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Introduction to the Special Issue:

Applications of business intelligence and analytics in social media marketing

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The massive amounts of social media data such as consumer subjective opinions, recommendations and ratings, and consumer behavioral data stored in social networking sites are a valuable source for supporting the marketing activities of many firms if they are analyzed in meaningful ways. Business intelligence and analytics (BI&A) is increasingly advocated as an important IT breakthrough to meet this growing need. However, BI&A is challenging for firms seeking to adopt a thoughtful and holistic approach to analyze and harness social media data. There are several major obstacles, including the lack of data integration, data overload issues, barriers to the collection of high-quality consumer data, and organizational culture and change management that prevent firms from fully embracing BI&A and gaining all the benefits. The value of social media data is rarely discovered, analyzed and visualized, either for creating marketing insights and knowledge to complement the insufficiency of intrinsic organizational knowledge or as a roadmap for improving service quality and firm performance. As such, we believed that there is a need for further research to: (1) explore how to utilize social media data to capture consumer insights from the huge

variety of user-generated content in social media platforms, and (2) examine how BI&A enables firms to create business value and sustain a competitive advantage. With this aim in mind, this special issue has been developed to seek conceptual, empirical or technological contributions offering new insights into the applications of business intelligence and analytics in social media marketing.

The first article entitled: “Measuring the impact of spammers on E-mail and Twitter networks,” by Andrea Fronzetti Colladon and Peter A. Gloor investigates the research question of whether the senders of large amounts of irrelevant or unsolicited information – commonly called “spammers” - distort the network structure of social networks. Two large social networks are analyzed, the first extracted from the Twitter discourse about a big telecommunication company in Italy, and the second obtained from three years of email communication of 200 managers working for a large multinational company. This work compares network robustness and the stability of centrality and interaction metrics, as well as the use of language, after removing spammers and the most and least connected nodes. The results show that, for most of the social indicators, spammers do not significantly alter the structure of the information-carrying network. The authors additionally investigate the correlation between e-mail subject line and content by tracking language sentiment, emotionality, and complexity, by addressing the cases where collecting email bodies is not permitted for privacy reasons. The findings extend the research about robustness and stability of social networks metrics after the application of graph simplification strategies.

The second article entitled: “Exploring adverse drug reactions of diabetes medicine using social media analytics and interactive visualizations,” by SI LI, Yichuan Wang and Yedurag Babu proposes an automatic and real-time social media analytics framework with interactive data visualizations to support effective exploration of knowledge about adverse drug reaction (ADR) surveillance. This framework was prototypically implemented on the

basis of social media data. A case study of a longitudinal diabetes patient online community (AskaPatient.com), as well as FDA Adverse Event Reporting Systems (FAERS) data as a benchmark were used to evaluate their proposed approach's performance. Based on the results, this approach significantly increases the precision and accuracy of ADR extraction. The number of ADR cases, the time when the ADRs occurred, and the ratings of Glucophage were visualized and resulted by mining a collection of 870 ADRs posted in Askapatents.com from 2001 to 2015. The findings have important implications for pharmaceutical companies and hospitals wishing to monitor the ADRs of medicines.

The third article entitled: "Using big data analytics to study brand authenticity sentiments: The case of Starbucks on Twitter," by Hamid Shirdastian, Michel Laroche and Marie-Odile Richard examines the sentiments towards a brand, via brand authenticity, to identify the reasons for positive or negative sentiments on social media. From a database containing 2,282,912 English tweets with the keyword 'Starbucks', the authors use a set of 2204 coded tweets for analyzing both brand authenticity and sentiment polarity. Through three qualitative studies, they discuss several tweets from the dataset that can be classified under the *quality commitment*, *heritage*, *uniqueness*, and *symbolism* categories. Results from the support vector machine (SVM), as the quantitative research method, illustrate the effectiveness of the proposed procedure of brand authenticity sentiment analysis. It shows high accuracy for both the brand authenticity dimensions' predictions and their sentiment polarity.

The fourth paper entitled: "A big data analytics model for customer churn prediction in the retiree segment," by Farid Shirazi and Mahbobeh Mohammadi constructs a predictive churn model by utilizing big data, including the structured archival data, integrated with unstructured data from sources such as online web pages, the number of website visits and phone conversation logs, and this for the first time in the financial industry. It also examines

the effect of different aspects of customers' behavior on churning decisions. The Datameer big data analytics tool on the Hadoop platform and predictive techniques using the SAS business intelligence system were applied to study the client retirement journey path and to create a churn prediction model. By deploying the above systems, they were able to uncover a wealth of data and information associated with over 3 million customers' records within the retiree segment of the target bank from 2011 to 2015.

This is followed by the article entitled: "Social media analytics: Extracting and visualizing Hilton hotel ratings and reviews from TripAdvisor," by Yung-Chun Chang, Chih-Hao Ku and Chun-Hung Chen who propose an integrated framework which includes a data crawler, data preprocessing, sentiment-sensitive tree construction, convolution tree kernel classification, aspect extraction and category detection, and visual analytics to gain insights into hotel ratings and reviews. The empirical findings show that their approach outperforms baseline algorithms as well as well-known sentiment classification methods, and achieves high precision (.95) and recall (.96). The visual analytics results reveal that business travelers tend to give lower ratings, while couples tend to give higher ratings.

The final article entitled: "Business intelligence in online customer textual reviews: Understanding consumer perceptions and influential factors" by Xun Xu, Yibai Li, and Mohammad Haghighi examines customer satisfaction and dissatisfaction toward attributes of hotel products and services based on online customer textual reviews. Using a text mining approach, latent semantic analysis (LSA), they identify the key attributes driving customer satisfaction and dissatisfaction toward hotel products and service attributes. Additionally, using a regression approach, they examine the effects of travel purposes, hotel types, star levels, and editor recommendations on customers' perceptions of attributes of hotel products and services. This study bridges customer online textual reviews with customers' perceptions

to help business managers better understand customers' needs through User Generated Content.

Today, we are situated at the growth stage of the big data analytics revolution, and we hope that this special issue helped advance the field further. However, with the development of a more interconnected world, more theoretical and empirical research could help business managers stay ahead of the competition by obtaining and analyzing big data from all sources which could be converted into both short-term and long-term strategies in this brave new world.