



# A longitudinal exploration of the relations between electronic word-of-mouth indicators and firms' profitability: Findings from the banking industry



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## ABSTRACT

Prior research on electronic word-of-mouth (eWOM) has focused on the predictive utility of star ratings. Extending these studies conceptually and methodologically, this paper employed Automatic Text Analysis to investigate the predictive utility of evaluative textual information contained in online reviews. Based on a real-world dataset that matched eWOM with annual financial performance of 68 banks over an eight-year period, this study tested patterns of the bi-directional relations between eWOM indicators and banks' profitability over time. Results showed that both star ratings and consumers' verbalized emotions in eWOM significantly predicted increases in firms' future profitability, which is measured by Return on Assets. Star ratings emerged as a consistent predictor, and their effects lasted for at least two years. Expressed anger predicted lower profitability in the following year and explained additional variance beyond the star ratings. Finally, higher firm profitability was prospectively related to higher star ratings and more verbalized positive feelings in next year's eWOM.

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## 1. Introduction

The advent of the Internet has dramatically expanded the scale and scope of consumers' word-of-mouth (WOM) communication. As a result, the power of electronic word-of-mouth (eWOM) on firms' market performance has recently attracted great research attention (e.g., Chen & Xie, 2008; Dellarocas, Awad, & Zhang, 2007; Ho-Dac, Carson, & Moore, 2013). Companies are expected to harness user-generated eWOM to better understand consumers and create competitive advantage in order to excel in the business environment (Dey, Haque, Khurdiya, & Shroff, 2011). However, as a relatively new research area, theory construction and methodology development in this area are still in their infancy, although consumers have posted thousands of online reviews containing their thoughts, emotions, and evaluations regarding a multitude of products and services, the potential value of the information contained in the textual reviews has barely been explored.

To this end, the present research intends to introduce Automatic Text Analysis (ATA) as an efficient method for quantifying the valuable information contained in eWOM and demonstrate the value of text analysis indicators adding to eWOM research. Specifically, this paper used text analysis to extract two linguistic indicators from textual reviews, expressed anger and verbalized positive feelings, and then tested the pattern of the associations among star ratings, the linguistic eWOM indicators, and firms' profitability in a longitudinal dataset. This study represents a pioneering effort to explore how the quantified textual content of eWOM is related to firms' profitability.

## 2. Literature review

### 2.1. The concept and formats of eWOM

Henning-Thurau et al. (2004) defined eWOM as: "any positive or negative statement made by potential, actual or former customers about a product or company, which is made available to a multitude of people and institutions via the Internet." EWOM is distributed through various internet channels such as consumer forums, boycott websites, personal emails, chat rooms, and instant

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messages (Cheung & Thadani, 2012). Among these channels, consumer review forums – web-based consumer-opinion platforms used by consumers to publicize and communicate their opinions, recommendations, and complaints – are one of the most widely used eWOM formats. In a survey of 2000 internet users, more than 70% of the respondents reported that online reviews had a significant influence on their purchase decisions and the respondents noted that online consumer reviews had a greater influence than the reviews generated by professionals (comScore, 2007). Given its importance, this study focuses on consumer eWOM through online reviews.

Unlike the traditional WOM characterized by face-to-face or telephone communication, eWOM is text-based with a sender typing a message on the Internet and a number of consumers reading this message on the Internet. The enormous quantity of text-based eWOM messages available on the Internet poses both opportunities and challenges to researchers and managers. On the one hand, eWOM provides free access to voluminous, authentic consumer information. On the other hand, utilizing the huge amount of unstructured textual information can be challenging (Lehto, Park, Park, & Lehto, 2007).

## 2.2. Automatic text analysis

Capable of processing a large amount of text data effectively, Automatic Text Analysis (ATA) techniques have great potential in overcoming the challenge and deriving valuable insights from the text-based eWOM. ATA, which is also called computer-based text analysis, is the computer-aided method of extracting statistically manipulable information (Shapiro & Markoff, 1997). Through text analysis, researchers can discover hidden sentiment, patterns, traits, and relationships. Despite the different terminologies and technologies used, the common aim of text analysis is to transfer the unstructured text information into structured information, which can then be analyzed with traditional data mining and statistical techniques.

With the advances in computer technology, many computer-based text analysis tools and software have been developed. The typical functions of these text mining tools include information extraction, text categorization, text clustering, document summarization, and association analysis. According to Tang and Guo (2015), text analysis can be conducted from a qualitative approach, a quantitative approach, or a combination of both. Qualitative analysis tools are used to generate non-numerical information. For example, Kozinets (2002) adapted ethnography to the online community context and developed “netnography” as an online marketing research tool to qualitatively study consumer behavior. In contrast, the quantitative tools are used to generate numerical data. Because its output is objective and can be directly used in conventional statistical analysis, the quantitative approach has been more widely used in current research and many text mining tools (e.g., SAS text miner, SPSS Modeler with Text Analytics, LIWC) have been developed. Recently, a number of innovative studies have employed quantitative analysis tools to obtain valuable information from eWOM. For example, based on the mining of the text content on Facebook and Twitter sites of the three largest pizza chains, He, Zha, and Li (2013) employed a combination of two text mining tools including SPSS Clementine text mining tool and Nvivo 9 and demonstrated how to use social media to conduct competitive analysis. Employing Linguistic Inquiry and Word Count (LIWC), Ludwig et al. (2013) examined the influence of affective content and linguistic style matches in online reviews on consumers’ conversion rates.

In this study, we used Linguistic Inquiry and Word Count (LIWC, Pennebaker, Francis, & Booth, 2001), a popular text analysis software for several reasons. First, LIWC extracts quantitative

information, making the resulting data amenable to statistical analysis. Second, LIWC not only analyses basic grammatical features of texts, but also provides information about important psychological processes (e.g., Positive Feelings and Anger). Third, LIWC operates automatically and eliminates the burden of manual coding. Fourth, LIWC is currently one of the most widely used and extensively validated ATA tool in academic research (Lyons, Mehl, & Pennebaker, 2006; Pennebaker, Mehl, & Niederhoffer, 2003).

LIWC employs a word count strategy, which is the foundation of many text analysis tools. LIWC compares each word of a given text to an internal dictionary and then generates linguistic indicators by calculating the percentage of words falling into a number of categories (e.g. words indicating emotional, cognitive, or social processes). The assumption of LIWC is that the percentage of emotion-related words used within a given category can serve as a reliable and valid measure of an individual’s emotional state. For example, the more negative emotion words used the stronger negative emotions a consumer have. A series of validation studies (e.g., Cohn, Mehl, & Pennebaker, 2004; Mehl & Pennebaker, 2003) have provided empirical evidence of the validity and reliability of this method.

## 2.3. The relationship between eWOM and firms’ market performance

Some prior studies have empirically examined market performance (i.e., product revenues and diffusion) in relation to eWOM. As suggested by Cheung and Thadani (2012), studies on the impact of eWOM communication can be classified into two levels: market-level analysis and individual level analysis. The market-level analysis focuses on the impact eWOM on firms’ market performance. These studies (e.g., Chevalier & Mayzlin, 2006; Dellarocas, Awad, & Zhang, 2004; Joeckel, 2007) have provided relatively consistent evidence that the volume and valence of eWOM are significantly related to product sales and stock prices. For example, Dellarocas et al. (2004) found that the number of posted movie reviews predicted both first week box-office revenues as well as total box-office revenues. Chevalier and Mayzlin (2006) found that favorable consumer ratings were positively related to book sales. The individual-level analysis focuses on the impact of eWOM communication on the buying intention and behavior of individual consumers. For example, Chu and Kim (2011) suggested that social network factors (e.g., tie strength) affected consumers’ eWOM behaviors. Gruen, Osmonbekov, and Czaplewski (2006) reported that customer know-how exchange influenced customers’ perceptions of product value and likelihood to recommend the product. Sparks, Perkins, and Buckely (2013) found that both the source and content of online reviews influenced consumers’ beliefs, attitudes and purchase intention.

Although the existing research has furthered our understanding of eWOM, as a relatively new area some important research gaps still exist in the literature (King, Racherla, & Bush, 2014). One such limitation lies in the lack of a method that can efficiently deal with huge volumes of textual reviews. As a result, most previous studies have focused on the volume or the star ratings of online reviews and have relatively neglected any information contained in the textual reviews. To address this methodological issue, the current study employed text analysis to extract consumer information from eWOM reviews. Another limitation is that prior research focused on the relationship between eWOM and product sales. It is conceivable that the benefits of WOM extend not only increasing revenue but also enhancing profitability, which has been relative neglected in the previous research. To fill this gap, the present study sought to examine the relationship between eWOM and firms’ profitability. A third limitation is that most prior studies (e.g., Chevalier & Mayzlin, 2006; Liu, 2006) have only tested the uni-directional impact of

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