Understanding cities through city brands: City branding as a social and semantic network

H. Efe Sevin

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City branding, Place branding, Measurement, Social network analysis, Semantic network analysis

Abstract

More and more towns, cities, regions, and countries are investing in branding campaigns in order to establish a reputation for themselves, and to have a competitive edge in today's global market. In their essence, branding campaigns are places' attempts to define themselves to target audiences. However, the literature and practice of place branding have focused on the competition of brands at the expense of exploring the relations between people, symbols, meanings, and physical characteristics of cities. Therefore, current branding measurement scales and indices used to understand the defining characteristics of places are problematic. This article first analyzes three of the prominent place branding indices: Anholt-GfK Roper City Brands Index, FutureBrand Country Brand Index, and East–West Nation Brand Perception Index. Subsequently, it proposes an analytical framework combining two network analysis methods – social and semantic – to evaluate place brands, called "*Define–Measure–Visualize*" (DMV). In order to argue for the feasibility of the proposed method, a sample dataset is created based on tweets about Boston and New York City. By introducing a consumer-centric and communications-based approach and exploring the connection between cities, people, and messages, the findings of this research can be used in understanding cities/places, measuring the success of branding campaigns, and managing future campaigns.

Introduction

This research aims to present a place branding measurement model that is capable of capturing the complexity of cities, regions, and nations,[1] and of their brands, with the ultimate objective of a better understanding of how places are perceived by different audiences. This is indeed a complicated task as places are intricate phenomena, involving geographic, economic, social, cultural, and many other components (Landry, 2006). Additionally more and more places are investing in branding campaigns in order to have a competitive edge in today's global market, and to establish a reputation for themselves (Anholt, 2010). In other words, these places attempt to define and communicate what they believe to be their distinctive and defining characteristics to target audiences (Chen, 2012). Such strategies and communication campaigns add a second layer of complexity to the already complicated nature of places because places do not have concrete uniformed identities and are seen differently by different audiences.

[1] This article assumes that city, region, and nation branding refer to similar processes taking place at different bureaucratic levels (Lucarelli & Berg, 2011). Therefore, ''place branding'' and ''place'' are used as umbrella terms to refer to all these processes and levels – including cities – throughout the paper.

There is still a need to make sense of and draw meaning from this complex nature of places. It is important to know where a place stands and how it is perceived as without sound measurement, branding cannot go beyond being ‘‘just talk’’ (Aaker & Joachimsthaler, 1999, p. 141). There are several measurement practices and studies using various methods such as quantitative perception surveys (Anholt, 2006a), interviews gathering qualitative data (Laaksonen, Laaksonen, Borisov, & Halkoaho, 2006), concept maps (Brandt & de Mortanges, 2011), repertory grid analysis (Hankinson, 2004a), and importance satisfaction analysis (Insch, 2010). Even though several of these models have shown various levels of success, it is not possible to argue that they present a comprehensive model in which we can measure place brands.

This article presents a more exclusive model in the following four sections. Firstly, a literature review on place brands, place branding, and measurement is introduced. The second section describes and examines three prominent models [Anholt-Gfk Roper City Brand Index (ACBI), FutureBrand Country Brand Index (FCBI), and East–West Nation Brand Perception Index (NBPI)]. Thirdly, ‘‘Define–Measure–Visualize’’ (DMV) model is introduced which is influenced by earlier work on relational branding (Hankinson, 2004b), and perception and network analysis (Zenker & Beckman, 2013). Subsequently, the feasibility of DMV is demonstrated through an example case, followed by limitations of this study and conclusion.

Literature review

Definitions

‘Place brands’ and ‘place branding’ have been defined with the help of several disciplines such as marketing theories (cf. Kavaratzis, 2005), public relations (Szondi, 2010), international relations (Potter, 2009; van Ham, 2001), public administration (Eshuis, Braun, & Klijn, 2013) public diplomacy (Gilboa, 2008; Szondi, 2008), communication (Kaneva, 2011; Sevin, 2010), and geography (Boisen, Terlouw, & van Gorp, 2011). Thus, it is not surprising to find that the consensus within the literature is on what place branding is not, rather than what it is (Kavaratzis & Ashworth, 2006). Indeed, as Lucarelli and Berg (2011) argue, there seems to be different approaches even in the nature of the activity itself – let it be marketing, promotion or branding.

The main premises behind place branding are that when a place is named, several associated concepts are invoked in individuals’ minds (Kavaratzis, 2004) and these associations can be manipulated to create a better brand for a place. Therefore, place branding concentrates on creating a brand management system focused on the identity (Freire, 2005), and distinctive and definitive characteristics (Zhang & Zhao, 2009) of a particular place. Parallel to these definitions of branding, Zenker and Braun (2010) provide a comprehensive definition of a place brand and argue that a brand is a ‘‘*network of associations in the consumer’s mind based on the visual, verbal, and behavio[u]ral expression of a place, which is embodied through the aims, communication, values, and the general culture of the place’s stakeholders and the overall place design*’’ (p. 5). This is to say, as a social phenomenon, a place brand is based on the perceptions of target audiences – which might or might not be influenced by the physical and communicative aspects of a given city.

Place branding and measurement

Scholars have introduced various measurement models in place branding employing various theories and methods. Zenker, Knubben, and Beckman (2010, p. 5) categorize these attempts under three headings based on their research methods: qualitative methods using free brand associations, quantitative methods measuring attributes through standardized questionnaires, and mixed methods combining qualitative and quantitative data through network analysis. Given the fact that the theoretical background of place branding

is based on several disciplines (Ashworth & Kavaratzis, 2010), a categorization based on how these studies interact with disciplinary boundaries is also helpful in understanding the current state of the literature. Within this approach, there are three possible alternatives: (i) employing corporate marketing and branding measures, (ii) adapting corporate marketing and branding measures to place branding context, and (iii) devising models specific to place branding.

Kaplan, Yurt, Guneri, and Kurtulus (2010) employ already established branding methods to cities. These scholars bring the concept of brand personality from marketing discipline to define and measure city brands. The research extracts six dimensions – namely excitement, malignancy, peacefulness, competence, conservatism, and ruggedness – to evaluate the brands of three Turkish cities. Their study is based on the argument that ‘‘brand personality dimensions are applicable to place brands’’ (Kaplan et al., 2010, p. 1298).

Insch and Florek (2008) attempt to adapt different customer satisfaction indices to create a model of place satisfaction that determines ‘‘the interrelationships between objective and subjective place qualities and the individual assessments of residents’’ (p. 142). Arguing that residents are the main stakeholders of cities, the authors direct their research question and model at this specific group. The results of such a satisfaction analysis can be used in place management and resource allocation (Insch & Florek, 2008). Instead of directly using customer satisfaction analysis, the authors adapt the concepts to the context of places.

Baxter and Kerr (2010) devise a model specific to place images and place identities by using semantic-differential scale. In their model, they initially identify a list of concepts that can be used to describe a place. Subsequently, they put these concepts on a five-point differential scale and gather data through a survey research from different target groups including the residents. The researchers argue that their model helps place marketers to identify the gaps ‘‘between place identity and place images’’ (Baxter & Kerr, 2010, p. 15). Zenker, Eggers, and Farsky (2013) propose a model by using choice-based conjoint analysis and network analysis. The researchers aim to examine the nature of competition between German cities and demonstrate the importance of city images in this competitive environment. Their model is based on the argument that decisions regarding places – in this case the decision to move to a new city – are highly complex thus require a more elaborate inspection of a city’s perception by target audiences (Zenker et al., 2013, p. 137).

At this moment, it is important to clarify the difference between adapting outside methods to place branding and devising specific models. In both approaches, scholars use data gathering and analysis methods available in virtually all social science disciplines. Yet, in the former approach scholars tend to fine-tune existing measurement scales – such as satisfaction analysis in the example explained above – whereas in the latter approach, proposed measurement models are novel and are designed specifically for places. Given the unique and complicated nature of places, the DMV model argues the need for using place branding specific models and builds one using available methods – namely social network analysis and semantic network analysis.

Contemporary practices

This section focuses on three place branding measurement practices (ACBI, FCBI, NBPI) with the objective of identifying their strengths and weaknesses. There are several branding scales used by practitioners such as Anholt-GfK Nation Brands Index, Saffron European City Brand Barometer, and Creative Cities International—The Vitality Index. The practices included in this study are chosen through a purposeful sampling understanding to capture the variation among prominent practices. All three indices are widely used and discussed in the literature (as seen in Go and Govers (2011)) and employ different data gathering and analysis processes.

In order to provide a succinct analysis of these indices, a comparative framework is created. The framework borrows fundamental social science concepts in order to assess these indices. Basically, three questions are raised about their (i) operationalization of the place brand concepts, (ii) instruments used to measure the brands, and (iii) lastly reporting styles of the results.

Given the fact that city brands are not material phenomena that can be directly measured, a measurement scale first needs to define what it seeks out to measure: A *valid* measurement scale should be able to accurately represent the social phenomenon that it seeks to measure. Each measurement scale should include an implicit or explicit definition of 'place brand'. By asking whether the scales define place branding adequately and include all the relevant dimensions, *construct validity* of their city branding definition is evaluated.

Secondly, the instruments of measurement – namely data gathering and analysis processes – are discussed. In other words, *content validity* – the ability of the instruments to capture all relevant aspects of place brands – is questioned. Additionally, the *reliability* – the ability of these instruments to yield consistent measures over repeated attempts – is assessed.

Table 1
Comparative framework.

	Concepts assessed	Index part analyzed
Operationalization	Construct validity	Definition of ''Place Brands''
Instruments	Content validity and reliability	Tools of measurement
Reporting	Consistency and usability	Reports

Reporting is an important part of measurement. The results need to be shared with various stakeholders – in the case of place branding, including bureaucratic authorities and decision-makers. More often than not, it is difficult to share the entire research process with all the stakeholders. This is why measurement scales are expected to summarize and report their results. The comparative framework assesses whether these reports are comprehensible and usable by decision-makers. A supplementary question is asked to understand whether the reporting methods convey their findings without losing any aspects of their place brand definition. The table below shows a summary of the comparative framework (see Table 1).

The Anholt-GfK Roper City Brands Index (ACBI)

Simon Anholt, a practitioner who is often credited in coining the term 'nation branding',[2] started the Nation Brands Index in 2005 and partnered up with GfK in 2008 (Anholt, 2011). Following the commercial success of Nation Brands Index, Anholt started the Anholt-Global Marketing Institute (GMI) City Brands Index. The current ACBI is surveyed by GfK Roper Public Affairs & Corporate Communications (GfK America, 2013).[3]

The survey asks around 40 questions to 20,000 people from 20 countries about 50 cities, and is administered online (Anholt, 2009). ACBI has six separate measures for the characteristics of cities (Anholt, 2009):

> *Presence* [...] measures the city's global contribution in science, culture and governance. *Place* [explores] people's perceptions about the physical aspect of each city in terms of pleasantness of climate, cleanliness of environment and how attractive its buildings and parks are. *Pre-requisites* determines how people perceive the basic qualities of the city [...] such as schools, hospitals, transportation and sports facilities. *People* [reveals] whether the inhabitants of the city are perceived as warm and welcoming, whether respondents think it

would be easy for them to find and fit into a community that shares their language and culture and whether they would feel safe. *Pulse* [measures] the perception that there are interesting things to fill free time with and how exciting the city is perceived to be in regard to new things to discover. *Potential* [measures] the perception of economic and educational opportunities within the city (GfK America, 2013, italics added)

The ranking is based on the average of these six measures (Anholt, 2006a, 2009). Anholt (2007), in his book, *Competitive Identity*, explicitly argues that in today's global economy each country, region, and city should be ready to compete for limited resources such as investors, tourists, and consumers. Competitive identity is ''the synthesis of brand management with public diplomacy and with trade, investment, tourism, and export promotion'' (Anholt, 2007, p. 3) and brand is ''a word that captures the idea of reputation observed, reputation valued and reputation managed'' (Anholt, 2010, p. 20). Both terms Anholt uses refer to establishing a system that controls the policy, strategy, and communication aspects of how a given place is seen by target audiences. He argues that cities and countries with better reputations are in a more advantageous position than those with poor reputations by saying that the ''brand *images* of places are indeed central to their progress and prosperity'' (Anholt, 2010, p. 3, emphasis in the original).

ACBI's definition of brands, which is dominantly based on reputation and brand image, is widely accepted and echoed in the literature (Dinnie, 2008; Hankinson, 2009; Kavaratzis, 2005). Yet, problematically, ACBI does not provide details about how the aforementioned six categories are derived from reputation, brand or competitive identity concepts. ACBI argues cities are different from nations, therefore requires a different hexagon than the one used for The Anholt-GfK Roper Nation Brands Index (Anholt, 2007, pp. 55–62). However, it is not possible to argue that these six categories entirely capture city brand as a social phenomenon. For instance, history, an aspect that is deemed vital by certain scholars (cf. Zenker, 2011), is ignored in ACBI by keeping the questions focused solely to the most recent three decades (Anholt, 2006b). Thus, the construct validity is questionable as it is not possible to argue that the hexagon can exhaustively capture the social reality.

ACBI gathers data through an online survey and uses statistical measures; therefore it is likely to have a high reliability. However, the results of online surveys might not be generalizable to the population as this method might reflect the skewed attributes of the Internet population or as online sampling might not follow random sampling strategies (Evans & Mathur, 2005). ACBI is a commercial product, therefore its methods and surveys are not transparent. However, Anholt (2006b) and other GfK employees (Feinberg & Zhao, 2011) have shared limited information about the content of these surveys that include questions about various aspects of the hexagon. Respondents are given hypothetical questions (i.e. ''If you had a week of free time in the city, how easy do you think it would be to find interesting things to fill that time?''), and are asked about their perceptions of the cities (i.e. ''How clean or dirty do you think the city is?'') included in the survey. The non-transparent nature of the survey makes it difficult to argue for or against the content validity of the index. But it is important to note that without construct validity, content validity is virtually impossible to reach.

ACBI publishes its results in terms of scores and rankings. The cities are ranked separately in six categories. The average of these scores is assigned to the cities as an overall brand score. Based on the ranking of the cities, it is possible to provide policy recommendations to decision makers. Especially the changes in the rankings over time can be used to identify potential areas for intervention or to assess the effectiveness of certain campaigns and projects. Be that as it may, there seems to be an inconsistency between the brand definition and reporting style in ACBI. Despite the fact that Anholt argues the governments should promote distinct characteristics of ''their people and landscapes, their history and heritage, their products and their resources: to *prevent* them from becoming mere brands,'' (Anholt, 2010, p. 4), the results are produced in terms of rankings and scores for all cities included in the study.

FutureBrand Country Brand Index (FCBI)

FCBI is a global study conducted by FutureBrand. Over 110 countries are included in the study (FutureBrand, 2012, 2013). In FutureBrand's conceptualization, country branding is the attempt to capture a country's narrative and assets for internal and external audiences (FutureBrand, 2012). A country's brand is ''an asset that represents the sum total of the associations that influence preference'' (FutureBrand, 2012, p. 3). In order to entirely capture these associations, FutureBrand uses a survey to gather quantitative data from frequent travellers, organizes focus groups with tourism, investment, export, and public policy experts, and crowd-sources information from online discussions (FutureBrand, 2012).

The focus on 'associations' in country brand concept provides FCBI the opportunity to present a more inclusive understanding of place brands compared to other contemporary practices, and the inclusion of qualitative data in addition to the quantitative data facilitates the measurement of distinct brand characteristics. Therefore, the construct validity is high.

FutureBrand has been developing its methodology through the years. In 2013, the company claimed that the 2012–2013 report is ''based on more research and data than ever before'' (FutureBrand, 2013, p. 5). FCBI follows a ''hierarchical decision model (HDM)'' that tries to understand how key audiences perceive brands by following seven steps: awareness, familiarity, associations, preference, consideration, visitation, and advocacy (FutureBrand, 2012). Similar to ACBI, the commercial nature of the product limits its transparency. Apart from FutureBrand reports (Futurebrand, 2012, 2013) and publication by its employees (Adams, 2011), the information about FutureBrand's methodology is limited. FCBI gathers data through surveys with different groups of respondents, such as travelers, businessmen, and global experts, which present them with rich data, however, creates problems about generalization as their sample is not representative of the population. Survey includes questions that directly assesses respondents' awareness of a given country (*awareness*), their familiarity with what the country has to offer (*familiarity*), whether they resonate with the country (*preference*), whether they plan to interact with the country (*consideration*), whether they follow up on their intentions to interact with the country (*visitation*), and whether they recommend this country to others (*advocacy*) (Adams, 2011; FutureBrand, 2012, 2013). *Associations* are broken into further dimensions, such as value system, quality of life, and heritage and culture (Futurebrand, 2013). Indeed, this detailed system is likely to be helpful in establishing content validity of survey questions and other measurement instruments. Robust data-gathering and analysis procedures also ensure reliability of the measurement.

FCBI's reporting system is very similar to ACBI in the sense that reports include ranking in different categories and an overall ranking for each country included in the index. Such overall rankings tend to disregard *associations*, one of FCBI's strengths. Moreover, associations are also underlined in FCBI's definition of brand, which makes its reporting system inconsistent with its definition.

East–West Communications Nation Brands Perception Index (NBPI)

NBPI was ''developed as [a] tool[...] to quantify international perceptions of nations'' (Cromwell, 2011, p. 102) by East–West Communications. Basically, NBPI employs a proprietary system to evaluate news articles that are connected to a given country as positive or negative (East-West Communications, 2012). Based on the volume and tone of coverage, countries are given a perception index score and ranked accordingly.

NBPI claims that every country ''makes a unique contribution to the world and has a compelling story to tell'' (East-West Communications, 2012). Behind this generic explanation and infrequent references to reputation in company documents (East-West Communications, 2012) and works published by its

employees (Cromwell, 2011), there is no definition of brands or branding. The concept is vaguely constructed.

The measurement process of NBPI solely focuses on the perception portrayed by the English language mass media (Cromwell, 2011). East–West Communications argue that ‘‘most of the information we get about places, and the images produced in our minds by that information, comes to us through one form of mass media or another’’ (Cromwell, 2011, p. 107). Even though it is possible to claim the presence of a link between media frames and public opinion formation, in the case of nation branding and individual behavior this link is not precise as various other media outlets – including social media – and personal experiences/interactions indeed influence people's perceptions of cities. The proprietary system's ability to do language processing is not certain due to lack of transparency. The same system, on the other hand, establishes reliability in their measurement as the same automated system is used across countries and years.

Reporting is again limited by rankings and scores based on the news media portrayal. Country specific reports are used to ‘‘identify which words improve perceptions, and which are damaging, enabling countries to design messaging that builds on their strengths and addresses their weaknesses... [and] the relative impact, positive or negative, of sectors on the overall perception of a country’’ (Cromwell, 2011, p. 103). But, encapsulating a nation's reputation as positive or negative is neither possible nor desirable. Moreover, NBPI's reporting deduces the unique stories of countries into scores and rankings thus is inconsistent with its definition.

The summary of this comparative analysis is presented in Table 5 under the "Discussion and Implications outside Social Media" section of this paper. It is important to note these indices tend to prepare more detailed reports to their clients. Yet, the details of the reports do not change any of the assessments made in this analysis as the conceptualization of brands, measurement tools, and the reporting of aggregate results stay the same across the board.

Define–Measure–Visualize

DMV aims to provide guidance on the three areas discussed during the comparative analysis, namely operationalization, instruments, and reporting. *Define* prepares an operational definition of place brands which is important in terms of establishing construct validity. *Measure* explains data gathering and analysis methods to establish content validity and reliability. *Visualize* proposes a new reporting method that is easy to interpret and is consistent with the definition – instead of ranking places, DMV introduces semantic network and social network visualizations.

DMV is influenced by earlier work on relational branding (Hankinson, 2004b, 2009), and perception and network analysis (Zenker, 2011; Zenker & Beckman, 2013) in the field of place branding. Hankinson (2004b) sets out to create specific models for place branding through a comparison with corporate branding literature. Based on relational and network paradigms of branding, he redefines place brand as a *relational network brand*. Basically, Hankinson argues that ‘‘a place branding strategy relies on the effective extension of the core brand through effective relationships with stakeholders, each of which extends and reinforces the reality of the core brand’’ (2004b, p. 116). Therefore a place brand is not solely about the perception of audiences but is also related to how relevant stakeholders interact with each other. DMV model incorporates a social network understanding which can be used to capture, analyze, and visualize such relations.

Zenker and Beckman (2013) start their discussion within the fields of place branding and marketing. The authors define brands as networks of associations and make use of network analyses to include ‘‘the complexity of the place marketing target audience as well as the different perceptions of the brand among

the various target groups'' (Zenker & Beckman, 2013, p. 13) in their research. Their proposed model makes it possible to identify various associations attached by different target audiences for a given place.

DMV accepts this possibility of multiple brand images and makes it possible to analyze the relations between different associations through semantic network analysis and between different target audiences through social network analysis.

Define

When a country or a place is named, several associated concepts are invoked in individuals' minds (Anholt, 2007). If one is to measure a given place's brand, one has to analyze who thinks what about the place. In other words, different groups (Zenker et al., 2013) and stakeholders (Insch & Florek, 2008), and their perceptions should be identified. Thus, a place brand is the sum of everyone's perceptions and their interactions within their information resource network.

Measure

Based on the definition, the brand of a place could be measured with social and semantic network analyses. Social network analysis, as the name suggests, studies the relationship between actors within a social network by conceptualizing such actors as nodes and their relations as edges (Wasserman & Faust, 1998). In the case of places, the nodes will be used to signify members of target audiences and edges will show their interactions with each other about a given place. Semantic network analysis studies the relationship between themes and concepts by identifying how closely different concepts are used. In the case of places, the themes and concepts will show the associations people have in their minds. The relations between these associations will be used to aggregate individual data to undercover place brands.

Visualize

Data needs to be reported to decision-makers, stakeholders, and other interested parties. This is why data should be summarized in a concise manner while making sure all the relevant aspects are included. The brand indices discussed in this research summarize the data in ranking terms. This reporting method fails to capture the unique characteristics of places, deduces them to numbers and figures, and assumes that all places have the same characteristics that can be ranked. DMV proposes social and semantic network visualization to take the place of these figures by summarizing how messages travel and what concepts are associated with a given place. These maps make it possible to identify the influential actors in social networks and relevant themes and associations in semantic networks.

Example case

To exemplify DMV, this research uses data collected from Twitter about Boston and New York City. It is important to note that this example study should not be seen as an attempt to accurately measure the brands of Boston and New York City. In order to make such an argument, one must assume that Twitter is a perfect replica of the entire population. Given the fact that Twitter users do not represent the entire population, the discussions about Boston and New York City are partial and are made to demonstrate how DMV might be used. Twitter is chosen for testing because of logistical reasons as the platforms makes it possible for users to freely express their ideas, and ''mention/retweet'' capabilities enable users to interact with each other. In other words, data coming from Twitter can be analyzed both through social and semantic network analyses.

A total of 70,691 tweets for New York and 35,513 tweets for Boston were collected between April 1st and June 27th, 2012. Tweets are scrapped with a python-based scrapper code, and are based on three

keywords (Boston, New York, and NYC). The content of tweets are used to find out the associations about given cities through semantic network analysis. A retweet-mention network is created for each city to analyze the social network.

Social network

The first part of measurement in DMV is to analyze the social relations within target audiences. In the case of a Twitter analysis, it is possible to analyze such relations through retweet/mention networks. The relations between Twitter users were analyzed separately for each city. Each tweet that contained a reference to another user (by including the other user's twitter handle with an "@" sign) was extracted, and a dyadic list of relations was created. These dyads showed the interactions between users. Each reference to a user was counted as a degree for both the user making the reference, and the user that was referred.

An analysis of degree frequencies in Boston revealed that only 3% of the users had a frequency of 10 or more. This shows that most of the users were not active part of the network. The users with highest frequencies were usually sports teams/players, local newspapers/TV stations, and technology companies. The messages that are sent by these users are likely to reach a higher number of people. In Boston, 2702 unique users build up 3400 connections, with 2610 of these connections being unique. We can then see that within this network, connections are not strong. Users prefer to build up new relations with new users, rather than conversing with the users they already know. Only 23% of the relations are used more than once. Moreover, it is not possible to talk about a single network for Boston. There are 99 different networks that are not connected to each other. The largest network includes nearly 37% of the users, whereas the rest belongs to 98 different networks (see Table 2).

New York's network structure showed similar characteristics in terms of activity level. Only 1% of the users has a degree frequency higher than 10. Out of all the users, 92% of the users have a degree frequency of less than five. These users were included in the analysis stages, however they were excluded from network visualizations due to their low level of influence. The users with the seven highest degree frequencies are celebrities (including three members of the Kardashian family), TV shows, and online deals. New York network has 13,476 unique users that build up 19,353 connections, with 12,896 of these connections being unique. Similar to Boston's network, this network does not have strong, repeated connections among their users, as 33% of the relations are repeated over time. The overall network is composed of 2365 connected sub-networks, with nearly 29% of the connections belonging to the largest component.

This network analysis reveals three important findings with policy implications. First, there is low level of interaction among users which show that users do not get their information from each other about Boston or New York on Twitter, but rather follow a small number of users. Secondly, there is a low level of activity about the cities. In other words, these places are not likely to be priorities for the audience. And lastly, there are multiple networks surrounding the cities. Therefore, it is possible to argue – at least on Twitter – there are independent groups of target audiences that do not interact with each other. If a place branding campaign aims to change the perception of the entire target audience, it is of uttermost importance to use several nodes as starting points for the messages within this disconnected network (see Table 3).

Table 2
Overall usage statistics.

	Boston	New York City
Vertices	2,702	13,476
Unique edges	2,610	12,896
Edges with duplicates	790	6,457
Total edges	3,400	19,353
Connected components	99	2,365
Maximum vertices in a connected component	1,005	2,981
Maximum edges in a connected component	1,194	5,671
Degree frequencies (df)		
Users with $df < 10$	2,632	13,301
Users with $df < 20$	20	142
Users with $df < 30$	23	17
Users with $df < 40$	10	5
Users with *df* 40 and above	17	11

Semantic network

Second step of measurement in DMV is identifying the associations. The content of tweets were analyzed, and a keyword and a phrase frequency analyses were conducted by using *WordStat* software. The analysis returned 150 words and phrases for both cities. Table 4 shows the top ten keywords and phrases for Boston. The highest frequencies belong to sports and local media related words. This is caused by both the repetition of these names in retweets, as well as the overall interest in local news and sports in the city.

Wordstat's thesaurus was used to cluster the keywords into ten categories based on co-occurrence and similarity (the visualization for Boston and New York clusters can be seen in Figs. 3 and 4 respectively). Subsequently, these ten clusters were manually analyzed and re-categorized into five categories labeled as: 'night life', 'sports', 'culture', 'economy', and 'media/local news'.

The same process was repeated for New York City. Table 5 shows the top 10 keywords and phrases. It is seen that TV shows and live concerts attract the attention of Twitter users. Based on the similarity of the keywords, Computer-generated ten clusters were re-categorized into three categories labeled as: 'music', 'local news', and 'business'.

The analysis of the content presents three findings. Firstly, using frequency analysis makes it possible to capture more associations about a place. A certain tweet might include references to more than one category. By counting keywords and phrases, the analysis includes all these references in the results. Secondly there are relations between different associations. Different brand aspects (such as ACBI's hexagon categories) should not be seen separately. For instance, Boston's sports teams are observed under the culture category. In New York, business and music are very closely related. Within the framework of Twitter, interest in sports is embedded into the culture in Boston, and business and music go hand-in-hand. Lastly, combining social network analysis and semantic network analysis enable the researcher to show the differences between target audiences (such as residents and non-residents) in terms of associations about a given place and the interaction between these associations. However given the low densities of the networks, it was not possible to demonstrate this functionality of DMV with the test dataset.

Table 3
Top 10 phrases and keywords for Boston.

	Frequency	% Cases		Frequency	% Cases
BOSTON RED	942	2.50	CELTICS	1,657	4.30
BOSTON CELTICS	939	2.60	RED	1,541	3.90
BOSTON MARATHON	722	2.00	GAME	1,416	3.60
BOSTON HERALD	695	1.90	WIN	1,299	3.50
BOSTON GLOBE	517	1.40	JOB	1,263	2.70
BOSTON BRUIN	389	1.00	DAY	1,199	3.10
BOSTON FAN	331	0.90	TIME	1,121	3.00
TIME TO MESS WITH TEXAS	315	0.90	HEAT	1,014	2.60
BOSTON COLLEGE	262	0.70	FAN	1,014	2.50

Visualize

In the last step of DMV, networks maps are used to report the findings. As opposed to rankings and scores, networks maps protect the unique characteristics of places and their brands in the reporting stage. The social network maps below are created by NodeXL (Smith et al., 2010), and enhanced by Gephi (Bastian, Heymann, & Jacomy, 2009). 2-D concept maps are created by WordStat and finished by manual manipulation.

Fig. 1 shows Boston's network. The sizes of the bubbles are based on degree frequencies. The thickness of the edges (lines between bubbles) shows the strength of relations between two actors. At a first glance, this visualization reports the most influential actors: *bostondotcom, yankees, celtics* (Boston-based basketball team), and *espnchrispalmer* (Chris Palmer, a sports writer).

It is also possible to identify different sub-networks through this visualization. *Bostondotcom*, the Twitter account of Boston's local news site boston.com has a community of users around it, whereas there is another smaller network around *Yankees*, the New York-based baseball club's official Twitter account. Moreover, accounts belonging to individuals, such as *boston_mikem* and *frienshlp.*

Similarly Fig. 2 shows New York's network – however includes solely actors with a degree frequency of 8 or higher. Given the large size of New York's network (a total of 13,476 unique nodes), only more influential actors are included in the map to avoid unnecessary visual cluttering. The Kardashian sisters, Nicki Minaj, Justin Bieber, and the Today Show are easily identifiable as influential actors on the map.

These influential actors lead their own sub-networks with little or no interaction between them. There are also smaller groups of people in between these larger actors. Succinctly stated, social network visualizations report the characteristics about individual actors (i.e. their level of influence) as well as interactions and groupings within target audiences.

Fig. 3 shows the top keywords about Boston with the added 5 categories, and Fig. 4 shows New York's top keywords with the added 3 categories. This reporting style makes it possible to visually summarize all the relevant concepts and associations about a city. Moreover, semantic network maps also display the relations of these concepts and associations with each other.

It is important to underline that these maps offer more than visual aesthetic to the research. The DMV model argues that it is not possible to summarize a place's brand with figures or rankings. As a place's brand is about the audiences and their perceptions, it is important to use social and semantic network maps that display the structure of these audiences and perceptions in the data summary.

The discussions included here should be seen only as an exemplification of the DMV method, as the results do not necessarily reflect the structure of entire audience and relevant stakeholders. An analysis on Twitter cannot present the whole picture of an audience network. In this test case, it was assumed that tweets with city names were sent for information exchange purposes. Moreover, co-occurrence and proximity of terms within tweets were taken as associations. These assumptions are not necessarily correct but are made solely to demonstrate the capabilities of DMV model through an example.

Table 4

Top 10 phrases and keywords for New York.

	Frequency	% Cases		Frequency	% Cases
YORK DAILY NEWS	489	0.70	TIME	4,847	6.60
YORK SUE SPRINT	422	0.40	DAY	3,557	4.30
INSTAGRAM BE WORTH	405	0.60	LOVE	2,809	3.80
REMEMBER THIS DAY	363	0.50	JOB	2,557	2.80
CONCERT IN NYC	327	0.50	LIVE	2,111	2.90
NYC IN THE MORNING	295	0.40	TODAY	2,091	2.90
ALL AROUND THE WORLD ON THE NBA FINAL	286	0.40	GREAT	1,833	2.30
GOTTA GET SOME REST	286	0.40	NEWS	1,711	2.30
TODAY SHOW CONCERT IN NYC	286	0.40	SHOW	1,581	2.20
LIVE IN NEW YORK	280	0.40	YEAR	1,535	2.10

Table 5

Comparing DMV to contemporary practice.

		ACBI	FCBI	NBPI	DMV
Operationalization	*Construct validity*	Problematic	High	Vague construct	High, includes all associations
Instruments	*Content validity*	Transparency and construct validity problem	Transparency problem	Transparency and choice problem	Depends on the application
	Reliability	High but sampling issues	High but sampling issues	High	High
Reporting	*Usability*	Easy to understand	Easy to understand	Easy to understand	Easy to understand, informative
	Consistency	Inconsistent	Inconsistent	Inconsistent	Consistent

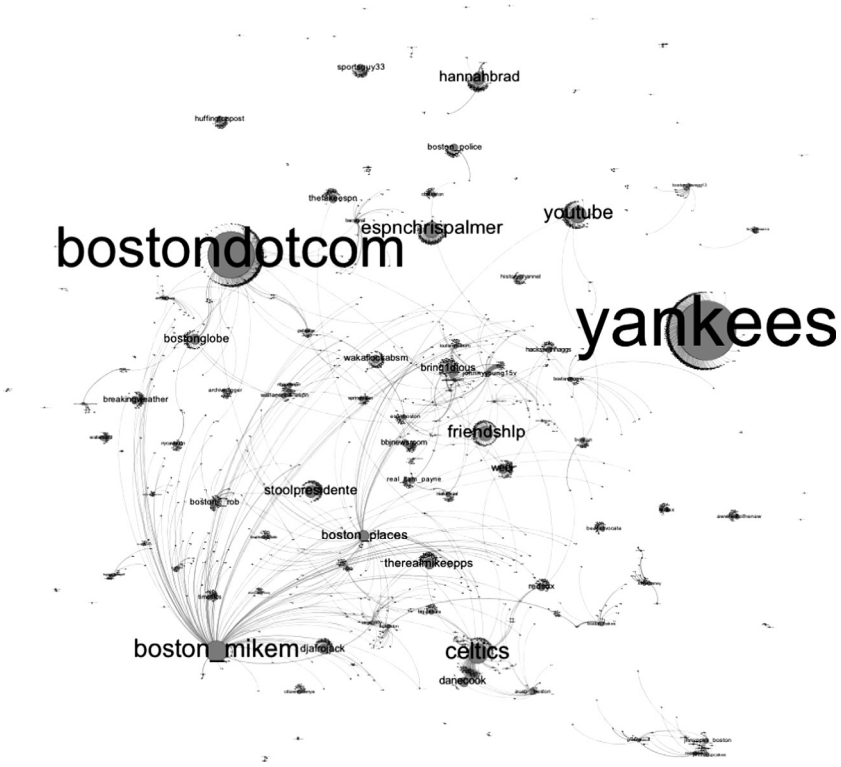


Fig. 1. Boston network map.

Discussion and implications outside social media

The example case study challenges two assumptions made by contemporary practices. Firstly, a deductive approach to measurement is not effective. The three place branding indices mentioned earlier employ a deductive approach. However, a place brand is a network of associations in people's minds,

therefore two places might have distinct associations that can be neither compared nor ranked. In their attempt to evaluate the brands of Catalonia and Wales, Roig et al. (2010) come up with semantic groups such as country of contrasts, quality, and national identity for Catalonia; and golf, nature, and scenery for Wales. In other words, their research also shows that places do not necessarily have same or similar associations in people's minds. In DMV, an inductive approach was used to come up with brand categories.

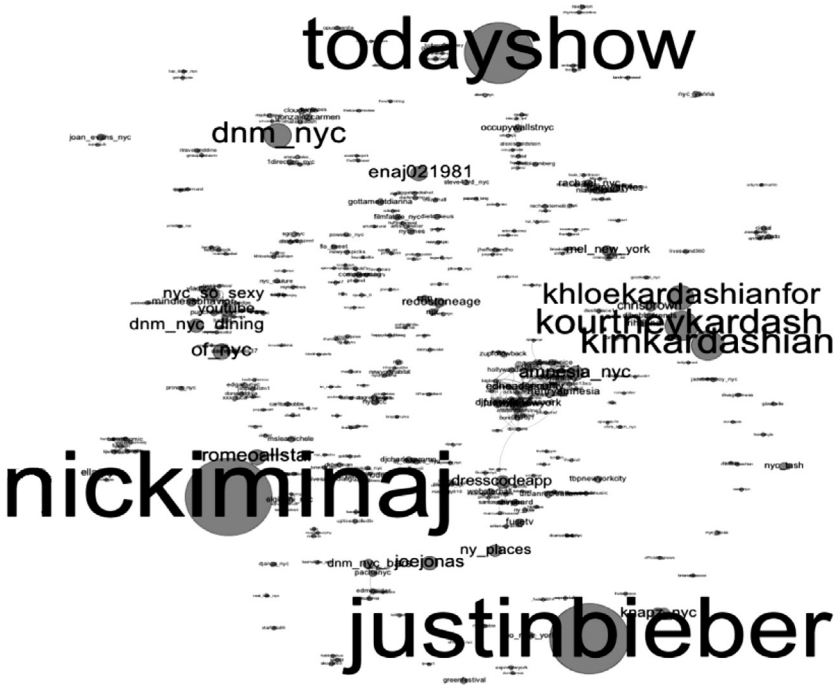


Fig. 2. New York Network visualization, *df* > 3.

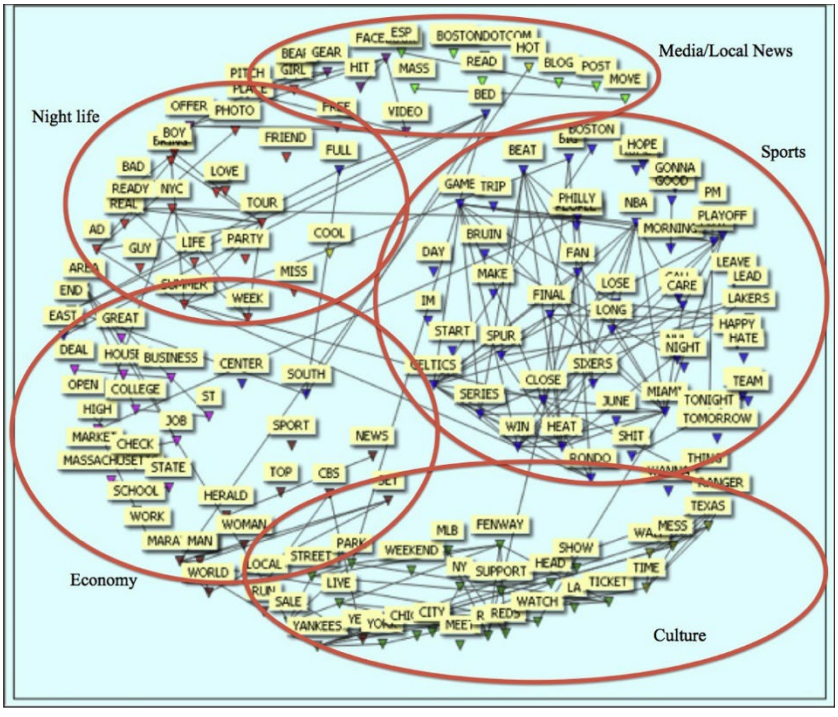


Fig. 3. Boston 2D dendogram (category representation is approximate on the figure).

Secondly, DMV does not rank or compare places. Places cannot be compared unless the audience have similar perceptions, and cannot be ranked unless these perceptions are the same. Similar perceptions can be grouped at a higher level of abstraction (Sartori, 1970) to compare places. In other words, if the

associations about different places can be combined under same categories, it is possible to compare their brands. In the case of Boston and New York City, it is possible to compare them based on economy/business, and night life/music. However, it is not possible to rank these places in the aforementioned categories as Boston's economy-related associations are usually about state/local government and job offers, whereas New York City's business-related associations are stock market related. Similarly, night life and music categories are predominantly composed of local events, which are not necessarily comparable. In the case of New York City, over 70% of music-related tweets mentioned Justin Bieber's concert on The Today Show, whereas Boston's tweets deal with a variety of concerts and night life-related advertisements.

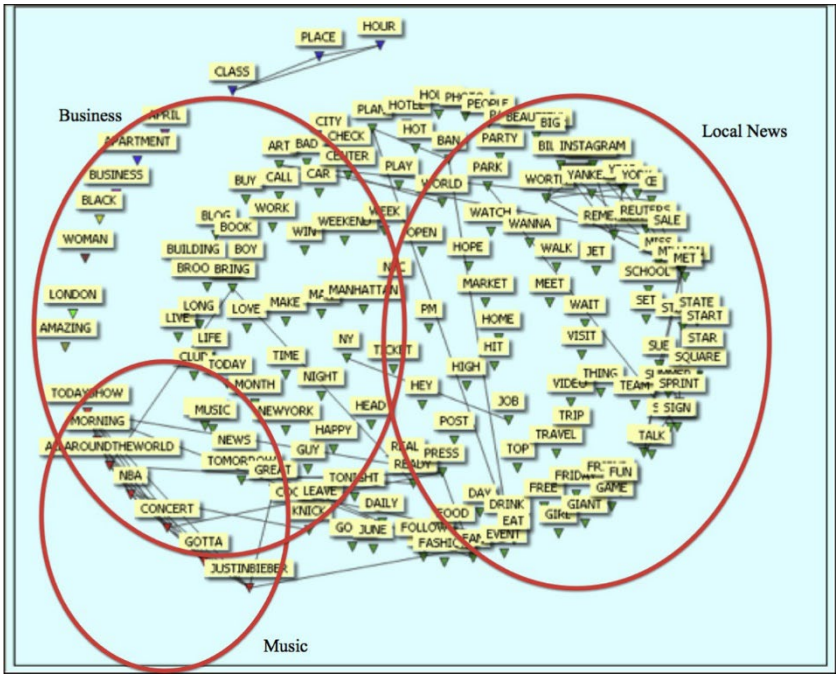


Fig. 4. New York 2D deningram (category representation is approximate on the figure).

Ranking is only possible at a lower level of abstraction (Sartori, 1970), where it is possible to point out specific peculiarities of places, and better comprehend a place's brand. If places have similar characteristics at a lower level of abstraction, it might be possible to rank them. In a hypothetical case, if both Boston and New York had a stock-market and audience had stock-market related associations about these places, it would be possible to rank the place brands. In the absence of a lower level of abstraction match, a ranking is impossible.

DMV is not proposed as a model to measure place brands exclusively through online media. DMV is a measurement model which can be used to analyze data gathered through various resources. The main idea behind the model is three fold. Firstly, DMV argues that a robust definition of ''place brand'' is necessary for construct validity. Within the DMV framework, place brands are defined as networks of associations. Secondly, given this definition, it is most appropriate to analyze data through social and semantic network analyses methods. In the case of place brand measurement, the former method captures how target audiences interact with each other, receive information and shape the associations in their minds about a given place. The latter examines how these associations are related to each other, therefore, helps present a complete picture of place brands instead of partial explanations based on categories. Content validity of DMV depends on the data gathering methods. In offline studies, data can be gathered by devising questions regarding people's associations about a given place, their information gathering networks, and social relations (cf. Young, Pieterson, Hsieh, Wang, & Contractor, 2010 for a study using surveys to gather data about information gathering networks). Lastly, the reporting system based on visualizations is more

informative than rankings in identifying key concepts and influential audience members. The end product of a DMV-based measurement will be a social network map showing the interactions among target audiences and different sub-networks; and a semantic network map showing the relations between the associations in people's minds. An additional third visualization can be created to show the different associations made by different sub-networks. An information-rich summary is consistent with DMV's place brand definition. The table below compares DMV to the contemporary analysis discussed in this research.

Conclusion

This paper aims to contribute to the discussion of measurement in city branding literature, and help us derive meaning out of the complex nature of cities. The proposed method, *Define–Measure– Visualize*, argues that a robust measurement should start with a definition to ensure construct validity. Content validity and reliability should include appropriate measurement techniques. Lastly, a model should also be able to summarize and report its findings in line with its conceptualization. Following the direction in the literature to devise city branding specific models, DMV is conceptualized step-by-step, instead of importing tools and techniques from other disciplines.

DMV has its limitations. Firstly, the success of the model highly depends on the data gathering methods. For instance, keyword-based Twitter search by itself is definitely not a proper method, as this approach cannot capture offline target groups. Besides, users tend to share more than only associations and perceptions of places on Twitter. Even with the DMV model, it is still a challenging task to design questions with high content validity. Secondly, DMV emphasizes uniqueness of the places at the expense of certain competitive aspects of branding – such as tourism, exports, and foreign direct investments (Anholt, 2007). DMV can neither forecast competition coming from places with different categories of association nor evaluate the success of campaigns in numerical and financial terms. Thirdly, visual reporting might be problematic especially in crowded social and semantic networks. Moreover, both social and semantic network maps solely capture the reality at one point in time. In order to express the variations over time, a dynamic mapping approach is needed. Lastly, and most importantly, place-relevant associations might be highly influenced by certain high-profile events. For instance in New York's Twitter network, Justin Bieber's appearance on the Today's Show affected the associations. Researchers need to be careful about differentiating between long-term place associations and short-term event influences, as well as how these short-term events influence long-term associations.

This paper solely presents a theoretical look on the measurement question through one mock analysis. The measurement processes and visualizations introduced here are the parts of a rudimentary analysis. Future research projects could and should introduce new data gathering methods that have high content validity. Moreover, the visualization aspect should be developed to reflect variation over time and different sub-networks.

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