which knows more about its product(s) than they do. The information-economics literature terms this an “information asymmetry.” And when consumers do search for information, they cannot be sure they’ve understood it correctly or accurately; that is, the information is imperfectly perceived, understood, and assimilated. In the context of such asymmetric and imperfect information is exactly where brands and elements of the marketing mix can all serve as signals for the consumer. In prior sections, we discussed a number of marketing-mix elements as signals (warranties, pricing, advertising, etc.), but in this section, we will focus on the brand itself.

Needing to make a choice among products, and yet understanding they are subject to asymmetric and imperfect information, consumers may rely on the brand as a credible (i.e., believable and trustworthy) signal. The brand is effective in this role for several reasons:

- (1) The brand conveys content information about product attributes (physical, functional, and perceptual/symbolic) and signals product positioning in attribute space;

- (2) The brand also reminds consumers of the marketing-mix elements (price, quality, channel, advertising, etc.) the firm uses, both currently and retrospectively. This association between brand and marketing mix gives consumers a sense of the clarity and consistency of the brand positioning;
- (3) The consistency of the positioning and consumer experience with the brand lends (or not) credibility to the brand as a signal. That is, if the brand has consistently delivered on its promises to consumers, and is perceived as being capable of doing so in the future, the brand is a credible signal; and
- (4) In turn, high brand credibility reassures consumers that they can trust the brand's claims about itself (particularly with respect to quality) and reduce perceived risks in making the purchase, all while saving the consumer the effort of acquiring more and better information.

As we shall see subsequently, high brand credibility (BCr) undergirds several benefits that brands create for consumers.

Even in a market characterized by imperfect and asymmetric information, consumers are not helpless or powerless. If they do rely on a brand, yet over time discover its claims are not credible (believable and trustworthy), consumers may lose their trust in the brand and buy someone else's product. A lot of the firm's effort may have gone into building that brand's credibility over the years (e.g., capital investments to improve quality, advertising to promote products and claims). This effort is forfeit when consumers abandon the brand in favor of another. This act is analogous to forfeiting a bond due to non-performance: if the brand promises yet does not deliver, it loses its sizable investments in brand-building. This, in essence, is the reason brands are credible signals: if the brand does not follow through on its promises, it loses consumers' trust as well as its investments. Such losses are very difficult to overcome by their very nature: although marshalling financial resources as part of a recoup effort may be possible, "spending" time is impossible except at the fixed rate of one second after the other.

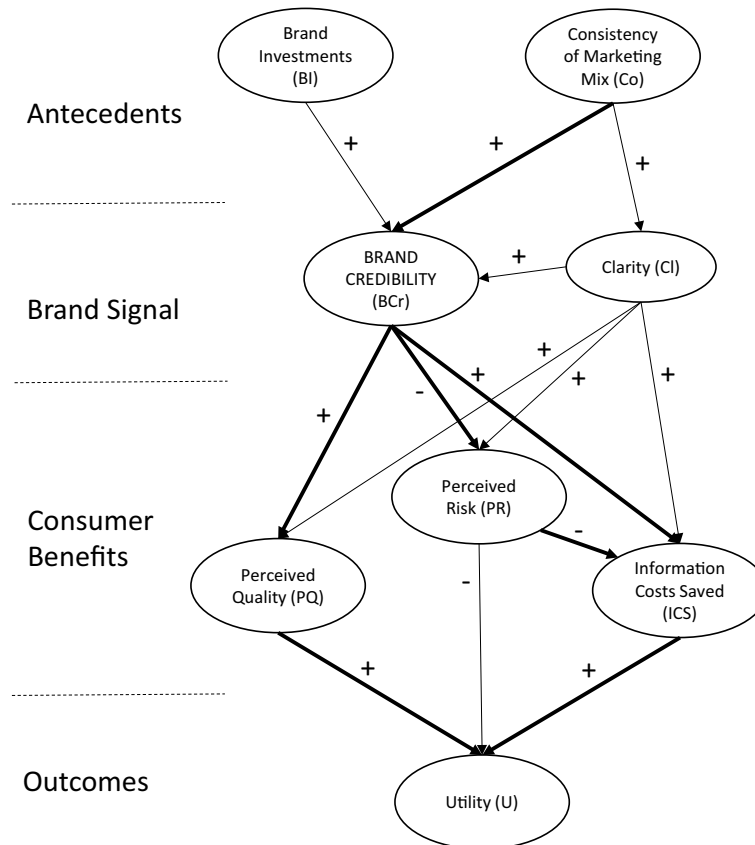
To summarize: brands can be signals to consumers, because they transmit positioning information and embody past experiences between consumers and products; if brands are *credible* (i.e., trustworthy and believable), they reduce decision-making costs by decreasing the need to seek more information, and they reduce perceived risks associated with purchasing; if brands are *not credible*, firms forfeit past investments as consumers abandon them for more credible brands.

### 3.1 Proposed model based on signaling theory

Erdem and Swait [1998], to which we refer the reader for more details, first outlined the above conceptualization. The basic structural equation model (SEM) reflecting the conceptualization is shown in Figure 3.1. In that diagram, the ellipses represent latent (or unobservable) constructs generated by theory — more on these below — whereas the arrows represent the postulated relationship effects that should be found in data; the  $+/-$  signs along the arrows represent the expected sign of the impact of the antecedent construct on the object construct.

To elaborate, the structural model tying together the various constructs (brand investments — BI, marketing-mix consistency — Co, product-positioning clarity — Cl, brand credibility — BCr, perceived quality — PQ, perceived risk — PR, information costs saved — ICS, and utility — U) can be envisioned as having four tiers, as it were (see the left-hand side of Figure 3.1). The tier of principal interest to us is that of the *brand signal*, which includes a characterization of the brand’s credibility (BCr, i.e., perceptions of the trustworthiness of its claims as well as its technical capability to deliver on its promises) and the clarity of its product positioning and messaging (Cl). If the clarity of a brand’s positioning is in question (ambiguous), this lack of clarity should lead to decreased credibility of brand claims.

The *brand signal* tier is conceptually preceded by the *antecedents* tier, which includes two constructs that (partially) explain the level of BCr: the perceived level of investment that a firm makes in the brand (BI, e.g., advertising expenditures, sponsorships) and perceived consistency of the marketing mix (Co). The structural relationships



**Figure 3.1:** Signaling Model of Brand Equity [after Erdem and Swait, 1998].

in the SEM indicate that BCr is assumed to increase as BI and Co increase. The BI-BCr link expresses the expectation that higher advertising expenditures, say, lead to higher brand credibility because the firm has more to lose if it does not follow through on its promises. The consistency of the marketing mix describes the coherence between mix elements (product, pricing, distribution, and promotion) at a point in time and across markets, as well as the stability/consistency of the mix over time. That is, distributing a high-price product (a luxury perfume) through a low-end channel (a mass merchandiser) creates dissonance to

some degree in consumers' perceptions, reduces perceived consistency, and, ultimately, reduces the credibility of the firm's claims about perceived quality. The *antecedents* tier as a whole describes much of the impact of the firm's day-to-day marketing efforts on consumer perceptions of the brand. In fact, this tier is where the development and execution of marketing activities should be judged with respect to their impact on consumer choice: will this marketing action (product extension, pricing policy, distribution agreement, advertising message) lead to improved perceptions of brand credibility? Will the action contribute to enhancing the clarity of the brand's positioning?

Below the *brand signal* tier is the rollout of *consumer benefits* generated by the brand's credibility. The *consumer benefits* of higher BCr are essentially three: increased perceived quality (PQ), reduced perceived risks (PR) of purchase, and savings arising from avoiding costs of information gathering (ICS).

The bottom tier is that of *outcomes*, where the proverbial "rubber meets the road": increased PQ, reduced PR, and increased ICS (all arising from higher BCr) all give rise to increases in the utility of the branded product to the consumer. That is, branded products may be more attractive to consumers because they make decisions easier (by saving on information search, acquisition, and processing), they reduce the risk of a bad purchase, and reassure consumers through higher perceived quality.

### 3.2 Testing the main theoretical implications of the information-economics brand-equity framework

Besides embodying the signaling-based brand-equity framework in the structural model of Figure 3.1, E&S [Erdem and Swait, 1998] tested it empirically by first developing what is known as the measurement model for the constructs they postulated. A measurement model for an SEM generally consists of multiple items associated with each of the constructs. For example, the BCr construct has six items associated with it: statements such as "This brand has a name you can trust" and "This brand delivers what it promises." E&S (Table 3.1) presents all 25 items used in their tests. As noted in the footnote to that table, the

items were generally measured on 9-point agree/disagree scales (exceptions noted in table).

E&S developed a paper-and-pencil survey around two product categories (juice and jeans) that were deemed relevant for undergraduate students at a major US university. To test the model, the authors obtained 92 usable surveys for jeans and 86 for juice.

Detailed statistical results can be found in E&S, but the bottom line is that the authors found strong statistical support for the structural relationships in Figure 3.1, all in the expected direction, in both product categories. The most impactful relationships (i.e., not only statistically significant but also substantively important) are shown in Figure 3.1 as heavy lines; the lighter lines are almost all statistically significant but much less impactful. In addition, some small differences in results exist between the two product categories, but the main story remains as told by Figure 3.1.

To summarize, the E&S test of the signaling-brand-equity framework suggests that brands seem to have an impact on brand evaluations (hence, on choice) through two main mechanisms, emanating from the perceived credibility level associated with the brand:

1. Brands as credible signals increase perceived quality levels directly; and
2. Brands as credible signals reduce the need for information about the brand, generating direct decision-making cost savings for the consumer. In addition, it reduces perceived risks associated with the purchase and consumption of the brand, which in turn further reduces the need for information.

Thus, at least in the tested product categories and this population of subjects, ICS seems to mediate the impact of PR on brand evaluations.

To digress for a moment, the original measurement model presented in E&S has been somewhat refined over the years to achieve greater precision in the measurement of brand constructs, particularly brand credibility. We particularly recommend the use of the measurement model by Erdem et al. [2006], which was used in the extensive cross-country validation reported in that paper. We further recommend that



applications of the measurement model in non-theory-testing papers be conducted with person-/brand-centered measures, to account for individual heterogeneity in the responses to agree/disagree scales. In theory-testing contexts, this should be controlled for through the SEM's specification.

A final comment is also in order about the basic signaling framework for brand-equity measurement. E&S's theory development and empirical testing, as well as subsequent validation applications, have taken a point-in-time perspective; that is, we have not really considered the processes that might govern the evolution over time of the constructs involved. We turn our attention to this point in the following section.

### **3.3 Dynamic structural models and the evolution of brand equity**

The preceding discussion showed that one very important way brands manifest their effects on consumer choice is through their impact on the evolution of constructs such as consumer perceptions of attributes, risk, and preferences, which underlie the formation of brand equity over time. Dynamic structural choice models with learning have explicitly modelled the processes through which these effects materialize.

Dynamic structural choice models estimated on individual-level disaggregate data with implications for brand-equity formation, management, and measurement date back to the late 1980s. These models are based on the random utility maximization framework, like most discrete-choice models. The main difference in these models is that they explicitly capture the dynamic processes that underlie brand-equity formation. [Roberts and Urban \[1988\]](#) and [Eckstein et al. \[1988\]](#) were the earliest to model explicitly how, under quality uncertainty, learning about quality may reduce the variance of quality perceptions (which can be conceptualized as perceived risk), affect consumer mean-quality perceptions, and hence increase consumer expected utility when consumers are risk averse. The Roberts and Urban model assumes consumers to be myopic and learn through word of mouth and test trials in the car market. [Eckstein et al. \[1988\]](#) model brand choice in the context of frequently purchased product categories, where strategic sampling can

be important. Thus, consumers were allowed to be forward-looking, maximizing expected utility over the planning horizon (rather than the immediate utility) by considering the impact of the information contained in the trial on future utilities.

The [Eckstein et al. \[1988\]](#) model allows learning to occur only through endogenous signals such as use experience. [Erdem and Keane \[1996\]](#) generalize the basic forward-looking learning model in which consumers update their quality perceptions upon arrival of new information in a Bayesian fashion by proposing a model in which consumers learn both through endogenous (e.g., use experience) and exogenous (e.g., advertising) signals. This latter model demonstrated how learning about quality through experience (with or without strategic sampling<sup>1</sup>), as well as via marketing-mix elements (advertising), may increase consumer utility in the long run by decreasing consumer uncertainty through reduction of the variance of consumer quality perceptions, hence leading to brand-equity formation and updating.

These models explicitly capture the evolution of consumer perception (e.g., perceived quality) and perceived risk (the variance of quality perceptions). These models also explain how brand loyalty (defined here as the repeated buying of a small subset of brands) is formed over time: brand loyalty occurs both due to a match between product offerings and consumer tastes (unobserved heterogeneity), as well as to lower perceived risk associated with the familiar brand (state dependence).

### 3.3.1 A formalization of concepts

The key feature of learning models is that consumers do not know the attributes of brands with certainty. Although this scenario may be true of many attributes, most papers, including [Erdem and Keane \[1996\]](#), have focused on learning about brand quality. In their model, consumers receive signals about quality through both use experience and advertising signals. But prior to receiving any information, consumers

---

<sup>1</sup>Learning models with myopic consumers (no strategic sampling) and forward-looking consumers (where consumers may strategically sample different brands to learn about them) both show how use experiences decrease perceived risk and build brand equity for the consumer.

have a normal prior on brand quality:

$$Q_j \sim N(Q_{j1}, \sigma_{j1}^2) \quad j = 1, \dots, J. \quad (3.1)$$

Equation (3.1) says that, prior to receiving any information, consumers perceive the true quality of brand  $j$ , denoted  $Q_j$ , is distributed normally with mean  $Q_{j1}$  and variance  $\sigma_{j1}^2$ . So in the first period, the consumer's information set is just  $I_1 = \{Q_{j1}, \sigma_{j1}^2 \forall j\}$ . The values of  $Q_{j1}$  and  $\sigma_{j1}^2$  may be influenced by many factors, such as reputation of the manufacturer, pre-launch advertising, and so on.

Use experience does not fully reveal quality because of “inherent product variability.” Inherent product variability has multiple interpretations. First, the quality of different units of a product may vary. Second, a consumer's experience with a product may vary across use occasions. For instance, a cleaning product may be effective at removing the type of stains one faces on most occasions, but be ineffective on other occasions. Alternatively, psychophysical perception may include inherent randomness; for example, the same cereal tastes better to someone on some days than others.

Given inherent product variability, a distinction exists between “experienced quality” for brand  $j$  on purchase occasion  $t$ , which we denote  $Q_{jt}^E$ , and true quality  $Q_j$ . Let us assume the “experienced quality” delivered by use experience is a noisy signal of true quality:

$$Q_{jt}^E = Q_j + \varepsilon_{jt}, \quad \text{where } \varepsilon_{jt} \sim N(0, \sigma_s^2) \quad \text{for } t = 1, \dots, T. \quad (3.2)$$

Here  $\sigma_s^2$  is the variance of inherent product variability, which we refer to as “experience variability.” Of course experience signals are consumer  $i$  specific. But here and in later equations, we will suppress the  $i$  subscript whenever possible to save on notation.

Note that we have conjugate priors and signals, because we assume both the prior on quality in Equation (3.1) and the noise in the quality signals in Equation (3.2) to be normal. This structure gives simple formulas for updating perceptions as new information arrives, as we will see below, which is precisely why we assume priors and signals are normal. Few other reasonable distributions would give simple expressions. Also, because signals are typically unobserved by the researcher, more

flexible distributions would not necessarily be identified from choice data alone.

Thus, the posterior for perceived quality, given a single use-experience signal (received after the first purchase of brand  $j$ ), is given by simple Bayesian updating formulas:

$$Q_{j_2} = \frac{\sigma_{j_1}^2}{\sigma_{j_1}^2 + \sigma_\varepsilon^2} Q_{j_1}^E + \frac{\sigma_\varepsilon^2}{\sigma_{j_1}^2 + \sigma_\varepsilon^2} Q_{j_1}, \quad (3.3)$$

$$\sigma_{j_2}^2 = \frac{1}{\left(\frac{1}{\sigma_j^2}\right) + \left(\frac{1}{\sigma_\varepsilon^2}\right)}. \quad (3.4)$$

Equation (3.3) describes how a consumer's prior on quality of brand  $j$  is updated as a result of the experience signal  $Q_{j_1}^E$ . The more accurate the signal is (i.e., the smaller  $\sigma_\varepsilon^2$ ), the greater the extent of updating. Equation (3.4) describes how a consumer's uncertainty declines when he/she receives the signal. The quantity  $\sigma_{j_2}^2$  is often referred to as the "perception error variance."

Equations (3.3) and (3.4) generalize to multiple signals. Let  $N_j(t)$  denote the total number of use-experience signals received up until the purchase occasion at time  $t$ . Then we have

$$Q_{jt} = \frac{\sigma_{j_1}^2}{N_j(t)\sigma_{j_1}^2 + \sigma_\varepsilon^2} \sum_{s=1}^{t-1} Q_{j_s}^E d_{j_s} + \frac{\sigma_\varepsilon^2}{N_j(t)\sigma_{j_1}^2 + \sigma_\varepsilon^2} Q_{j_1} \quad \text{for } t = 2, \dots, T \quad \text{and} \quad (3.5)$$

$$\sigma_{j_t}^2 = \frac{1}{\left(\frac{1}{\sigma_{j_1}^2}\right) + N_j(t) \left(\frac{1}{\sigma_\varepsilon^2}\right)} \quad \text{for } t = 2, \dots, T, \quad (3.6)$$

where  $d_{j_t}$  is an indicator for whether brand  $j$  is bought/consumed at time  $t$ .

In Equation (3.5), perceived quality of brand  $j$  at time  $t$ ,  $Q_{jt}$ , is a weighted average of the prior and all quality signals received up until the beginning of time  $t$ ,  $\sum_{s=1}^{t-1} Q_{j_s}^E d_{j_s}$ . Crucially, this is a random variable across consumers, as some will, by chance, receive better-quality signals than others. Thus, the learning model endogenously generates

heterogeneity across consumers in perceived quality of products (even starting from identical priors). This aspect of the model is appealing because people are unlikely to be born with brand preferences (as standard models of heterogeneity implicitly assume); rather, they arrive at their views through heterogeneous experience.

Of course, as Equation (3.6) indicates, the variance of perceived quality around true quality shrinks as more signals are received, and in the limit, perceived quality converges to true quality. Still, heterogeneity in perceptions will persist over time, for several reasons: (i) both brands and consumers are finitely lived, (ii) a flow of new brands and consumers is entering a market, and (iii) as people gather more information, the value of trial diminishes, and the incentive to learn about unfamiliar products will become small. Intuitively, once a consumer is familiar with a substantial subset of brands, the additional benefit to learning about the rest is usually insignificant.

Learning models that account for strategic trial (i.e., they allow for forward-looking consumers) must be solved by dynamic programming (DP), because today's purchase affects tomorrow's information set, which affects future utility. The key idea of DP is that at each time  $t$ , the value of choosing option  $j$  consists of an immediate payoff, *plus* the expected present value of the future payoff stream, which arises in period  $t + 1$  onward. This "forward-looking" term is *conditional* on the option  $j$  chosen at time  $t$ , because the choice at  $j$  alters the consumer's information set, which in turn affects the choices he/she makes in the future.

One can obtain information about a brand other than trial purchase in numerous other ways. Some of these ways are under the direct control of the firm and constitute brand investments, such as advertising and communications, using price as a quality signal, and so on. Others, such as word of mouth, are influenced by both the firm's brand investments and others' brand experiences. Thus, an increase in the mean-quality perceptions (or the creation of favorable brand associations) and a decrease in the variance of perceptions (decreased perceived risk) through all these information sources contribute to the formation and evolution of brand equity.

### 3.3.2 Applications of dynamic structural learning and choice models

Over the last 20 years, both economics and marketing have proposed a large number of models that have enriched the [Erdem and Keane \[1996\]](#) setup, several of which modelled the different roles advertising play in brand choice and brand-equity formation. Erdem and Keane modelled the direct information effect of advertising by allowing the advertising exposure to provide unbiased but noisy information about product quality. [Ackerberg \[2003\]](#) proposes another forward-looking dynamic structural model to account for the indirect informational role of advertising, by allowing advertising intensity to signal product quality. He also represented persuasive effects of advertising by allowing advertising frequency to shift consumer utility directly. Ackerberg found empirical evidence in the yogurt category for the indirect informational but not the persuasive role of advertising. [Mehta et al. \[2008\]](#) assume myopic consumers and modelled the informative, persuasive, and “transformative” effects of advertising, where advertising alters the consumption experience itself. They found the informative effect dominates in the early life cycle of a brand, whereas the transformative effect becomes more important over time. Thus, this literature studied the long-term effects of advertising in brand-building.

Another long-standing issue in the branding literature has been the potential adverse effects of price promotions on brand equity. [Jedidi et al. \[1999\]](#) show promotions indeed lead to increased price sensitivities and may erode brand equity [see also [Swait and Erdem, 2002](#)]. To explicitly model this possibility, [Erdem et al. \[2008\]](#) estimate a forward-looking model in which consumers learn about quality through use experience, advertising (both directly through information content and indirectly through advertising intensity), and price. For brand equity to erode due to price promotions, consumers would need to also use price as a signal of quality. Indeed, Erdem et al.’s [2008] results show supporting evidence in the ketchup category for brand-equity erosion due to price promotions, which increase sales in the short run but adversely affect quality perceptions in the long run because consumers infer quality from price. They also find the impact of information on

quality learning is greatest for use experience, followed by price, then by advertising content, and last by ad frequency/intensity.

Although a large number of learning models with implications for brand-equity formation, management, and measurement have been proposed and implemented in the context of frequently purchased product categories, prescription drugs [e.g., Crawford and Shum, 2005, Narayanan et al., 2005, Ching, 2010], and tariff choice [Miravete, 2003, Narayanan et al., 2006], few learning models have been proposed for durables. An exception is Erdem et al. [2005], who model Apple/Mac versus Windows platform choices. For durable goods, both quality and price uncertainty exist because the prices of a given system drop over time due to technological progress. Thus, consumers have an incentive to wait to learn about the quality/price trajectory, but waiting involves a foregone utility of consumption. Erdem et al. [2005] model how consumers search for information sources, learn about quality, and form both price and quality expectations in this setting. The results indicate that learning is the more important reason for purchase delay, stressing once again the importance of reduced uncertainty about quality being a main driver of purchase and brand equity.

Finally, the models discussed thus far in this section all depicted partial equilibria, that is, they treated the supply side (i.e. firms' decisions) as exogenous. There have been also applications where firms' decisions are modelled too. For example, Ching and Ishihara [2010] allow both consumers and firms to be uncertain about product quality in prescription drug markets, and estimate the demand model jointly with a pseudo-policy function for potential endogeneity of detailing, one source of information in such markets. Goldfarb et al. [2009] operationalize brand value to the firm as the extra profit a brand earns over and above what it would have earned based on its search attributes, which are the attributes the consumer can see before buying the product. The distinguishing feature of their approach is that they view the excess profit a brand earns as a comparison between two equilibria: the equilibrium with the brand as it is, and a counterfactual

### 3.3. *Dynamic structural models and the evolution of brand equity* 21

equilibrium in which the brand has “lost” its brand equity (value to the consumer, which is measured as the brand constants in this equilibrium model) but retained its search attributes. Thus, their framework measured consumer-based brand equity as the brand constants, after controlling for search attributes.



# 4

---

## Implications of the Information Theoretic Brand-equity Framework

---

In this section, we discuss a number of implications of the E&S signaling- brand-equity framework, focusing on the role of brand credibility as

1. a source of the phenomenon of price premia,
2. a driver not only of the utility (or attractiveness) of branded products but also as a driver of consideration- and choice-set formation,
3. a means to guide brand management in relational service industries, such as retail banking and telecommunication firms, and finally,
4. a factor in building brand loyalty.

We take up these topics in turn.

### 4.1 Price premia

One of the major benefits firms often attribute to strong brands is their ability to charge a price premium in the market; that is, customers who

are “attached” or “loyal” to a brand are less price sensitive than those who are not. In fact, this might be more a hope than a reality, because a strong brand might lead to more awareness by more consumers, perhaps then leading to a greater market share, or the strong brand has the ability to expand markets more easily/cheaply than a weak one, but the buyers of a strong brand will not necessarily have less sensitivity to price changes.

[Erdem et al. \[2002\]](#) test the proposition that high-credibility brands are associated with lower price sensitivity. In other words, the utility impact of a price change (conceived as a weight given to price in product evaluation) should be smaller for a high-credibility brand than for a low-credibility brand. This proposition is substantively different from the original empirical tests reported in [Erdem and Swait \[1998\]](#), which essentially formulated the impact of BCr on utility through what we might call “level changes”: high brand credibility leads to an overall better evaluation (utility) of the associated product. [Erdem et al. \[2002\]](#) proposed a further mechanism whereby high brand credibility works: it should actually result in changing the importance of price in the evaluation of the product (“rate change”). [Erdem et al. \[2002\]](#) justified their proposition thus:

1. (BCr→PR) High brand credibility reduces perceived risk; in a context of information asymmetry and uncertainty about product attributes, this may reduce price sensitivity.
2. (BCr→ICS) High brand credibility increases information costs saved; again, information asymmetry and uncertainty may reduce price sensitivity due to reduced information search costs.
3. (BCr→PQ) High brand credibility increases perceived quality, leading to reduced price sensitivity.

Intuitively, these points arise from the various mechanisms shown in [Figure 3.1](#), but are now proposed to work directly on price sensitivity rather than just as an incremental, undifferentiated impact on utility arising from a high brand credibility.

[Erdem et al. \[2002\]](#) test the proposition across four product categories: juice, jeans, shampoo, and personal computers. They selected

these four because they represent a search good (juice), short- to medium-term experience goods (jeans and shampoo), and a longer-term experience/credence good (PCs). One would expect, of course, that information asymmetry and uncertainty about product attributes increase as one considers search, experience, and credence goods; hence, the impact of BCr on price sensitivity should reflect this, leading to larger effects in longer-term experience and credence goods.

The study's subjects were again university undergraduates, with final sample sizes of 221 (juice), 232 (jeans), 217 (shampoo), and 198 (PCs). Besides measurement of brand credibility and certain other constructs, subjects participated in a discrete-choice experiment (Louviere et al., 2000) for one of the product categories. This DCE presented subjects with five brands in the category plus an opt-out (or None) alternative, each brand with a price assigned by an experimental design.

Based on the statistical models estimated, Erdem et al. [2002] demonstrate strong support for their proposition: individuals who associate high credibility with a brand are less price sensitive than those who believe that a brand is less credible, even after controlling for "level change" impacts from BCr. They also demonstrate that the effect varies in magnitude by product category, in large part because of the different financial stakes involved: PCs are, after all, much more expensive than juices; hence, making a mistake in the former has more negative consequences than in the latter.

The Erdem et al. [2002] study gives a concrete basis to firms' hopes about price premia for strong brands, but does so specifically by assigning to brand credibility the formative basis for the phenomenon.

## 4.2 Consideration- and choice-set formation

Following the initial effort in E&S, we broadened our studies of the effects of BCr, the central construct in the information-economics view of brand equity, to include not only evaluation/choice but also the consideration of brands (i.e., whether BCr affects not only how a product is evaluated, but also whether it even enters the set of goods actively compared for choice). Erdem and Swait [2004], using survey data, show

that credibility increases both the probability of a brand entering a consideration set, as well as the brand being chosen from the consideration set. They find the processes through which credibility impacts materialize differ across consideration and choice stages, as well as across product categories (i.e., athletic shoes, cellular provider, headache medication, orange juice, personal computers, and shampoo) that vary in terms of potential perceived risk, information costs, and sensitivity to perceived risk and information costs. BCr's impact operates mainly through perceived risk at the consideration stage, whereas it operates mainly through perceived quality at the choice stage (conditional on consideration). That is, the statistical evidence points to different roles for the constructs in Figure 3.1: PQ is more important in evaluating the attractiveness of branded products once they are deemed to be of sufficiently low PR to warrant full examination. PR and ICS, therefore, play a screening role in the choice process, whereas PQ is useful when one is choosing between acceptable products (i.e., those in the consideration set). The results also include the following findings: (1) the impact of credibility through information costs saved and perceived risk as opposed to through perceived quality is more pronounced in categories where uncertainty levels and sensitivity to uncertainty are higher; and (2) perceived quality effects are more pronounced at the choice stage rather than consideration stage.

Swait and Erdem [2007] further study the impact of credibility on choice-set formation and brand choice, as well as the stochastic component of utility, using experimental data collected through surveys. In effect, not only do choice parameters capture the impact of systematic utility differences on choice probabilities but also the relative importance of the stochastic utility moderates the magnitude of this systematic effect, a moderation phenomenon labelled *preference discrimination*. Preference discrimination is conceptualized as the decision makers' capacity to effectively discriminate between product utilities in choice situations. They find that in both categories studied (orange juice and PCs), credibility affects preference discrimination, but the choice-set size moderates the effect of credibility on preference discrimination. More specifically, higher brand credibility is associated with

higher preference discrimination when choice-set sizes are constant or the universal brand set remains unchanged across choice instances. When choice-set size varies greatly, however, lower brand credibility (through lower perceived quality effects) is associated with higher preference discrimination, suggesting that decision makers place greater weight on quality differences among lower-quality brands than among higher-quality brands.

Finally, using scanner panel data on fabric softeners, [Swait and Erdem \[2002\]](#) test the impact of temporal consistency of store promotions (variability in prices, displays, features over time for specific brands) and the availability of the products on the shelf on consumer brand evaluations and choice probabilities, and find that consistency increases consumer brand evaluations (utility) and choice probabilities. As noted earlier, consistency of marketing-mix elements is an important antecedent of brand credibility, which therefore suggests the possibility that inconsistent use of marketing-mix elements will gradually erode high credibility: essentially, inconsistency in pricing, availability, and so on increases consumer uncertainty about the claims a brand makes, ultimately leading to lower brand credibility.

#### **4.2.1 Consumer learning, search, and consideration-set formation**

The information-economics view of brand equity stresses the role brands play in reducing information costs. A particular type of information cost, search costs (i.e., information-gathering costs), and their impact on consumer choice have been widely studied. Indeed, both the learning literature covered in Section 3.3.2. and the search literature focus on consumer choice under uncertainty. Search models are usually applied to explain dispersion in prices (or wages). In its simplest form, this class of models usually assumes that a large number of retailers sell the same product. Conditioning on a consumer who has already decided to buy this product, his/her objective is to buy it from a retailer that offers the lowest price. But before visiting a retailer, he/she does not know what price it offers. The literature typically assumes that consumers know the distribution of prices in the market. A cost is associated with visiting a retailer (i.e., the search cost). Finally, one

can assume consumers are forward-looking and conduct a sequential search. Then the dynamic-programming-problem solution implies consumers' decision regarding whether to continue to search (or to make a purchase now) is an optimal-stopping problem. The solution is characterized by a reservation price: a consumer's decision rule is to reject any price above the reservation price and accept any price below the reservation price (e.g., [Koulayev, 2013](#), [De los Santos et al., 2013](#)).<sup>1</sup>

Interestingly, although the standard search model implies that consumers always buy on the last search, these learning-and-search models are able to explain why some consumers return to a previous search (as is supported by empirical patterns). In a learning-and-search model, the reservation price is decreasing with the number of searches (conditional on continuing search): if a consumer continues to search, the price he/she just sampled must be higher than his reservation price. This consumer then uses this observation to update his prior, which drives up his perceived "average" price based on the prior belief right before seeing this observation. The price distribution then shifts up slightly, resulting in a higher reservation price. But with a higher reservation price, some previously seen prices might actually fall below it. Therefore, returning to a previous search makes sense for consumers.

A subset of the search literature has also explicitly focused on the formation of consideration sets. For example, [Mehta et al. \[2003\]](#), [Kim et al. \[2010\]](#), and [de los Santos et al. \[2012\]](#) model search as the way consumers form their consideration sets. All three articles quantify search costs and estimate the size and composition of consideration sets. [Honka \[2014\]](#) observes the set of companies a consumer considered and his purchase decision at the individual level, and models search costs, switching costs, and consideration-set formation. Honka develops an integrated utility-maximizing model in which consumers decide over which and how many companies to search, and from which company to purchase, in the auto insurance industry. Estimated search costs range from \$35 to \$170. The article concludes that search costs are the most important driver of customer retention in the auto insurance industry.

---

<sup>1</sup>See [Ching et al. \(2016\)](#) for a more detailed discussion of this literature.

Although these models focus on price search, the frameworks can be adapted to include search costs incurred to learn about quality and product characteristics. The extent of search costs associated with only prices reveals the potentially significant amounts of search costs once one extends the information gathering process to other product attributes. The role that brands play in reducing such costs is an important component of brand equity in the information economics view.

### **4.3 The role of brands in Customer Relationship Management (CRM) for relational service firms**

Relational service firms, like retail banks, financial services, and telecommunication companies, maintain medium- to long-term relationships (usually measured in years) with their customers. In fact, maintenance of these relationships is generally considered key to the profitability of such firms. Thus, one of the principal motivations today that guide firms in managing their customer relationships is that of managing customer churn (conversely, retention).

[Sweeney and Swait \[2008\]](#) examine the role of service/firm brands (through brand credibility) in affecting customer retention and customer participation in advocacy for the brand (specifically, word-of-mouth recommendations). Their essential question centers on the relationship between brand credibility and satisfaction with the services provided through the firm/brand, and the loyalty customers' relationship with the brand engender.

[Sweeney and Swait \[2008\]](#) theorize that two motivations guide customers' downstream behaviors (e.g., switching from the brand and positive word of mouth): (1) an experience-based reasoning that gauges how well consumers benefit from the relationship, which is captured by their cumulative satisfaction (Sat) with the firm or brand; and (2) a future-oriented reasoning, which is captured by their commitment to the relationship. Commitment is described as being multi-dimensional, encapsulating loyalty commitment (LC — the psychological attachment to the brand) and continuance commitment (CC — based on

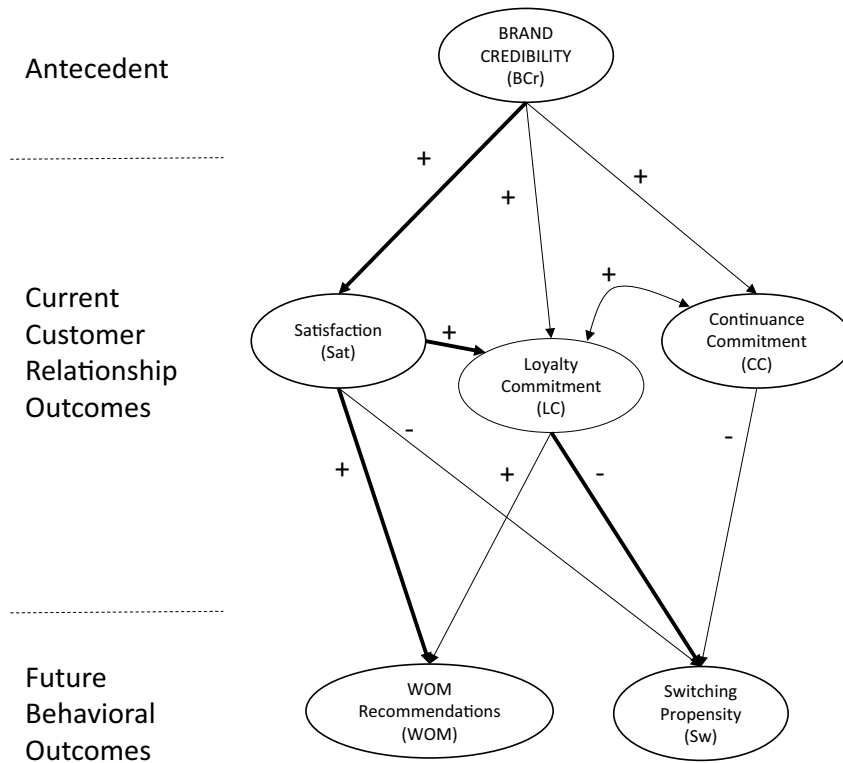
the cognitive consideration of the costs of switching). Hence, commitment as a whole considers both psychological/affective reasons for staying/switching, and the costs of switching.

Earlier we defined the construct of brand credibility (BCr) as having two components, namely, the perceived trustworthiness of claims (i.e., the belief that the firm will follow through on claims) and the perceived expertise to deliver on claims (i.e., the belief that the firm is able to do what it promises). [Sweeney and Swait \[2008\]](#) argue that these are also drivers of cumulative satisfaction since, over time, BCr will be the summary “statistic” expressing the customer’s perception of the stability of the service brand. Similarly, the perceived trustworthiness of the brand (hence, credibility) should contribute to the reinforcement of the affective component of commitment, LC. Higher perceptions of brand expertise should also increase the calculative component of commitment, CC. We note that this reasoning is strongly supported by [Kim et al. \[2008\]](#), whose primary finding is that brand credibility serves as a source of cognitive and affective conviction, which then leads to stronger brand commitment.

These various propositions are manifested in [Figure 4.1](#), which expresses the structural equation model tested by [Sweeney and Swait \[2008\]](#). The authors tested the model using customers from two service sectors, retail banking and telecommunications (specifically, long-distance [ld] service customers). Contrary to earlier studies of the brand-signaling framework, this study used not a student sample, but a general population convenience sample recruited in a large North American metro area. A self-completion paper-and-pencil questionnaire was distributed in places where interceptions were possible, and completed questionnaires were mailed back. Respondents were randomly assigned to either the banking or ld questionnaire, and to complete it were asked to self-select a bank/ld firm “you regularly use.” Final sample sizes were 460 for retail banking and 266 for ld services.

The statistical modelling results support all the proposed structural relationships in [Figure 4.1](#) (details of analyses can be found in [Sweeney and Swait \[2008\]](#)). That diagram also indicates that the more substantive results through the bold arrows, indicating that the impact of





**Figure 4.1:** The Role of Brand Credibility in Customer Relationship Management [after Sweeney and Swait, 2008].

brand credibility is most substantial on satisfaction (though the other first-tier paths are statistically significant, just not as impactful). Satisfaction increases, in turn, lead directly to WOM recommendations; satisfaction also has a substantial impact in decreasing switching propensity, but does so through the mediation of loyalty commitment. Note here that satisfaction contributes directly to brand-advocacy behavior, less so to directly lowering switching propensity. Satisfaction contributes to customer retention, but does so by reinforcing the affective component of commitment.

Now, CRM systems are directly designed around the concepts embodied in the middle tier of Figure 4.1, which we have termed

*Current Customer Relationship Outcomes:* these concepts measure principally customer satisfaction with the service, some may broaden the focus to include such measures as brand loyalty and commitment. These systems, over time, have also evolved to some extent to help service-failure recuperation efforts. But they rarely focus on the antecedent role the brand may have as a strategic tool to gauge and direct firm–customer relationships. Sweeney and Swait’s [2008] results suggest that considering adding monitoring of credibility as part of CRM systems (and implicitly, as part of brand-monitoring systems) would be helpful to bring the brand dimension into relationship management.

As a final point on the Sweeney and Swait [2008] study, note that those authors tested whether a model that assumes brand credibility is the result of satisfaction and commitment better explains their results. By contrast (see Figure 4.1), their reasoning suggests that brand credibility is an antecedent to these constructs. The alternative model (credibility-as-outcome) is not unreasonable: that evaluations of satisfaction and commitment might influence credibility seems plausible, particularly in cross-sectional data of the type they used. However, their results strongly support the model as shown in Figure 4.1: brand credibility shapes satisfaction and commitment, and not the other way around.

#### **4.4 Brand-management implications: Brand extensions (umbrella branding), co-branding, brand alliances and brand-crisis management**

Many researchers have adopted the information-economics approach to brand equity to study various brand-management topics including co-branding and brand alliances and brand-crisis management.

Erdem [1998] estimated a learning model of umbrella branding whereby consumers’ priors about quality are correlated for umbrella brands, and use experience with the brand in one category provides (noisy) information about the quality of the same brand in another category. She explicitly showed that in the complementary toothpaste

and toothbrush categories, information spillover effects exist and brand-equity dilution occur when an extension is not well-received. [Erdem and Sun \[2002\]](#) showed that both use experience and advertising spill-over effects exist for umbrella brands, reducing consumer risk and information costs. [Anand and Shachar \[2004\]](#) provide evidence that a multi-product firm's portfolio of products (umbrella brands) affects consumer purchase decisions about each of the firm's products. The authors show that revision of the information set in this way introduces a source of consumer loyalty and explains interesting empirical regularities in consumer behavior. For example, consumers are loyal to a multiproduct firm even when the firm does not offer a product that matches their preferences better than a product of competing firms. The authors estimate the model and test its implications using panel data on television viewing choice. The empirical results support the model and its implications. The model offers a parsimonious framework for brand-extension strategies and maps new channels of spillovers in a multiproduct firm. The model adopted is again consistent with the signalling view of brand equity.

Similarly, the implications of the signaling view of brand equity have also been developed and tested for co-brands. Co-branding or brand alliances occur when two or more existing brands are combined into a joint product or are marketed together in some fashion [[Keller, 2013](#)]. For example, [Rao et al. \[1999\]](#) study how brand alliances are formed to gain mutual access to proprietary markets or to encourage affect transferal. They show that overall perceptions of quality for a product featuring a brand alliance will vary depending on the observability of the product's quality and the credibility of the signal provided by the brand ally. Similarly, [Gammoh et al. \[2006\]](#) study consumer evaluations of brand signals. They indicate that signaling theory works on the risk-reduction hypothesis, and use the ELM (elaboration likelihood model)<sup>2</sup> to test whether, under low cognitive elaboration, when consumers do

---

<sup>2</sup>ELM asserts that if a person thoroughly processes persuasive communication, he/she is more likely to be influenced by the content of communication, called central cues, whereas if he/she does not process the communication, he/she is influenced by executional aspects such as attractiveness, number of arguments, and so on.

not process relevant product information available to them, the well-known brand ally is interpreted as an endorsement of the focal brand, and the alliance improves consumers' evaluations of focal brand.

The information-economics view of brand equity has also been applied to study the effects of brand-harm crisis. For example, [Zhao et al. \[2011\]](#) study the Kraft Australia peanut butter product-harm crisis and its implications for brand equity by considering whether consumers who receive a very negative experience signal may change their perception of signal variance. They found evidence for the fact that consumers also update their perceptions of noisiness of information sources over time.

Thus, the results based on these kinds of models have shown that standardization of quality and consistent provision of information through the marketing mix (advertising, price, and the like) is the key to successful brand-equity management. This finding is in agreement with predictions of the E&S brand-signaling framework.

# 5

---

## Validation of the Information Theoretic Brand-Equity Framework Across Product Categories, Countries, and Time

---

The early research proposing and testing the information-economics signaling framework for brand equity [Erdem and Swait, 1998] was conducted using undergraduate student subjects in North American universities and covering only two product categories (jeans and juice). This method prompts the question as to the generalizability of the structural relationships and measurement model found in that study. And more generally, it begs the question of the framework's applicability over a broader sweep of products and countries and over time.

In this section, we will present evidence that the signaling framework applies quite broadly over these various dimensions.

### 5.1 Generalizability over product categories and choice stages

Erdem and Swait [2004] investigate the generalizability of the E&S framework across product categories, while maintaining constant the use of student subjects in a North American setting. They focused on six product categories: athletic shoes, cellular services, headache medication, juice, personal computers, and shampoo. Each subject provided

data for three of the product categories, in such a way that each product category had a final sample of about 80 subjects.

The authors selected these categories to cover a broad spectrum of consumer uncertainty about product attributes and heterogeneous sensitivity to uncertainty. For example, consumers are more likely to be uncertain about a number of attributes of a personal computer than they are about an apple juice; in addition, because of more serious negative consequences (e.g., the PC will cost several orders of magnitude more than a juice), consumers may be more sensitive to this uncertainty in PCs than in juices.

Besides using a broader set of product categories, [Erdem and Swait \[2004\]](#) also looked at the role of brand credibility in (a) consideration-set formation (i.e., whether or not a brand is included among the set of goods compared for choice) and (b) choice, conditional on inclusion in the consideration set. This distinction is important. Earlier work by [Erdem and Swait \[1998\]](#) had assumed that all brands presented to subjects would be considered during comparison and evaluation for choice. Decomposing the process into a screening component and a conditional choice component allowed the investigation of differential roles of the brand in each stage.

In this study, brand credibility was explicitly decomposed into two component sub-constructs, trustworthiness (i.e., the perceived willingness of the brand to deliver on its claims) and expertise (i.e., the perceived ability of the brand to deliver on its claims). Within the scope of [Erdem and Swait's \[2004\]](#) research, this decomposition of credibility into trustworthiness and expertise permits insights into the interaction between brand credibility and consumer uncertainty about attributes in the product categories.

We direct the reader to [Erdem and Swait \[2004\]](#) for detailed presentation of their results, but give here only an overview.

1. Consideration-set formation:
  - a. Brand credibility has a pronounced impact via both trustworthiness and expertise in all product categories examined.

- b. Uncertainty with respect to product attributes may increase the role of expertise in determining consideration of the brand, particularly where long-term experience and/or credence attributes are the case (headache medication and PCs).
- c. Perceived quality and information costs saved are strong positive determinants of consideration, whereas perceived risk plays a negative role in consideration for athletic shoes (perhaps because of high attribute — longevity, comfort — uncertainty) and PCs (perhaps because of large negative consequences).

2. Choice conditional on consideration:

- a. Perceived quality is always an important component of brand evaluation during choice.
- b. Information cost savings is important during choice within consideration set for headache medication, juice, and PCs, product categories with higher uncertainty and higher sensitivity to that uncertainty.
- c. Among considered brands, perceived risk plays no role during choice, indicating that perceived risk is limited to the consideration-set-formation stage; that is, it is used as a screener.
- d. In consonance with these prior observations, trustworthiness is also important in headache medication, juice, and PCs, and not in the other categories, whereas expertise is seen to play no role at all during conditional choice.

3. Overall:

- a. The trustworthiness of the brand is important in both consideration-set formation (i.e., the brand getting in the game, so to speak) and choice (i.e., winning the game).

- b. Expertise plays a screening role, so that high-perceived-risk brands that are seen as unable to deliver on their promises get removed from further consideration.
- c. Significant heterogeneity across individuals exists, due to their perceived uncertainty with respect to product attributes and their familiarity with the category.

The [Erdem and Swait \[2004\]](#) results strongly support the idea that brands receive two benefits from high credibility: (a) they are more likely to be considered (be in the game) and (b) they are more likely to be chosen (win the game). Conversely, the downside of low credibility is that the brand is not considered, and hence cannot be chosen. In Section 6.3, we will examine a concrete example of this happening in the automobile market, but for now let it suffice to say that reducing the likelihood of being in consumers' consideration sets can carry a very high cost for the firm. [Swait et al. \[2014\]](#) mention that from 2007/Q2 to 2010/Q4, Toyota's purchase consideration in the US auto market dropped from 35% to 23%, a staggering 34% drop in consideration! In addition, "...overall sales, vehicle resale values, brand market share, and perceptions of safety all declined for the brand" [[Swait et al. 2015](#), p. 318], which they attribute to a loss of credibility arising from poor management reaction to a product-related crisis. The obvious lesson is that if you are not in the game, there is no way you can win it.

To summarize, the research of [Erdem and Swait \[2004\]](#) supports that the basic framework of E&S is generalizable across product categories. They also demonstrated [see [Swait and Erdem, 2007](#)] that brand credibility has a role in both brand screening (consideration) and choice conditional on consideration.

## 5.2 Generalizability over cultures and stages of economic development

[Erdem et al. \[2006\]](#) explore a key aspect of generalizability of the E&S brand-signaling framework: the applicability of brand signals across different countries, implying different cultures and levels of economic



development. While maintaining undergraduate students as subjects, they collected data from universities in Brazil, Germany, India, Japan, Spain, Turkey, and the United States. Additionally, they used juices (like E&S) and PCs (not included in E&S) as their focal product categories. Data were collected via an online survey, administered from October 2002 to April 2003, depending on the country. Every country had at least 114 subjects (maximum of 161) except Germany, which had a sample of 57 subjects. Respondents provided measurement items for an SEM, as well as stated choices for both product categories via a discrete-choice experiment.

For the purposes of analyses, Erdem et al. [2006] used Hofstede's (2003) cultural dimensions to characterize the various countries [see Erdem et al., 2006, Table 3]. The cultural dimensions they employed are PD (power distance — as PD increases, brand affiliations that reflect group affiliation and identification should increase), C/I (collectivism/individualism — increases in this characteristic should also reinforce the impact for brands that enhance perceptions of belonging to social groups), and UA (uncertainty avoidance — cultures that are high in this dimension are more likely to use brand signals to manage perceived risk associated with brand choices). This latter construct is the one that a priori seems most relevant to the signaling framework. Erdem et al. [2006] elaborate considerably more on differences in the processes whereby brand credibility may work its effect; we urge the interested reader to consult the reference directly for such discussions.

The most salient and important of the results Erdem et al. [2006] present is that, in all countries studied, brand credibility was a strong predictor of brand-choice behavior. Though country-specific differences in the impact of brand credibility existed, the E&S framework demonstrated remarkable robustness. This finding is an important one in the age of global brands: common mechanisms exist to justify (some degree of) commonality in brand management across markets.

But another noteworthy finding of this study is that cultural differences are relevant. For example, cultures that display high-uncertainty avoidance (e.g., Japan, Spain, and Turkey) relied much more on brand credibility in their choices compared to low UA cultures (e.g., Brazil, Germany, India, and the United States), for both juices and PCs.

A strong cultural focus on individualism (essentially, the United States among the countries studied) can lead to stronger reliance on credibility; given that credibility is essentially a summary of the consumer's experience, interaction, and history with a brand, this result indicates that in such cultures, individuals exhibit a tendency to rely more on personal history to make their choices than on the experience/credibility that others may attribute to brands. However, this effect was only discernible for juices, and not PCs. So individuals in highly individualistic cultures, given a sufficiently high potential for negative consequences, will not rely more than needed on brand signals to make their brand product evaluations. The remaining cultural construct, power distance, was not found to be related to subjects' responses or choices in either the SEM or the choice experiment. Therefore, these findings support the operational tailoring of marketing activities across countries in the support of building and enhancing brand credibility. Brand credibility is important everywhere, but its overall impact is differentiated everywhere. In addition, how credibility enhances a brand's odds of being chosen differs between markets: in one place, it may enhance perceived quality; in another, it may reduce perceived risk, and so forth.

Another point to be made about these cultural constructs is that significant heterogeneity can exist within a culture. Americans may be more individualistic as a culture compared to most other countries, but within that culture are people who score low on the C/I scale; similarly, whereas Japan has the highest uncertainty-avoidance tendencies among the countries tested, risk-prone individuals are in that country. Thus, understanding the country-specific distributions of these cultural dimensions to then decide to what extent external guidance concerning marketing activities is applicable would behoove the brand-management team of a global brand.

### **5.3 Generalizability over time: Brand-signaling framework temporal stability**

From the point of view of testing the validity of any theory, one of the most stringent "stress" tests concerns the stability of its predictions

over time and changes in context. Where structural relationships among latent constructs are concerned, this test is seldom done. But in the case of the information-economics signaling framework for brand equity, [Swait et al. \[2014\]](#) performed just such a test for the US automobile industry at two points in time, 2006 and 2011.

Before proceeding to the results of this study, we must establish the historical significance of the period for the auto industry. In 2006, the US domestic auto makers (GM, Ford, and Chrysler) had been undergoing a long-term decline in sales, were generally perceived to lack technical and design innovation, and were further saddled with high labor costs. Their international competition, particularly Asian brands, was benefiting from the opposite perceptions and avidly picking up the slack in the American market. Things came to a head for GM and Chrysler, which put them on the verge of bankruptcy; they eventually received significant bailouts from the US government and in Europe, though Ford was able to manage its way out of (not quite so dire) financial difficulties. These events and conditions occurred within the context of what turned into a worldwide recession, which led to lower sales for all auto brands.

Despite the generalized difficulties that Toyota faced, it was able to capture market share in the United States as the domestic brands lost sales due to consumer uncertainty about their staying power. But then Toyota ran into its own difficulties through a series of sustained product recalls in the United States and elsewhere [see [Swait et al., 2014](#), Table 4], involving millions of vehicles. In the case of the United States, the recalls in late 2009 and early 2010 involved floor mats that interacted with faulty accelerator pedals to cause runaway vehicles whose operators could not bring them to a stop. Product recalls are not uncommon in the auto industry, but the recalls Toyota was undertaking were a little more dramatic than usual. What caused the real difficulties for Toyota turned out to be the way in which its management persistently denied problems with its products, as well as how it prevaricated and stonewalled in the face of mounting evidence concerning design flaws.

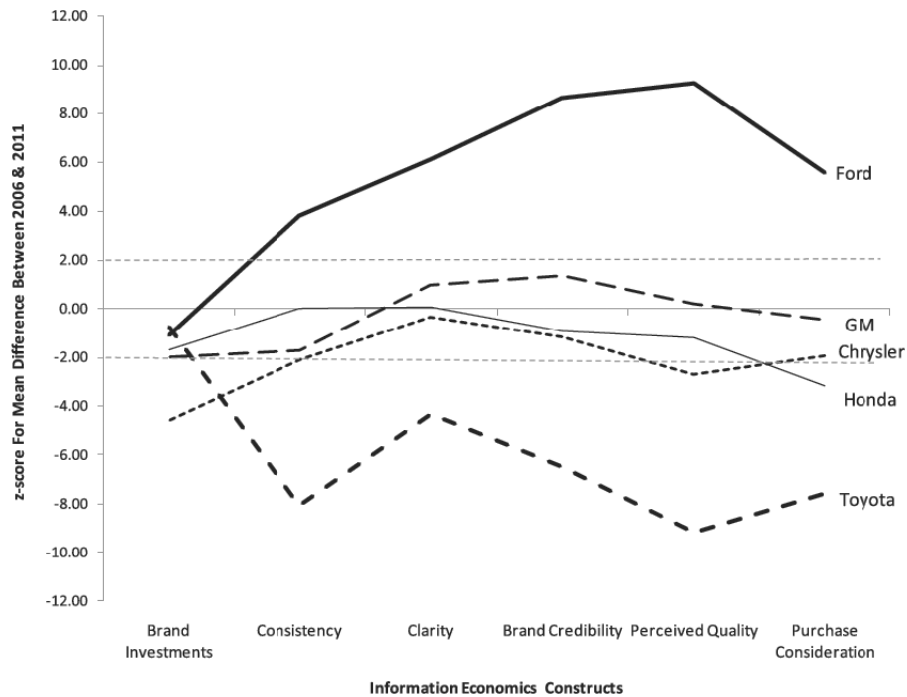
This denial led to a crisis of consumer confidence in the brand: Did Toyota really stand behind its products? Could Toyota be trusted to

make good on unanticipated problems in this expensive durable category? From the perspective of the information-economics paradigm, were the promises made under the Toyota brand credible? What ensued in the marketplace was quite impactful for the Toyota brand: from Q2 in 2007 to Q4 2010, Toyota's purchase consideration decreased by 34%, an overall year-to-year sales reduction of 0.4% occurred, vehicle resale values fell, and so forth (Swait et al., 2014, pp. 317–318; see specific references therein).

With this background, we turn our attention to the data-collection methods used by Swait et al. [2014]. Two cross-sectional surveys were conducted, the first in November 2006 and the second in February 2011. Respondents for each survey were recruited via an online panel provider from the same population (18 years or older, owning at least one economy, sedan, SUV, or sports vehicle, anywhere in the continental United States). The first wave had 800 completed surveys available for their analyses, and the second had 765.

Note that the data are *not* a panel using the same subjects for both surveys, but constitute repeated cross sections of the same population at widely separated points in time (4 years and 3 months apart), thus somewhat limiting the conclusions that can be drawn across the time gap to population level. Despite this shortcoming, because the survey instrument was identical for the two samples, we can make certain inferences about the temporal stability of the E&S brand-signaling framework.

One of the important outcomes of the study is a simple comparison of differences in the information-economics constructs in the E&S framework, graphically depicted in Figure 5.1. Left to right, the graph shows the brand investments, consistency, clarity, credibility, perceived quality, and purchase consideration for six of 12 umbrella brands Swait et al. [2014] included in their study. This order largely reflects the top-to-bottom flow from Figure 5.1, which depicts the original E&S framework. The vertical axis shows the  $z$ -scores for the average construct differences from the 2006 and 2011 samples. A  $z$ -score with an absolute value over 2.0 indicates that the 2011 construct value is significantly different from the 2006 value, at the 95% confidence level; additionally, a positive (negative) sign for the  $z$ -score indicates that



**Figure 5.1:** Changes in Information-Economics Constructs from 2006 to 2011, US auto market.  
*Source:* Swait et al. [2014], Figure 6 (used with by permission from of Springer).

the average 2011 construct value is greater (less) than the corresponding 2006 value.

The purchase-consideration result in Figure 5.1 shows the effect previously mentioned concerning the Toyota brand: consideration significantly decreased from 2006 to 2011. But the real contribution of Figure 5.1 is the ability to diagnose where that decrease arises. As we proceed from right to left, up the information-economics chain, as it were, we note that consideration decreased due to a significant reduction in perceived quality, which decreased because brand credibility itself had decreased. Referring to our earlier discussion of the Toyota brand crisis arising from management handling of the accelerator pedal problems, we further note from Figure 5.1 that the credibility losses can

be tied to reductions in clarity about the brand, but most particularly and dramatically, to reductions in perceived consistency of the marketing mix. According to the authors of the paper, “at the heart of Toyota’s problems in consideration levels is the issue of the credibility of its claims about its products in the face of a series of product recalls and the brand’s handling of these product recalls, which seem to have negatively affected consumer perceptions of consistency, perceived quality, brand credibility and, hence, brand consideration” [Swait et al., 2014, pp. 322–323].

From the point of view of the E&S framework, Figure 5.1 is evidence for its temporal stability, because it shows that the theory is able to detect the presence of the predicted phenomenon in a real setting. That is, a poorly handled brand crisis surely generates the opportunity for negative impacts to credibility. Figure 5.1 shows the information-economics constructs patently capture Toyota’s credibility loss; linking this with the validated E&S framework further allows its structural relationships to aid in diagnosing the sources of impact. Thus, the E&S framework, allied to a brand-monitoring system, can certainly be used to develop post-mortem brand-crisis analyses that are likely to suggest paths to mitigate and/or recuperate credibility losses. We suggest also the framework is likely to be useful not just after the fact, but will prove critical to better inform managerial decisions during a crisis.

Swait et al. [2014] conducted a second test of temporal stability of the E&S framework. This second test comprised the estimation and comparison of sample(year)-specific statistical models of the E&S framework, as well as a joint model using both cross sections simultaneously. The paper reports high stability of parameters and goodness-of-fit across the two samples, concluding that even at the level of the detailed statistical models, the framework evidences high stability.

Before closing, we would like to remind the reader of the much earlier work of Mannering and Winston [1991], concerning explaining the loss or static behavior of share of car sales by US domestic brands (particularly General Motors) compared to Japanese brands in the 1980s. These authors attribute GM’s share loss of 12 percentage points to the decline in consumers’ loyalty to domestic auto brands. Note that Kim

*et al.* [2008] find brand credibility is an antecedent of brand loyalty, potentially linking Mannering and Winston's [1991] findings with the information-economics literature.

#### **5.4 Summary**

This chapter has detailed the set of validation tests that the E&S framework has undergone since its publication in 1998. In hindsight, the efforts to test the validity and generalizability of the brand-signaling framework are quite noteworthy because of the framework's breadth and depth. The framework has been shown valid in the general population, with a wide array of product (and some service) categories, across different cultures, and across time for a product category. These test dimensions have all been considered together, of course; nonetheless, we feel confident at this point that the framework constitutes a well-tested basis for marketing and brand management.

# 6

---

## Links between the Information-Economics Perspective of Brand Equity and Other Conceptual Brand-Equity Frameworks

---

A number of different conceptualizations of brand equity exist besides the information-economics and signaling-theory-based approach. Some of these alternative brand-equity conceptualizations complement, rather than compete with, the signaling framework. This section discusses briefly these other conceptualizations to stress the similarities and complementarities, both conceptually and in terms of measurement models.

### 6.1 Conceptual links

[Aaker \[1991\]](#) defines brand equity as a set of brand assets and liabilities linked to a brand, its name and symbol, which add to or subtract from the value provided by a product or service to a firm and/or the firm's customers. The sources of this brand equity are asserted to be brand awareness, brand associations, perceived quality, brand loyalty, and other proprietary brand assets. [Keller \[1993\]](#) offered a cognitive psychology perspective, defining customer-based brand equity as the differential effect of brand knowledge on consumer response to the marketing of that brand. In Keller's framework, the source



of customer-based brand equity is the outcome of brand awareness and brand associations, which underlie brand image. The more unique, favorable, and strong these associations are, the higher the customer-based brand equity, keeping all else constant.

Most brand-equity conceptualizations are indeed linked to consumers, by emphasizing consumer-based concepts such as brand associations [Aaker, 1991], brand knowledge [Keller, 1993], perceived clarity, and credibility of the brand information under imperfect and asymmetric information [Erdem and Swait, 1998]. Based on these frameworks, brand equity also clearly accrues over time via consumer learning and decision-making processes.

The differential emphasis the respective frameworks place on consumer-centric constructs can capture the complementary nature of the cognitive psychological and information-economics views of brand equity. In the cognitive-psychology view, brand equity stems from awareness of brand features and associations that drive attribute perceptions, whereas the information-economics view emphasizes consumer uncertainty and its impact on consumer choice via perceived risk and information costs. The two perspectives also share similar ideas regarding the market consequences of brand equity [Erdem and Swait, 1998], which Keller terms the “outcomes” of brand equity [Keller, 1993]. In the information-economics framework, a brand’s added market performance (greater consumer loyalty, more aggressive pricing, enhanced capacity for extensions, etc.) is the result of increased perceived quality and reduced risk and information costs. Kim et al. [2008] reinforce this finding by showing brand credibility, the common antecedent of PQ, PR, and ICS, is also an antecedent of both affective and cognitive sources of brand commitment. The cognitive-psychology perspective attributes these marketplace outcomes to the existence of strong, favorable, and unique associations in the minds of consumers.

Indeed, brands play a dual role: (1) they are conveyors of (credible) information, serving as choice heuristics for consumers, as well as (2) creators of meaning, especially through underlying emotional/experiential and self-expressive brand associations, thus enhancing quality perceptions [Aaker, 1991]. Information-economics and

cognitive-psychology-based frameworks are complementary to each other in emphasizing these two different roles brands play. Finally, both information-economics and cognitive-psychology frameworks stress the importance of consistency (of brand identity, brand positions, etc.) over time and across the marketing-mix elements for brands to fulfill their roles as credible information providers and meaning creators.

## 6.2 Measurement links

The common, overarching factor that unites these various conceptualizations of brand equity is that brands help lead consumers to what they perceive to be good choices. These choices are good because strong (credible) brands are perceived to have higher quality (perhaps due to uniqueness and beneficial associations), lower perceived risk (perhaps due to decision simplification arising from elimination of weak, i.e., less credible, brands), and savings in information costs (perhaps due to lower information-search and processing costs). In any event, from a measurement perspective, the frameworks we have discussed ultimately need to associate the latent constructs they motivate with certain consumer outcomes: consideration, choices, recommendations, switching behavior, and so forth. These outcomes may be at the individual or market level (e.g., choices vs. shares), actual choices versus stated choices, that is, revealed versus stated data, or even combinations of these.

Empirically, the link between these outcomes and motivating latent constructs is essentially achieved through a latent variable that we will generically term “utility.” That is, a branded product is attractive (generates utility) to some degree for the consumer, and that utility is expressed via multiple components: utility increases in beneficial attributes, decreases in non-beneficial attributes (e.g., price), increases in beneficial associations and uniqueness, and so forth, which is why several of the signaling-framework papers [[Erdem et al., 2002](#), [2006](#), [Swait and Erdem, 2007](#)] estimate the impact of brand credibility using stated choice data generated through discrete-choice experiments

(DCEs, see Louviere et al., 2000). These experiments allow strong controls that help identify the contribution of different utility components.

Besides the conceptual frameworks, a stream of research in brand equity exists that is more empirical in nature. They all basically build on the general idea that the utility of branded products will contain the impact of the brand, and they set up measurement models to isolate this impact. We briefly review these papers below.

[Swait et al. \[1993\]](#) introduce a measure called the equalization price (EP), which expresses the holistic utility of the brand in a monetary metric anchored on the branded product's price in a market (or DCE). EP is defined as

$$EP_i = p_i - \frac{V_i}{\beta_s}, \quad (6.1)$$

where  $i$  refers to the brand,  $p_i$  is its price,  $V_i$  its utility, and  $\beta_s$  is the (dis)utility of price. EP can be understood as a consumer's willingness to pay (WTP) for objective and symbolic attributes, uniqueness, and so forth, anchored on market price. Implicitly, this measurement is contextualized in a particular market (i.e., set of brands and prices) at a point in time. [Swait et al.](#) demonstrate that three components of utility can be isolated: objective attribute effects, symbolic attribute effects, and an intangible brand effect. This can be shown to be directly related to Kamakura and Russell's (1993) "intangible valuation measure," based on scanner panel data.

Contemporaneously with [Swait et al. \[1993\]](#), Park and Srinivasan (1994) propose a brand-equity measurement method that is also based on holistic utility measurement. This utility measurement was originally conducted using a technique called "self-explicated" measurement, wherein respondents directly provide ratings interpreted as preference/utility values. These authors also mention that a traditional ratings-based conjoint technique could be used to infer utilities. They use the former method because of its simplicity. Interested readers should likely consider the use of DCEs. The main contribution of Park and Srinivasan, in our view, is their attempt to isolate the impact of attribute-based versus non-attribute-based brand contributions to utility. The need to separate objective from perceptual consumer knowledge at the attribute level is the main reason for these authors' adoption

of the self-explicated preference technique. Generalizing this approach, Srinivasan et al. (2005) propose a more outcomes-based measure of brand equity:

$$\text{BE}_{in} = q_n(\Delta P_{in})g_i, \quad (6.2)$$

where  $\text{BE}_{in}$  is the proposed measure for consumer  $n$  and brand  $i$ ,  $q_n$  is the overall category purchase of the consumer over a certain time period,  $\Delta P_{in}$  is the difference in choice probability between branded and non-branded versions of the product, and  $g$  is the unit contribution margin (unit price less unit marginal cost). The influence of the earlier work on the proposed measure is felt through the  $\Delta P$  term.

The measurement approaches reviewed above do not constitute an exhaustive list by any means, but they illustrate the general method that might be employed to infer the impact of brand using cross-sectional data.

Panels are an alternative data source that might be available to the researcher. In marketing, consumer scanner panels in packaged goods categories can be used for brand-equity analyses. Kamakura and Russell (1993) conducted an early analysis of scanner panel data with the intent of capturing heterogeneity in brand impacts via association of stochastic distributions with brand-specific constants in utility functions. The use of panel data for brand-equity analysis raises a number of important challenges for the analyst, foremost among them the need to represent the dynamics of learning (see Section 3.3).

# 7

---

## Summary and Future Research

---

“The market is a brutal teacher when customers and investors realize a company isn’t practicing what it preaches.” (*Wall Street Journal Online*, “A Chipotle Education,” Dec. 22, 2015)

As we sought to bring the multiple threads of this book together, we ran across the above statement concluding an article on the difficulties being experienced by Chipotle Mexican Grill restaurant following an (as of this writing) unresolved *Escherichia coli* outbreak in its outlets across five different states in the United States. No specific culprits have been identified, but Chipotle’s emphasis on sourcing 10% of its produce locally may have been a source of vulnerability: these local suppliers are not as able as “big agriculture” to guarantee food safety at the levels expected by Chipotle’s consumers. Chipotle made (implicit) promises to consumers that their food was better, fresher, purer, *safer* than their competitors’, but then . . . failed to deliver. Investors have taken this failure to heart, as witnessed by a 25% price drop in the share over the course of 2015. Chipotle’s management has promised to centralize more of its food preparation as a major change to raise its food safety standards.

We could not have made up a better example than that of Chipotle to illustrate the application and importance of the brand-signaling framework of [Erdem and Swait \[1998\]](#) to strategic brand management. Through their marketing claims, firms not only inform consumers about their products but also make many claims about these products. In the E&S framework, claims are the firm's statement of promises to the consumer; they are not simply ad copy or text in a sign that makes the brand's products more attractive. For a brand to be useful for a consumer, it needs to be credible: the brand needs to be perceived as willing and able to deliver on its claims. Actions, words, and associations that militate against this need to be carefully evaluated from the perspective of the brand-signaling concept.

The E&S framework, in emphasizing the consistency of the marketing mix as a major source of brand credibility, makes explicit the need for the marketer's every deed with respect to the product to be evaluated from the point of view of its impact on brand credibility. A spurious product claim is not just a false claim that may or may not be found out; it is a potential injury to the carefully built-up credibility of the brand. The brand has "posted a good behavior" bond to the market: if it does not live up to its claims, it forfeits the bond. This forfeiture does not have to arise from an intentional violation of the claim: the Chipotle brand was simply trying to differentiate itself in a very competitive market by using small local suppliers for a part of its food. Unfortunately, the differentiation involved making (some explicit and some implied) promises about the safety of its food, which consumer experience showed in late 2015 were not being met. The market is indeed a brutal teacher!

The research stream that developed from [Erdem and Swait \[1998\]](#) strongly supports its validity and generalizability: for a wide variety of product categories [[Erdem and Swait, 2004](#)], across different cultures [[Erdem et al., 2006](#)], for relational service customer relationship management [[Sweeney and Swait, 2008](#)], as a cross-temporal diagnostic tool, and as the basis for a brand-tracking system [[Swait et al., 2014](#)]. In addition, tying the concepts from the information theoretic brand-signaling framework to models of choice behavior [[Erdem et al., 2002](#),

[Erdem and Swait, 2004](#), [Swait and Erdem, 2007](#)] has also enabled two advances of practical and theoretical importance: (a) the identification that the price premium associated with strong brands is actually traceable to brand credibility, enabling us to interpret the price premium as a consumer's willingness to pay for the risk and decision cost reductions afforded by high-credibility brands; and (b) brands play important roles in multiple stages of choice (consideration, evaluation, and comparison), implying that brands are pervasive influences in consumer choice.

Despite this sequence of papers over the last 20 years, much remains to be done. We devote the remainder of this concluding chapter to the topic of future research.

To start from a more practical angle, we note that the brand-signaling framework emphasizes the importance of consistency in the marketing mix (and consistency in its actual execution, of course) in creating and maintaining brand credibility. One of the possible consequences of this emphasis is that the reader might conclude that any changes in the marketing mix are likely to lead to making consumers wary about the brand. That is not true: changes that compromise perceptions of trustworthiness and expertise should certainly be avoided (e.g., not following through on a claim, or not assuming responsibility for recognizable violations of a claim), but those that reinforce these perceptions should be critically evaluated (e.g., implementing mechanisms that permit violations to be made good, improving product quality to become more consistent with claims) are desirable.

But the manner and mechanisms for change, as well as their relative importance, need to be better understood. For example, are changes to the distribution channels for the brand more or less important than pricing-strategy changes in terms of their (dis)confirmatory impacts on credibility? Does temporal or spatial variation in brand messaging affect credibility more than other factors? Thinking about the top layer of [Figure 3.1](#), future research needs to bring more insight into the mechanisms whereby the marketing mix (and its execution in markets) affects credibility, thereby making the framework more managerially actionable.

Furthermore, assuring consistency in the marketing mix over time may pose a special challenge in today's market place where brands need to stay relevant, which calls for change. The balance between being consistent and staying relevant over time is a fine one, where the latter may require surprising the customers (in a positive way). The key to success in implementing the "new" will be in the execution of the tactics in a way to keep core identity intact and enhance credibility. More research is needed on how brands can keep (or increase) their relevance in an ever-changing market place while being consistent with their core values.

Another important managerial aspect of the framework involves understanding how the constructs in Figure 3.1 react to product and service brand failures, perhaps best illustrated by imagining a brand crisis, such as that experienced by Chipotle Mexican Grill [Wall Street, 2015], discussed earlier. How has the *E. coli* contamination affected credibility? Mostly via a loss of perceived trustworthiness, or via a loss of perceived expertise? Does the locus of responsibility (e.g., the firm vs. franchisees vs. suppliers) moderate credibility impacts? Such questions are critical to determine the form of firm responses to brand crises. On a smaller scale, this type of question also arises in situations involving individual consumers following service failures: missing a follow-up flight due to a maintenance problem with an aircraft is not simply an inconvenience; at one level, it constitutes a negation of the promise to transport the customer from A to B within a specific, scheduled time interval. How does this particular failure, and more importantly, an accumulation of such failures, lead to the erosion of credibility? Investigation of these questions will no doubt require an examination of before-and-after data on credibility impacts, as well as behavioral changes that may ensue. Thus, future research needs to examine such questions using a simple, two-period data-collection and modelling paradigm.

Enlarging on this topic, future research also needs to examine the dynamics of brand-credibility evolution. Section 3, Section 3.3, lays out a possible framework for such an exercise, but it needs to be further elaborated and tested.



Another (complementary) approach to studying the dynamics of brand equity will involve the implementation of the [Erdem and Swait \[1998\]](#) framework as the basis for a brand-tracking system. Such a system could serve not only as a platform for a more strategic perspective on brand management, but also as a management tool during brand crises. The question of how to structure such a system to enhance its managerial actionability is ripe for research.

Another issue involving data over time is that of linking the brand-signaling framework to stock valuations. Such research would be of first importance in creating a firm-level “dashboard” to guide managerial decision-making, both day to day and in times of brand crises. Implicit in this link is also a challenging measurement issue: How should framework measurements done at the consumer level be aggregated to match market-level stock prices? An associated issue is the handling of umbrella versus non-umbrella brands.

A correlate issue arising from the need to link brand credibility to accounting and financial values is that of the possible use of multiple data sources. To date, the studies we have reviewed in this book have generally used cross-sectional surveys and, in some instances, included choice experiments. Behavioral data can also come from observing consumer choice in the marketplace and can be usefully combined with survey-based choice experiments (e.g., see [Swait and Andrews, 2003](#), who combine a choice experiment with scanner panel data). This combination could expand the usefulness of revealed-preference data with the controlled framing of choices that involve product and pricing changes, brand extensions, co-branding, and so forth. If the revealed-preference data are a panel with choices over an extended time period, they could prove instrumental in exploring many issues related to the dynamics of brand equity.

## References

---

- D. A. Aaker. *Managing Brand Equity*. New York: The Free Press, 1991.
- D. A. Aaker. *Building Strong Brands*. New York: The Free Press, 1996.
- D. Akerberg. Advertising, learning, and consumer choice in experience good markets: A structural empirical examination. *International Economic Review*, 44:1007–1040, 2003.
- B. Anand and R. Shachar. Brands as beacons: A new source of loyalty to multiproduct firms. *Journal of Marketing Research*, 41(2):135–15, 2004.
- P. A. Argenti and B. Druckenmiller. Reputation and the corporate brand. *Corporate Reputation Review*, 6(4):368–374, 2004.
- L. M. B. Cabral. Stretching firm and brand reputation. *The RAND Journal of Economics*, 31(4):658–673, 2000.
- L. M. B. Cabral. Umbrella branding with imperfect observability and moral hazard. *International Journal of Industrial Organization*, 27:206–213, 2009.
- A. T. Ching. Consumer learning and heterogeneity: Dynamics of demand for prescription drugs after patent expiration. *International Journal of Industrial Organization*, 28(6):619–638, 2010.
- A. T. Ching and M. Ishihara. The effects of detailing on prescribing decisions under quality uncertainty. *Quantitative Marketing and Economics*, 8(2): 123–165, 2010.
- G. S. Crawford and M. Shum. Uncertainty and learning in pharmaceutical demand. *Econometrica*, 73(4):1137–1173, 2005.

- B. de los Santos, A. Hortacısu, and M. Wildenbeest. Testing models of consumer search using data on web browsing and purchasing behavior. *American Economic Review*, 102:2455–2480, 2012.
- Z. Eckstein, D. Horsky, and Y. Raban. An empirical dynamic model of brand choice. Working paper 88, University of Rochester, 1988.
- T. Erdem. An empirical analysis of umbrella branding. *Journal of Marketing Research*, 35(3):339–351, 1998.
- T. Erdem and M. P. Keane. Decision-making under uncertainty: Capturing dynamic brand choice processes in turbulent consumer goods markets. *Marketing Science*, 15:1–20, 1996.
- T. Erdem and B. Sun. An empirical investigation of spillover effects of marketing mix strategy in umbrella branding. *Journal of Marketing Research*, 39(4):408–420, 2002.
- T. Erdem and J. Swait. Brand equity as a signaling phenomenon. *Journal of Consumer Psychology*, 7(2):131–157, 1998.
- T. Erdem and J. Swait. Brand credibility, brand consideration, and choice. *Journal of Consumer Research*, 31:191–198, 2004.
- T. Erdem, J. Swait, and J. Louviere. The impact of brand credibility on consumer price sensitivity. *International Journal of Research In Marketing*, 19:1–19, 2002.
- T. Erdem, M. P. Keane, T. Sabri Öncü, and J. Strebel. Learning about computers: An analysis of information search and technology choice. *Quantitative Marketing and Economics*, 3(3):207–246, 2005.
- T. Erdem, J. Swait, and A. Valenzuela. Brands as signals: A cross-country validation study. *Journal of Marketing*, 70(1):34–49, 2006.
- T. Erdem, M. Keane, and B. Sun. A dynamic model of brand choice when price and advertising signal product quality. *Marketing Science*, 27(6):1111–1125, 2008.
- P. H. Farquhar. Managing brand equity. *Marketing Research*, pages 24–33, 1989.
- J. Farrell. Prices as signals of quality. Ph.D. thesis, University of Oxford, 1980.
- B. S. Gammoh, K. E. Voss, and G. Chakraborty. Consumer evaluation of brand alliance signals. *Psychology and Marketing*, 23(6):465–486, 2006.
- E. Gerstner. Do higher prices signal higher quality. *Journal of Marketing Research*, 22:209–215, 1985.

- A. Goldfarb, Q. Lu, and S. Moorthy. Measuring brand value in an equilibrium framework. *Marketing Science*, 28(1):69–86, 2009.
- S. Grossman. The informational role of warranties and private disclosure about product quality. *Journal of Law and Economics*, 24:461–483, 1981.
- E. Honka. Quantifying search and switching costs in the US auto insurance industry. *Rand Journal of Economics*, 45(4):845–887, 2014.
- K. Jedidi, C. F. Mela, and S. Gupta. Managing advertising and promotion for long-run profitability. *Marketing Science*, 18(1):1–22, 1999.
- K. L. Keller. Conceptualizing, measuring, and managing consumer-based brand equity. *Journal of Marketing*, 57:1–22, 1993.
- K. L. Keller. *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*. Pearson Education, 4th edition edition, 2013.
- R. E. Kihlstrom and M. H. Riordan. Advertising as a signal. *Journal of Political Economy*, 92:427–450, 1984.
- J. Kim, J. Morris, and J. Swait. Antecedents of true brand loyalty. *Journal of Advertising*, 37(2):99–117, 2008.
- J. Kim, B. Bronnenberg, and P. Albuquerque. Online demand under limited consumer search. *Marketing Science*, 29:1001–1023, 2010.
- B. Klein and K. B. Leffler. The role of market forces in assuring contractual performance. *Journal of Political Economy*, 89(4):615–639, 1981.
- S. Koulayev. Search with dirichlet priors: Estimation and implications for consumer demand. *Journal of Business and Economic Statistics*, 31(2):226–239, 2013.
- N. A. Lutz. Warranties as signals under consumer moral hazard. *The Rand Journal of Economics*, 20:239–255, 1989.
- F. Mannering and C. Winston. Brand loyalty and the decline of american automobile firms. *Brookings Papers on Economic Activity — Microeconomics*, 2:67–114, 1991.
- N. Mehta, S. Rajiv, and K. Srinivasan. Price uncertainty and consumer search: A structural model of consideration set formation. *Marketing Science*, 22:58–84, 2003.
- N. Mehta, X. Chen, and O. Narasimhan. Informing, transforming, and persuading: Disentangling the multiple effects of advertising on brand choice decisions. *Marketing Science*, 27(3):334–355, 2008.
- P. Milgrom and J. Roberts. Prices and advertising signals of product quality. *Journal of Political Economy*, 94:796–821, 1986.

- E. J. Miravete. Choosing the wrong calling plan? Ignorance and learning. *American Economic Review*, 93:297–310, 2003.
- K. Moore and R. Susan. The birth of brand: 4000 years of branding history. *Published in: Business History*, 4(50):419–432, 2008.
- S. Moorthy. Can brand extension signal brand quality. *Marketing Science*, 31:756–770, 2012.
- S. Narayanan, P. Manchanda, and P. K. Chintagunta. Temporal differences in the role of marketing communication in new product categories. *Journal of Marketing Research*, 42(3):278–290, 2005.
- S. Narayanan, P. K. Chintagunta, and E. J. Miravete. The role of self selection, usage uncertainty and learning in the demand for local telephone service. *Quantitative Marketing and Economics*, 5:1–34, 2006.
- L. Philips. *The Economics of Imperfect Information*. New York: Cambridge University Press, 1988.
- A. Rao, L. Qu, and R. W. Ruekert. Signaling unobservable product quality through a brand ally. *Journal of Marketing Research*, 36:258–268, May 1999.
- J. H. Roberts and G. L. Urban. Modeling multiattribute utility, risk, and belief dynamics for new consumer durable brand choice. *Management Science*, 34(2):167–185, 1988.
- D. E. M. Sappington and B. Wernerfelt. To brand or not to brand? A theoretical and empirical question. *The Journal of Business*, 58(3):279–293, 1985.
- C. Shapiro. Premiums for high quality products as rents to reputation. *Quarterly Journal of Economics*, 98:659–680, 1983.
- M. Spence. *Market Signaling: Informational Transfer in Hiring and Related Screening Processes*. Cambridge, MA: Harvard University Press, 1974.
- J. Stiglitz. The causes and consequences of the dependence of quality on price. *Journal of Economic Literature*, 25:1–48, 1987.
- J. Swait and R. Andrews. Enhancing scanner panel models with choice experiments. *Marketing Science*, 22(4):442–260, 2003.
- J. Swait and T. Erdem. Temporal consistency of sales promotions and consumer preferences. *Journal of Marketing Research*, 39:304–320, 2002.
- J. Swait and T. Erdem. Brand effects on choice and choice set formation under uncertainty. *Marketing Science*, 26(5):679–697, 2007.

- J. Swait, T. Erdem, J. Louviere, and C. Dubelar. The equalization price: A measure of consumer perceived brand equity. *International Journal of Research in Marketing*, special issue on Brand Equity. 10:23–45, 1993.
- J. Swait, T. Erdem, and T. Peters. Shocks to brand equity: An information economics perspective on the us auto industry 2006–2011. *Customer Needs and Solutions*, 1(4):317–332, 2014.
- V. Swaminathan, R. J. Fox, and S. K. Reddy. The impact of brand extension introduction on choice. *Journal of Marketing*, 65:1–15, 2001.
- J. Sweeney and J. Swait. The effects of brand credibility on customer loyalty. *Journal of Retail and Consumer Services*, 15:179–193, 2008.
- J. Tirole. *The Theory of Industrial Organization*. Cambridge, MA: MIT Press, 1990.
- Wall Street Journal Online. A chipotle education. Opinion: Review & Outlook Section, <http://www.wsj.com/articles/a-chipotle-education-1450829240>, December 22, 2015.
- B. Wernerfelt. Umbrella branding as a signal of new product quality: An example of signalling by posting a bond. *The RAND Journal of Economics*, 19(3):458–466, 1988.
- Y. Zhao, Y. Zhao, and K. Helsen. Consumer learning in a turbulent market environment: Modeling consumer choice dynamics after a product-harm crisis. 58:255–267, 2011.