



## The Semantic Brand Score

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### ABSTRACT

The Semantic Brand Score (SBS) is a new measure of brand importance calculated on text data, combining methods of social network and semantic analysis. This metric is flexible as it can be used in different contexts and across products, markets and languages. It is applicable not only to brands, but also to multiple sets of words. The SBS, described together with its three dimensions of brand prevalence, diversity and connectivity, represents a contribution to the research on brand equity and on word co-occurrence networks. It can be used to support decision-making processes within companies; for example, it can be applied to forecast a company's stock price or to assess brand importance with respect to competitors. On the one side, the SBS relates to familiar constructs of brand equity, on the other, it offers new perspectives for effective strategic management of brands in the era of big data.

### 1. Introduction

Nowadays text data is ubiquitous and often freely accessible from multiple sources: examples are the well-known social media platforms Facebook and Twitter, thematic forums such as TripAdvisor, traditional media such as major newspapers and survey data collected by researchers. Consumers express their feelings and opinions with respect to products in multiple ways, and their attitude towards brands can often be inferred from social media (Fan, Che, & Chen, 2017; Mostafa, 2013). Consumers' interactions among themselves and with companies can influence prospective customers, firm performance and development of future products (e.g., Wang & Sengupta, 2016). The increase in availability of text data has raised the interest of many scholars who have been working towards the development of new automatized approaches to analyze large text corpora and extract meaning from them (Blei, 2012). At the same time, there has been significant interest in studying the value and importance of brands, considering both company and consumer-oriented definitions (Chatzipanagiotou, Veloutsou, & Christodoulides, 2016; de Oliveira, Silveira, & Luce, 2015; Keller, 2016; Pappu & Christodoulides, 2017; Wood, 2000). Customer-based brand equity was defined by Keller (1993, p. 1) as 'the differential effect of brand knowledge on consumer response to the marketing of the brand'; the author also presented brand image and awareness as the two main dimensions of brand knowledge. These dimensions are in many cases assessed using surveys, case studies, interviews and/or focus groups (Aaker, 1996; Keller, 1993; Lassar, Mittal, & Sharma, 1995). Such approaches can be time-consuming for large samples and are sometimes biased, due to the fact that consumers often know to be observed and

studied (making their expressions less natural and spontaneous). Another problem of past models is that brand equity dimensions are often many, heterogeneous and sometimes not easy to integrate in the final assessment.

Among many factors affecting consumer-based brand equity, attention paid to consumers' feedback has proved to play a major role (Battistoni, Fronzetti Colladon, & Mercorelli, 2013). Therefore, in the era of big data, it seems relevant to investigate the opinions of consumers and other stakeholders in their spontaneous expressions – while, for instance, discussing the characteristics of a product, or their user experience, without them having the perception of being monitored. Nowadays, social media and online reviews represent a common method of feedback. However, dealing with very large datasets usually requires rapid and automatized assessments that would be unfeasible when relying on traditional surveys.

This work presents a new measure of brand importance – the Semantic Brand Score (SBS) – which overcomes some of these limitations, being automatable and relatively fast to compute even on big text data, without the need to administer surveys or to inform those who generate contents (such as social media users). The Semantic Brand Score (SBS) can be calculated for any set of text documents, either customer-based or related to the opinions and experience of other stakeholders of a company; it can be applied to different contexts: newspapers, social media platforms, consumers' interviews, etc... Indeed, a good measure of brand importance should be sensitive to its variations and should be applicable across markets, products and brands (Aaker, 1996).

In this work, brand importance is computed based on text data and

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conceptualized as the extent to which a brand name is utilized, it is rich in heterogeneous textual associations and “embedded” deeply at the core of a discourse. Accordingly, the SBS is expressed along the three dimensions of brand prevalence, diversity and connectivity, as illustrated in the next sections. Even if the way the SBS measures brand importance is new, it partially reconnects to dimensions discussed in other well-known models, such as brand awareness and heterogeneity in brand associations (Aaker, 1996; Grohs, Raies, Koll, & Mühlbacher, 2016; Keller, 1993). This approach is also an attempt to reduce the gap between text analysis and the study of brand importance, as this research area remains mostly unexplored even when considering well-known text statistics – such as the study of word co-occurrences or term frequencies (Evert, 2005).

The calculation of the SBS combines methods of Social Network and Semantic Analysis (Wasserman & Faust, 1994), using word co-occurrence networks (Danowski, 2009; Leydesdorff & Welbers, 2011). This paper advances research in this direction and can be useful for brand managers who would like to monitor and improve the equity of their brands and products. Additionally, the SBS is proposed as an adaptable metric, which can be applied to different sets of words – not just brands – with the possibility of multiple uses (such as the study of the strength of keywords associated with the main core values of a company).

## 2. Measuring brand importance

Customer-based brand equity was traditionally conceptualized along the dimensions of brand awareness and brand image (Keller, 1993); the former referring to brand recall and recognition, the latter to brand associations, their uniqueness, type and strength. The dimensions of brand knowledge were discussed in a subsequent study by Keller (2003) which demonstrated that marketing activities can generate feelings, thoughts, attitudes and experiences that can influence consumers' response and purchase intentions. Grohs et al. (2016) focused on brand associations, investigating the impact of their number, uniqueness, consensus and favorability on brand strength – finding a positive effect for perceived consensus, size and favorability. Another important model, based on information economics and signaling theory was proposed by Erdem and Swait (1998). In the authors' work, brands were seen as the company's response to customers' uncertainty and information asymmetries, ultimately serving as a signal of product quality. The authors' framework included factors such as brand investments, credibility, perceived quality and information costs saved. Other studies attributed greater importance to consumer experiences, satisfaction and brand loyalty (Nam, Ekinci, & Whyatt, 2011). Christodoulides and de Chernatony (2010) published a review which distinguished between financial based measures of brand equity and consumer-based perspectives, with the latter comprising both direct approaches focused on the evaluation of consumers' preferences and indirect approaches centered on the analysis of outcome variables, such as the price premium.

Measurement of brand equity was usually developed around market surveys which were administered to consumers and other potential stakeholders, or based on financial methods, in some cases considering the differential value of a product with and without its brand (i.e. the price premium). Lassar et al. (1995) produced several survey items to assess customer-based brand equity, organized in the dimensions of performance, social image, value, trustworthiness and attachment. Aaker (1996) illustrated five sets of measures to evaluate brand equity – loyalty, perceived quality/leadership, awareness, association/differentiation and market behavior – and presented the items useful to assess them. The author claimed that price premium was one of the best measures in most contexts. Price premium was given great importance in more recent studies as well (Netemeyer et al., 2004). However, this indicator offers only a partial view and cannot be used in those contexts where sales and profits are not among the objectives of a company or organization. Battistoni et al. (2013) used the Analytic Hierarchy

Process to rank factors that could influence customers' perceptions about a brand, thus affecting both the brand image and its awareness. Their research proved the importance of monitoring and maintaining a successful dialogue with customers paying particular attention to the received feedback. Indeed, attention paid to customers' feedback turned out to be the most important factor, immediately after the company history and reputation. In this sense, the text analysis of consumers' interactions on social media can be of great importance (Malthouse, Haenlein, Skiera, Wege, & Zhang, 2013).

Past research frequently addressed the effect of social media on brand equity, using different approaches and considering different points of view. Hollebeek, Glynn, and Brodie (2014) conceptualized consumer brand engagement on social media and developed a measurement scale, based on survey questions. Other scholars provided evidence to suggest the positive impact of social media marketing activities on brand equity (Bruhn, Schoenmueller, & Schäfer, 2012; A. J. Kim & Ko, 2012). Laroche, Habibi, Richard, and Sankaranarayanan (2012) showed that online brand communities can enhance brand loyalty. Even though all these studies investigated the link between social media activities and brand equity, their measurement of brand related constructs always relied on survey questions. On the other hand, it seems important, at least in online contexts, to find a measure which can be directly inferred from analyzing the discourse of social media users – trying not to impact their spontaneous behavior and without asking them to complete a survey.

The approach presented in this paper goes in this direction, without the aim of directly producing a single score representing brand equity as the expression of a positive construct. The author proposes a new measure of brand importance, based on the analysis of the occurrences of a brand name in a discourse, its embeddedness in text data, and the heterogeneity of its text associations. Brand importance is conceptualized by using the three dimensions of brand prevalence, diversity and connectivity (described in Section 2.1). According to this approach, a brand that is used marginally, or that is very peripheral in a set of documents, is classified as unimportant. An important brand, on the other hand, is at the core of a discourse, with the possibility of being associated to either negative or positive feelings. Therefore, a more comprehensive picture regarding the value of a brand is obtained combining the SBS with sentiment analysis, as illustrated in Section 3.2. The approach presented here is new and not necessarily limited to the analysis of customers' expressions, even if it is partially linked to some dimensions of the brand knowledge model presented by Keller (1993). Indeed, the conceptualization of brand importance presented in this paper is relevant to brand equity, even if it does not automatically translate into it. Keller's (1993) definition of brand equity includes the concept of differential response to knowledge of a brand name, which suggests that knowing the brand name is the main starting point. This knowledge is captured by two dimensions of the SBS, prevalence and connectivity, which not only reflect the brand name frequency of use, but also its embeddedness at the core of a discourse. In addition, the differential response may originate from the brand associations, in relation to their number and valence, with the former captured by the SBS dimension of diversity. While valence of associations can point to the nature of the differential response, the basis for a differential response is the importance of a brand. As described in the next section, this is captured by the SBS through the measures of prevalence, diversity and connectivity, whereas a measure of valence of brand associations, although still relevant, is not directly included in the SBS for the reasons illustrated in Section 3.2.

In online contexts, some efforts in the direction of evaluating brand popularity were made by counting the number of likes to brand pages and the number of comments on Facebook (De Vries, Gensler, & Leeflang, 2012). Gloor (2017) developed a software tool (Condor) useful for web and email data collection, and the calculation of social network and semantic metrics. The author used these metrics to support the idea that important brands are often associated with high levels of

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