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Using Chernoff Faces to Portray Social Media Wine Brand Images

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Abstract

Purpose: *With the rapid and exponential growth of Web 2.0 over the past few years, wine brand managers must increasingly be aware of how their brands are represented in the social media sphere. However, understanding social media can be complex due to the broad and diverse nature of communications platforms and styles. This paper illustrates two techniques for the collection, assimilation, analysis and presentation of a brand's social media visibility data*

Design/Methodology/Approach: *To investigate and demonstrate the two tools used in this paper, social media data on six wine brands (a convenience sample for illustrative purposes) was collected using the online tool Social Mention and processed using Stata to generate Chernoff Faces graphic representations of multivariate data.*

Findings: *Study results show that online tools can be used to gather and consolidate large amounts of fragmented brand visibility data, and that multiple interrelated variables may be visually represented to promote ease of data interpretation. Managerial implications, limitations of the methodology and directions for future research are identified.*

Key words: Wine, Websites, Internet, Brand, Visibility

1. INTRODUCTION

The first decade of the new millennium has seen social media become as influential as, if not more so than, conventional media. The impact of social media on marketing and brand management is profound. Yet despite widespread popularity, snowballing network effects and booming levels of brand-consumer and consumer-consumer communication, critical questions about social media remain unanswered from the perspective of both brand managers and brand management scholars. These would include questions such as: How do we find out what is being said about a brand in social media? What is being said about competitor brands, and how is that different from our brand? Since social media are multi-dimensional and require multiple simultaneous tracking measures, what is the best way to portray and communicate social media data so that it can be quickly and easily comprehended by marketing decision-makers?

These are the issues we address in this paper. We proceed as follows: First, we provide a brief overview of social media and distinguish between several types of social media. Second, we describe Social Mention, a tool for collecting various aspects of brand visibility information in social media. Third, we describe a study of the relative positioning of competing wine brands in the social media sphere according to Social Mention assessments. We then explain the use of and employ a graphic technique called Chernoff Faces (Chernoff, 1971; 1973) as a tool to easily portray and compare the selected brands' positioning across a number of social media dimensions. We conclude with an acknowledgement of the limitations of this approach, outline several implications for wine brand managers and identify possible avenues for future research. This paper contributes to the wine marketing literature by providing and explaining how to use a practical and innovative tool, Chernoff faces, to wine marketers in their quest to improve their social media presence in comparison to their competitors.

2. SOCIAL MEDIA & SOCIAL MENTION: A BRIEF OVERVIEW

Social media can be defined as media designed to be disseminated through social interaction between individuals and entities such as organizations. Typically, social media are created using highly accessible and scalable publishing techniques (Brogan, 2010; Zarella, 2010). Social media use Internet and web-based technologies to transform broadcast media monologues (one-to-many) into dialogues (many-to-many). Social media support the democratization of information by transforming individual consumers from content consumers into content producers.

Social media have altered the communications landscape by changing the ways in which organizations and brands interact with consumers. Many brands are attempting to utilize social media to reach existing customers, gain new ones, and build or maintain credibility and reputation. Through social media, organizations are able to reach out to and interact with customers directly online, and, if managed effectively, can possibly become part of independent customer conversations.

Some of the major types of social media are:

- Blogs (short for “web logs”) are websites owned and written by individuals who maintain regular diaries and commentaries that may include text, graphics and video.
- Micro-blogs are social networking services that enable users to send and read very short messages, usually restricted by the number of characters in the message. The best known of these is Twitter.

- Social networking websites are services on which users can find and link to friends and contacts, send messages, and share personal profiles and content. The best-known “friendship” social networking sites are Facebook and MySpace.
- Picture sharing websites, such as Flickr, Yahoo Images and Google Images, allow users to store, “tag” and share images.
- Video sharing websites, such as YouTube, allow users to upload and share videos.
- Social news websites allow users to share published content from anywhere on the Internet (by submitting links and stories), as well as vote or comment on others’ submitted links and stories. The most popular social news site is Digg.

Social Mention (www.socialmention.com) is a social media search and analysis platform that aggregates user-generated content from a plethora of social media platforms – including the most popular sites, as discussed above – into a single stream of information. It allows users to instantly track and measure what and how much people are saying about a brand across the web's social media landscape. Social Mention reports a number of metrics; those utilized in our study are described and defined in Table 1 below.

3. THE STUDY AND METHODOLOGY

Purely chosen for illustrative purposes, we selected the six brands of popular Sauternes as a source of data for wine brand indicators in this study. Sauterne is a French dessert wine from the Sauternais region of the Graves section in Bordeaux, typically made from Sémillon, Sauvignon Blanc and Muscadelle grapes affected by Botrytis Cinerea (“noble rot”). Botrytis Cinerea causes the grapes to become partially raisined, resulting in concentrated and distinctively flavored wine. In order to illustrate the portrayal of Sauternes brands in social media using Social Mention and Chernoff Faces, we chose the following Premier Cru brands: Supérieur Estate Château d'Yquem, Suduiraut, Coutet, Climens, Rieusec and Guiraud.

We gathered data on the six Sauternes brands identified above by entering the brand names into the Social Mention website. The website calculated the metrics shown in Table 1 (strength, sentiment, passion, reach, unique authors and frequency) for each brand across multiple social media. Next, a contingency table was created with the six Sauternes brands as columns and the Social Mention metrics as rows. A summary is shown in Table 2 below.

Important observations can be made from the above table. However, interpreting a reasonably complex table can be difficult, as the observer wishes not only to assess how a particular brand is performing but also to determine how a brand compares to its competition. In some cases, a visual representation of complex data can make these tasks easier, and the features of the human face provide a simple but powerful means of doing this. So, data from Table 2 was used as data input for the creation of Chernoff Faces using Stata data analysis software.

4. CHERNOFF FACES

Over the years, various graphic display techniques have been used to portray statistical data including pie-charts, histograms and scatter diagrams (Beniger and Robyn 1978; Zelazny 1972). From the 1980s on, the accessibility of user-friendly software and relatively inexpensive graphics plotters, printers and other media-producing devices greatly expedited the ability of researchers and managers to communicate complex numeric information with simpler visual

representations. Among others, researchers explored icons such as blobs (Fienberg 1979), glyphs (Anderson 1969) and faces (Chernoff 1973) as ways of displaying multivariate data (Everitt 1978; Cleveland 1985). These representations offered novel ways of presenting intricate data by means of straightforward, interpretable pictures.

Unlike graphs, icons are not designed to communicate absolute numerical information. Rather, the intent is to allow viewers to recognize clusters of similar variables, and are useful for sorting, organizing and comparing interdependent variables. Cognitive science research on multi-attributable visual processing has shown that people can accurately categorize multivariate data with the aid of appropriate visual cues (Garner 1974). The human face – or simplified representations thereof – is one of the most effective visual graphic icons for clustering multivariate data, particularly for the viewers' long-term memory processing.

The facial representation technique was originally proposed by Herman Chernoff (1973). Widely divergent facial features are shown in the graphic representation of a face, each of which can be associated with a different variable. "People grow up studying and reacting to faces all of the time. Small and barely measurable differences are easily detected and evoke emotional reactions from a long catalogue buried in the memory" (Chernoff, 1973, p.362). He later went on to say: "I believe that we learn very early to study and react to real faces. We perceive the face as a gestalt and our built-in computer is quick to pick out the relevant information and to filter out the noise when looking at a limited number of faces" (Chernoff, 1978, p.1). As such, the majority of people are able to recognize and discern between faces with different features, thus making the facial representation of data useful for viewers' recognition and understanding of multiple different variables.

The Chernoff Faces procedure, involving the assignment of variables in a data set to the features of a human face, has been incorporated into many statistics and statistical graphic representation packages. It is both cogent and flexible, and can be tailored to suit the prerequisites of almost any data set. The Chernoff Faces representation technique has been applied in a wide range of academic disciplines and applied fields.

4.1. Generating Chernoff Faces

While the Chernoff Faces technique has been employed for several decades, not until very technological advances has the technique been widely accessible or easily used by researchers or statisticians (cf. Nel, Pitt and Webb, 1994). In 2009, however, Raciborski published syntax that helped overcome these technological barriers, making the Chernoff Faces technique easy to use with the high-end statistical and data analysis software Stata. The Stata program is able to automatically generate Chernoff Faces to "detect patterns, clusters, outliers, and temporal trends" (StataCorp, 2009) from raw statistical data. As listed in Table 3, this paper used the Chernoff command in Stata to allocate facial features to data variables from the Social Mention scores (variables) in Table 2:

In order to help the reader interpret the resultant Chernoff faces, two additional sets of data were added to represent the minimum and maximum values across each of the seven categories as reference cases. These "ideal" or "extreme" case faces are shown in Figure 1, below.

As can be seen from Figure 1, the ideal Sauternes brand – in terms of social media presence as measured by Social Mention – would have a fat face, dense hair, bushy eyebrows, large round eyes with small round pupils, a large broad nose and a broadly smiling mouth. On

the other end of the spectrum, the face representing the lowest social media presence scores for a brand would have thin or narrow features, with the exception of large pupils. It is, arguably, not difficult to see similar “hero” or “villain” facial attributes or caricatures in many fictional characters in movies, particularly those geared toward children.

The faces generated for the six Sauternes brands are represented in Figure 2.

Using the Chernoff Faces representation alongside the raw data in Table 2, it becomes increasingly obvious that the six brands are quite different with respect to social media positioning. The d’Yquem brand, while not “perfect” on all the facial attributes as with the maximum score representation (Figure 1), does present a favorable picture of the brand: the fat face represents high brand strength, large eyes represent high positive sentiment, small round pupils represent low negative sentiment, the bushy eyebrows represent broad reach, the fat nose represents a high number of unique authors, and the dense hair represents high relative frequency. The exception in the dYquem face is the smile, which indicates relatively low scores for passion – i.e., lots of users talking about the brand, but none in great depth. In contrast, the Rieusec and Suduiraut represent the least ideal faces of the six.

5. MANAGERIAL IMPLICATIONS AND AVENUES FOR FUTURE RESEARCH

A number of managerial implications become apparent from the research conducted herein. If the Sauternes brands considered for this study do have clearly defined social media strategies, these are most likely still at a nascent stage. More than 80% of the 532 French winemakers surveyed by online marketing company mysocialwinery.com said they did not directly use social media platforms to interact with users. However, New World counterparts in the United States, South America, Australia and New Zealand seem to be more sensitive to the impacts of social media (Gervitz, 2010).

The rapid growth of social media means that online strategies, should wine brand managers choose to employ them, will have to be regularly updated in order to ensure goals are being attained and objectives reached. Astute managers should 1) define which social media they are most interested in utilizing (and why); 2) define the characteristics and dimensions of those media that they deem most important; 3) monitor social media content – possibly using tools such as Social Mention – for their brand to measure activity against performance benchmarks; and 4) monitor social media visibility for brands they regard as competitors or benchmarks.

For such a strategy, sources of data such as Social Mention and representative tools such as Chernoff Faces might become invaluable tools for managers, particularly when there is a need for rapid or simplified analysis and presentation of a brand’s social media positioning and visibility. Wine brand managers will also be able to monitor the effectiveness of their social media strategies by tracking their brands’ position and visibility (using Social Mention and Chernoff Faces) over time to determine the efficacy of particular social media strategies, particularly with respect to the brand’s positioning against competition.

Exploratory studies such as this suggest a stream of opportunities for further research. First, it would be wise to find ways of confirming the reliability and validity of data gathered by services such as Social Mention. This might be done by consulting and working directly with these service providers in an effort to gain a better understanding of their methodologies and results. It could also be done by closely monitoring the results for a set of brands over a period of time, and establishing some form of test-retest pattern to determine reliability. Second, the results of

secondary data research such as this could be combined or cross-referenced with primary data collection. For example, Chernoff Faces are amenable to showing the results of survey studies (cf. Nel, Pitt and Web, 1994) just as they are to showing the results of secondary data as used in this paper. Third, since data collection sites such as Social Mention enable linking directly back to the sources of data used in tabulation, researchers could more closely analyze the content of the interactions between brands and social media users. Researchers (eg, Opoku, 2008), describe tools that can be employed to analyze and synthesize large amounts of text by means of computerized content analysis. Lastly, Social Mention is just one of a plethora of readily available online tools for social media analysis (see Barros, 2009). Sources of social media visibility data might be combined or cross-referenced from multiple sources to increase reliability. Data from these sources could then be used individually or in conjunction to construct Chernoff Faces using Stata.

6. LIMITATIONS OF THIS STUDY

This paper does not claim to be a definitive study of the positioning of wine brands, or even specifically Sauternes brands, in social media. Rather, it has selected a small convenience sample of brands as a means of illustrating two complementary social media data analysis and presentation techniques. As such, the data and graphic representations presented in this paper may well have been very different had alternate variables, data and sources been chosen (such as different brands, additional brands, tools other than Social Mention, or other dimensions of performance measurement). Second, this study provides more of a snapshot in time than an ultimate set of results. The very nature of social media is that content is continuously evolving; Social Mention is a dynamic tool and as such, the scores obtained and resulting Chernoff Faces are representative of the selected brands up to the time of data collection only. Third, the allocation of variables (i.e., Social Mention scores) to facial features in a Chernoff Face generation exercise is relatively arbitrary. Chernoff Faces may be interpreted differently by audiences based on which attributes are assigned to which features. For example, some viewers may regard the smile as the most important or obvious facial feature, and therefore the researcher's choice of which variable to assign to the smile would become more or less significant. Finally, data from a third party source such as Social Mention has to be taken at face value, and any weaknesses in the methods used to gather or interpret data will be reflected in the results of a study using that information.

7. CONCLUSION

The management of brands in an era of social media is both more difficult and more critical than ever before. Consumers are increasingly empowered to discuss, share and even represent brands through platforms such as YouTube, Facebook and Twitter. Consumer generated content diffuses rapidly over the internet, and takes much of the control over brand messaging and communication away from brand managers. At the same time, brands can harness the power, speed and breadth of social media to spread messages and engage consumers in ways that would have been unlikely, if not impossible, just five years ago.

Wine brand managers, like others, will no longer be able to fully control the destinies of their brands in the consumers' eyes. They can, however, engage with and, ideally, direct the conversations about their brands. Managers will need to use several tools to gather and analyze information about brand performance in social media, and even more tools to help understand and present that information. We suggest herein that Social Mention and Chernoff Faces can be simple yet powerful tools in the brand manager's arsenal that will allow them to assimilate and understand complex, segmented and ever-changing information and conversations about their brands in the social media sphere.

REFERENCES

- Anderson, E. (1969). A Semigraphical Method for the Analysis of Complex Problems, *Technometrics*, 2, 3, 387-39
- Beniger, J. R. and Robyn, D. L. (1978). Quantitative Graphics in Statistics: A Brief History, *The American Statistician*, 32, February, 1-10
- Brogan, C. (2010) *Social Media 101: Tactics and Tips to Develop Your Business* Online, Hoboken, NJ: John Wiley and Sons
- Chernoff, H. (1971). The use of faces to represent points in n-dimensional space graphically, Technical Report 71, Department of Statistics, Stanford University.
- Chernoff, H., (1973). The use of faces to represent points in k-dimensional space graphically, *Journal of American Statistical Association*, 68, 361-368.
- Chernoff, H. (1978). Graphical Representation as a Discipline, In: *Graphical Representation of Multivariate Data*. (Ed) Wang, Peter C. (New York), Academic Press, 1-11.
- Cleveland, W. S. (1985). *The Elements of Graphic Data*, Monterey, CA, Wadsworth Advanced Books
- Everitt, B. (1978), *Graphical Techniques for Multivariate Data*, London, Heinemann Educational Books.
- Fienberg, S. E, (1979), Graphical Methods in Statistics, *The American Statistician*, 33, November, 165-178
- Garner, W. R. (1974) *The Processing of Information and Structure*, Hillsdale, NJ, Lawrence Erlbaum.
- Gevirtz, L. (2010) Winemakers shun social media grapevine, From: <http://www.reuters.com/article/idUSTRE66Q20W20100727>, Jul 27,
- Nel, D., Pitt, L., and Webb, T. (1994). Using Chernoff Faces to portray service quality data, *Journal of Marketing Management*, 10, 247-255.
- Opoku, R. A. (2009) Mapping Destination Personality in Cyberspace: An Evaluation of Country Web Sites Using Correspondence Analysis, *Journal of Internet Commerce*, 8, 1/2, 70-87
- Raciborski, R. (2009) Graphical representation of multivariate data using Chernoff faces, *The Stata Journal*, 9, 3, 374-387
- StataCorp., (2009) *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP.
- Wang, P. C. C. (Ed) (1978) *Graphical Representation of Multivariate Data*, New York, NY:

Academic Press.

Zelazny, G. (1972). *Choosing and Using Charts*, New York, NY: Video Arts.

Zarella, D. (2010) *The Social Media Marketing Book*, North Sebastopol, CA: O'Reilly Media

TABLE 1: SOCIAL MENTION METRICS – DESCRIPTIONS

Metric	Definition	How Calculated
Strength	The likelihood that your brand is being discussed in social media	Phrase mention within the last 24 hours divided by the number of total possible mentions
Sentiment	The ratio of generally positive mentions to the number of generally negative mentions	Number of Generally Positive Mentions/ Number of Generally Negative Mentions This measure can also be gauged in absolute terms by counting the number of positive mentions, the number of neutral mentions and the number of negative mentions*
Passion	A measure of the likelihood of individuals talking about your brand in social media will do so repeatedly	A small number of individuals talking about a brand repeatedly will give a high passion score. A large number of individuals talking about your brand, but only infrequently per individual, will give a low passion score
Reach	A measure of the range of influence	Ratio of the number of unique individuals talking about your brand as a % of the number of total possible mentions
Unique Authors	An indicator of the number of authors messaging about a brand	The number of unique authors messaging about a brand within a particular time period
Frequency	The frequency with which mentions of a brand appear	Measured in minutes or seconds. For our purposes, this indicator is reverse-scored; e.g. a brand being mentioned every 30 seconds vs a brand mentioned every 60 seconds would score 60 and the second brand 30. We term this Relative Frequency.

*For this study we counted positive, and negative mentions separately rather than simply use the ratio of positives to negatives

TABLE 2: SAUTERNES BRANDS AND SOCIAL MENTION SCORES

Sauternes Brand	Strength	Positive Sentiment	Negative Sentiment	Passion	Reach	Rel Frequency	Unique Authors
d'Yquem	2	66	13	20	10	660	113
Climens	1	33	2	41	4	60	32
Coutet	1	38	2	46	6	240	39
Riessec	2	30	1	29	6	674	44
Suduiraut	1	51	1	35	5	240	45
Guiraud	2	35	1	33	4	660	35

**TABLE 3: SAUTERNES BRANDS AND SOCIAL MENTION SCORES -
EXPLANATION OF FACIAL FEATURES**

Social Mention Mention	Facial Feature Allocation
Strength	Facial line - The fatter the face the higher the brand strength
Positive Sentiment	Eye Size - The larger the eye size the higher the positive sentiment
Negative Sentiment	Pupil Size - The larger the pupil size the higher the negative sentiment
Passion	Mouth - The higher the passion the greater the curvature of the smile
Reach	Eye Brows - The larger the reach the bushier the eye brows
Unique Authors	Nose - The more unique authors the larger the nose
Relative Frequency	Hair Density - Greater relative frequency results in higher hair density

FIGURE 1: MAXIMUM AND MINIMUM VALUES – CHERNOFF FACES

Maximum Values Face



Minimum Values Face



FIGURE 2: CHERNOFF FACES OF 6 SAUTERNES BRANDS, BASED ON SOCIAL MENTION CHARACTERISTICS

