

7-1-2013

# Analyzing Online Customer Reviews - An Interdisciplinary Literature Review And Research Agenda

Manuel Trenz

*University of Augsburg, Augsburg, Germany, manuel.trenz@wiwi.uni-augsburg.de*

Benedikt Berger

*University of Mannheim, Mannheim, Germany, benedikt.berger@bwl.lmu.de*

Follow this and additional works at: [http://aisel.aisnet.org/ecis2013\\_cr](http://aisel.aisnet.org/ecis2013_cr)

---

## Recommended Citation

Trenz, Manuel and Berger, Benedikt, "Analyzing Online Customer Reviews - An Interdisciplinary Literature Review And Research Agenda" (2013). *ECIS 2013 Completed Research*. 83.

[http://aisel.aisnet.org/ecis2013\\_cr/83](http://aisel.aisnet.org/ecis2013_cr/83)

This material is brought to you by the ECIS 2013 Proceedings at AIS Electronic Library (AISEL). It has been accepted for inclusion in ECIS 2013 Completed Research by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# **ANALYZING ONLINE CUSTOMER REVIEWS – AN INTERDISCIPLINARY LITERATURE REVIEW AND RESEARCH AGENDA**

Trenz, Manuel, University of Augsburg, Universitätsstr. 2, 86159 Augsburg, Germany,  
manuel.trenz@wiwi.uni-augsburg.de

Berger, Benedikt, University of Mannheim, Schloss, 68131 Mannheim, Germany,  
bberger@bwl.uni-mannheim.de

## **Abstract**

*Online customer reviews increasingly exert influence on customers' purchase decisions when shopping online and give new importance to the concept of word-of-mouth. This is reflected in a growing body of academic literature across varying disciplines that draws on online customer reviews as source of information. However, these studies apply varying methods and obtain contradicting results. We conduct a systematic and interdisciplinary literature review to examine how online customer review data is used in academic research and which insights these studies provide. Analyzing 49 journal articles we find that the most studies investigate online customer reviews' effect on sales, review helpfulness or review manipulation. Furthermore, the variety of product categories and review websites these studies receive their information from is rather limited. The results reveal that previous research can only provide an imperfect understanding of the impact of electronic word-of-mouth on business. We therefore develop a twofold research agenda with regards to (a) studies investigating customer reviews and its effects and (b) issues with respect to the use of customer reviews as a data source in academic research.*

*Keywords: e-commerce, social media, eWOM, online customer reviews, literature review, research agenda.*

## 1 Introduction

Customer reviews have become an essential part of the day-to-day business of most e-commerce platforms on the internet. According to a survey by the Pew Research Center's Internet & American Life Project, 58% of the American adults research products and services on the internet prior to the purchase decision and 24% post comments or reviews online afterwards (Jansen, 2010). The growing importance of electronic word-of-mouth (eWOM) for e-commerce success is reflected by a growing body of research that draws upon online customer review data.

The concept of word-of-mouth (WOM) has been part of the marketing literature since the middle of the 20th century (Katz and Lazarsfeld, 1955) but gained additional importance with the rise of the internet. Because the conventional limitation to a local social network and the fleeting character of WOM yielded a broad reach and long term accessibility (Breazeale, 2009; Chen and Xie, 2008; Davis and Khazanchi, 2008; Duan et al., 2008a), eWOM became a reliable source of customer information for various research purposes (Li and Hitt, 2010). Early scientific contributions towards the changes that WOM undergoes in an online context have been made by Dellarocas (2003) as well as Godes and Mayzlin (2004). The marketing and information systems (IS) literature on online customer reviews subsequently focused on the relationship between these reviews and sales (Chevalier and Mayzlin, 2006; Clemons et al., 2006; Dellarocas et al., 2007). Later on, further topics like bias or manipulation in online customer reviews (e.g. Hu, Liu, et al., 2011; Li and Hitt, 2008), or review helpfulness (e.g. Mudambi and Schuff, 2010) have been investigated. Apart from this, online customer review data is also examined in tourism or medical journals

Despite the large number of publications and the large number of issues addressed using customer review data, a structured analysis of this research stream is lacking. Such an analysis of previous research is especially valuable because the findings are distributed across multiple disciplines and are therefore difficult to survey. Two attempts to assess the literature on eWOM have been conducted so far (Breazeale, 2009; Cheung and Thadani, 2012). The review by Breazeale (2009) focusses solely on marketing literature and henceforth misses out important insights from other research areas named above. In turn, the literature review of Cheung and Thadani (2012) differs from ours in two ways. First, their study covers various forms of eWOM while we focus on online customer reviews in particular. Second, Cheung and Thadani (2012) restrict their literature review to studies investigating eWOM at an individual level, i.e., as a communication process between the reviewer and the reader. We fill these gaps by conducting a broad, systematic, and interdisciplinary review on studies that use genuine online customer reviews on products as their data source. We determine the scope and sources of online customer review data that has been observed, what research questions have been sought to answer using such a dataset, which methods have been applied to approach it, and what insights have been generated. These findings can guide further research to more successfully exploit this unique data to generate scientific and practical insights.

The remainder of this paper is organized as follows. In the theoretical foundations we provide basic definitions. After explaining the methodology of the systematic literature review we present and critically discuss our results in a concept-centric manner as suggested by Webster and Watson (2002). Finally, we summarize our findings and derive an extensive research agenda for the use of customer review data in academic research.

## 2 Theoretical Foundations

The most widespread definition of eWOM communication stems from Hennig-Thurau et al. (2004) who describe it "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." Following this definition, online and offline word-of-mouth both report personal product evaluations from the first-person perspective and address other customers (Dellarocas et al., 2010).

However, eWOM uniquely enables customers to exchange information about a product beyond geographic or temporal limitations (Chen et al., 2011; Dellarocas et al., 2010). Further differences between electronic and traditional WOM are the anonymity of the reviewer and the increased volume and the diversity of judgments (Pan and Zhang, 2011). While the definition by Hennig-Thurau et al. (2004) covers various forms of eWOM such as forums or blogs (Duan et al., 2008a) we are focusing especially on online customer reviews as an important part of the concept of eWOM.

In particular, online customer reviews can be regarded as “peer-generated product evaluations posted on company or third party websites” (Mudambi and Schuff, 2010). Usually, the customer is offered to provide a rating on a specific scale as a measure of the overall evaluation and to write a text of arbitrary length that may serve as a justification for the rating (Lee et al., 2011; Mudambi and Schuff, 2010). In contrast to other forms of eWOM, customer reviews have become an important tool for online marketplaces and sellers. Online customer reviews are of higher relevance than other forms of marketing communication and can be used to increase trust in an online shop (Chen and Xie, 2008; Dellarocas, 2003). Two important concepts closely related to online customer reviews are review manipulation or fraud and review helpfulness. Following Hu et al. (Hu, Bose, et al., 2011) we refer to review fraud or manipulation if vendors, producers or any other person that holds a stake in the product or the company behind it engage in writing online customer reviews with the aim to inflate the rating or to improve the awareness of the product while hiding behind the identity of an anonymous customer. The helpfulness of an online customer review is usually represented by the ratio of positive helpfulness votes to total helpfulness votes for a particular review. This vote is obtained from the reader by simply asking question whether this review was helpful or not (Mudambi and Schuff, 2010; Pan and Zhang, 2011). Because many customer review systems rank reviews according to their helpfulness, this concept gains additional relevance (Cao et al., 2011).

### 3 Methodology

The review is conducted along the eight-step guide for systematic literature reviews provided by Okoli and Schabram (2010) as well as the guide for literature reviews in the IS field by Webster and Watson (2002). We choose a broad scope for this literature review and did not restrict our research to a single discipline or a certain set of journals. Instead we conduct a key word search in abstracts of a broad range of publications via three main literature search services to assure the multidisciplinary approach. For this purpose we develop a comprehensive set of key words including synonyms as well as singular and plural terms for online customer reviews and eWOM. To guarantee appropriateness of the reviewed material we only search for peer refereed publications. We set January 1st 2012 as a publication deadline for articles to be included in our sample to avoid repeated searches until the completion of the review. Nevertheless, we allow for articles that were in press and published online only at that time. We obtain 380 results from our search on EBSCOhost, 85 results on ScienceDirect and 187 results on ProQuest in this chronological order. Due to the fact that 67.9 % of the results from ScienceDirect and 68.1 % of the results from ProQuest are redundant with prior search we decide to stop our search at this stage.

Using a set of exclusion rules, which we refine continually following Okoli and Schabram (2010), we screen the abstract and, if necessary, the full text of each article for inclusion. These rules assure that only studies drawing on original online customer product review data are included in our sample. We explicitly exclude lab experiments and tests of text mining algorithms because in these cases the object being studied is rather a customer or an algorithm than review data itself. After the practical screening we remain with a total of 77 articles. As expected, we receive a sample including studies from various disciplines such as IS, Marketing, Operations Research and Management Science, Accountancy, Tourism and Hospitality Management or Health Care Sciences. Instead of relying on a self-developed in-depth quality appraisal of each included article as suggested by Okoli and Schabram (2010), we rely on external quality indicators. Owing to the interdisciplinarity of our sample we opt for the 2010 Citation Impact Factors from the Journal Citation Reports as presented in the ISI Web of Knowledge

by Thomson Reuters which is available for many important journals across disciplines. Journals that are neither listed in the Social Science Edition nor the Science Edition of the Journal Citation Report are excluded from the sample. We set an Impact Factor of 1.0 as minimum for journals to be included in our final set of literature and remain with 49 articles. To back-up our sampling procedure we obtain the journal ratings from the Association of Business Schools (ABS) Journal Quality Guide (Harvey et al., 2010) and the VHB-JOURQUAL2.1 of the German Academic Association for Business Research (2011). These additional quality indicators underpin our selection.

We organize the analysis and synthesis of the literature using a concept matrix which we steadily adjust during our work (Webster and Watson, 2002). The concepts are derived iteratively based on the reviewed papers. The matrix categorizes the research topics, product categories the analyzed reviews stem from, data sources, product and review data extracted, as well as several properties of the dataset and methodology.

## **4 Results**

We present our results along the concept matrix that we used for the assessment of our final set of literature. Because our space is limited and the tabulation of the whole concept matrix might not add adequate value, we depict it in the form of a summarizing table (cf. Table 1). Although our review covers 49 top journal articles we analyze 55 entities because six of the articles either consist of two distinct studies (Pan and Zhang, 2011), conduct the same analysis with two different datasets (Chen et al., 2011; Dellarocas et al., 2010; Hu et al., 2012) or apply two separate models on the same data (Forman et al., 2008; Hu, Liu, et al., 2011). In addition, we want to note that two articles by Duan et al. (2008a; 2008b) use the same data and examine similar research questions while using slightly different empirical models.

### **4.1 Research Topics and Findings**

We identify three major topics in our set of articles: effect on sales, bias and fraud, and review helpfulness. We adopt this structure in the following to present our findings.

#### **4.1.1 Effect on Sales**

The most popular question examined is whether and to what extent the presence of online customer reviews has an effect on the sales of the reviewed products. Concerning the influence of average rating, or review valence, on revenue, results are mixed: whereas Archak et al. (2011), Chevalier and Mayzlin (2006), Chintagunta et al. (2010), Clemons et al. (2006), Li and Hitt (2008), Yang and Mai (2010), and Ye et al. (2009; 2011) affirm a positive relationship between the average rating of a product and its sales, others neglect a significant correlation between these variables (Duan et al., 2008b; Forman et al., 2008; Park et al., 2012). In contrast, the positive influence of online review volume on revenue is heavily supported (Archak et al., 2011; Chevalier and Mayzlin, 2006; Dellarocas et al., 2007; Duan et al., 2008b; Forman et al., 2008; Li and Hitt, 2008) with only Clemons et al. (2006) and Chintagunta et al. (2010) obtaining no significance for this effect. The findings by Archak et al. (2011), Clemons et al. (2006), and Hu et al. (2009) indicate that the variance or standard deviation in online customer ratings serves as a more accurate predictor of sales growth than the simple average, which again is negated by Chintagunta et al. (2010) and Ye et al. (2011). Clemons et al. (2006) observe that the average of the top quartile ratings seems to have stronger positive influence on sales growth than the average of the bottom quartile has a negative one. On the other hand, a follow-up study of Clemons and Gao (2008) identifies the absence of strongly negative reviews as an important predictor for online sales. This is in line with the findings by Chevalier and Mayzlin (2006) who state that an additional negative review has more power to decrease sales than an additional positive review has power to increase them.

Concept	Outcome	Abs.	Rel.
Research Topics	Effect on Sales	22	40.0 %
	Bias and Fraud	10	18.2 %
	Review Helpfulness	10	18.2 %
	Other	17	30.9 %
Product Categories	Books	14	25.5 %
	Movies	8	14.5 %
	Software	5	9.1 %
	Video Games	5	9.1 %
	DVDs	6	10.9 %
	CDs	3	5.5 %
	Digital Cameras	10	18.2 %
	Mobile Phones	4	7.3 %
	Hotels	5	9.1 %
	Other	21	38.2 %
	Data Source	Amazon	25
Barnes & Nobles		2	3.6 %
TripAdvisor		3	5.5 %
Yahoo! Movies		7	12.7 %
CNET		5	9.1 %
Epinions		5	9.1 %
Other		15	27.3 %

  

Concept	Outcome	Abs.	Rel.
Unit of Analysis	Product	30	54.5 %
	Review	22	40.0 %
Product-related Data extracted	Number of Reviews	31	56.4 %
	Average Rating	29	52.7 %
	Standard Deviation	8	14.5 %
	Price	21	38.2 %
	Sales	27	49.1 %
	Release Date	16	29.1 %
	Other	28	50.9 %
Review-related Data extracted	Rating	30	54.5 %
	Length	11	20.0 %
	Helpfulness Votes	17	30.9 %
	Reviewer Details	11	20.0 %
	Date and Time	18	32.7 %
	Text	23	41.8 %
	Others	15	27.3 %

Table 1. Results of the literature analysis (n=55)

Several possible explanations for these contradicting findings exist. Duan et al. (2008a) argue that eWOM is not only a determinant but also a result of retail sales and thus has to be accounted for as an endogenous factor. They suggest that average review valence has an indirect impact on sales because it is positively correlated to review volume. Thus, ignoring the bilateral relationship between review volume and revenue is likely to cause a bias and lead to an overestimation of the effect of review valence on sales. Chintagunta et al. (2010) explain different results of previous studies with the aggregation of data across different markets. Another reason for the inconsistent findings could be the lacking consideration of an interaction effect with the product variety offered (Zhou and Duan, 2012). Finally, Dellarocas et al. (2007) claim that both volume and valence are significant predictors of sales if properly modeled.

Further insights are provided by Zhu and Zhang (2010) and Duan et al. (2009) who confirm positive effects of eWOM on sales only for less popular products. Dellarocas et al. (2010) show that users prefer to rate products which are less available on the market or which already have been reviewed extensively. The distinction between more and less popular products is closely related to the concept of the long tail. This concept is analyzed with regards to online customer reviews by Lee et al. (2011) and Zhou and Duan (2012). Drawing on online review volume Lee et al. (2011) propose that the long tail theory only partly holds for products that are assessed objectively because people tend to follow other customers' advice in this case.

#### 4.1.2 Bias and Fraud

Systematic differences in rating or purchase behavior may introduce a bias which is one of the major concerns named by authors with regard to the limitations of their studies (Archak et al., 2011; Clemons et al., 2006; Decker and Trusov, 2010; Dellarocas et al., 2010; Duan et al., 2008a; Hu and Li, 2011; Lee et al., 2011; Money et al., 2011). It is generally acknowledged that online product ratings are overly positive on average (Chevalier and Mayzlin, 2006; Dellarocas et al., 2010; Duan et al., 2008b; Duan et al., 2009; Forman et al., 2008; Hu et al., 2009; Hu, Liu, et al., 2011; Li and Hitt, 2008; Li and Hitt, 2010; Mudambi and Schuff, 2010; Pan and Zhang, 2011; Zhu and Zhang, 2010). Hu et al. (2009) identify a J-shaped distribution of product ratings with extreme ratings dominating and less

average ratings. They explain this observation with the notion of two distinct self-selection biases: On the one hand, people who think a product is of very low or extraordinary quality are more likely to write a review than those with an average meaning – which they refer to as “underreporting bias” (Hu et al., 2009; Koh et al., 2010). On the other hand, extremely positive reviews outnumber extremely negative reviews because people with lower product evaluation prior to purchase will neither buy the product nor engage in writing a negative review – the “purchase bias” (Hu et al., 2009). Another important characteristic of online customer ratings is, that they usually tend to decrease with time elapsing (Duan et al., 2008b; Hu, Liu, et al., 2011; Li and Hitt, 2008; Zhu and Zhang, 2010). Li and Hitt (2008) attribute this phenomenon to idiosyncratic customer preferences. They reason that early adopters, and therefore early reviewers, might have preferences towards a product which favour positive reviews. This introduces a positive review bias of early product reviews that tends to decline with more customers rating the product. Yet another form of bias might be caused by reviews’ sensitiveness to price and changes in price over time (Li and Hitt, 2010).

A second concern regarding the reliability of reviews is the possibility of review manipulation (Chevalier and Mayzlin, 2006; Decker and Trusov, 2010; Pan and Zhang, 2011). Studying book reviews on Amazon, Hu et al. (2012) estimate that about 10 % of the books are subject to manipulated reviews. Hu et al. (2011) claim review manipulation to be an alternative explanation for decreasing average reviews over time as it becomes more costly to influence the average product ratings the more reviews already have been published. Based on their empirical analysis neither self-selection bias nor review manipulation can be ruled out as cause of this effect, whereas none of both explains it to the full extent. According to the observations by Hu et al. (2011), review manipulation is more likely for popular and high priced products as well products with less helpful reviews. Nevertheless, up until now it is still uncertain to which extent customers are able to correct review biases or manipulation when assessing eWOM (Hu, Liu, et al., 2011; Li and Hitt, 2008).

#### 4.1.3 Review Helpfulness

The last topic we used to categorize our literature set is review helpfulness. Mudambi and Schuff (2010), Forman et al. (2008), and Pan and Zhang (2011) conclude that review length has a positive effect on helpfulness and that this effect is stronger for search goods than for experience goods. In contrast, Korfiatis et al. (2012) find stylistic elements to be more important than the extensiveness of the text. Pan and Zhang (2011) and Cao et al. (2011) find a positive relationship between review extremity and helpfulness especially for experience goods while the results by Willemsen et al. (2011) suggest exactly the opposite. Mudambi and Schuff (2010) and Forman et al. (2008) observe a positive correlation between review helpfulness moderate ratings for experience goods. Characteristics of the reviewer influence review helpfulness as well (Forman et al., 2008; Pan and Zhang, 2011). The more the reviewers reveal about their personality the more helpful are their reviews to other customers who implement this information in their purchase decisions (Forman et al., 2008). In the second study of their paper Pan and Zhang (2011) arrive at the result that reviews by the least and most innovative reviewers are less helpful than those of reviewers with average innovativeness. Regarding the effect of message sidedness on review helpfulness, empirical evidence is contradicting. While Forman et al. (2008) approximated equivocality using the extremity of the review rating, Schlosser (2011) and Willemsen et al. (2011) perform a content analysis to measure whether a review is one- or two-sided. Although two-sided reviews appear to be more helpful in general, this effect is enhanced if the review is accompanied by a moderate review instead of an extreme one. We can summarize that the effects of both review length as well as review extremity and message sidedness on review helpfulness have not been agreed upon so far.

#### 4.1.4 Other

14 articles could not be allocated to one of the three main topics. Chaves et al. (2011), Hughes and Cohen (2011), Yang and Fang (2004), and Yang et al. (2004) conduct content analyses to extract

quality dimensions important to customers, while Chen and Xie (2008) and Zhang et al. (2010) study the differences between customer and professional reviews. Amongst the others, Feng and Papatla (2011) and Chen et al. (2011) examine the relationship between eWOM and traditional marketing and Nelson (2008) investigates the anxiety of parents about their kids reflected in online customer reviews.

## **4.2 Product Categories**

The most mentioned limitation in the studies we review is that the results are restricted to the particular product category examined (Cao et al., 2011; Duan et al., 2008b; Feng and Papatla, 2011; Forman et al., 2008; Hu et al., 2012; Korfiatis et al., 2012; Lee et al., 2011; Li and Hitt, 2010; Li et al., 2010; Mudambi and Schuff, 2010; Pan and Zhang, 2011; Park et al., 2012; Schlosser, 2011; Yang and Mai, 2010; Zhou and Duan, 2012). The decision for a certain kind of product is in many cases related to inherent characteristics of these goods. Generally, a minimum level of popularity and therefore number of reviews is required (Chen and Xie, 2008; Clemons et al., 2006; Hu et al., 2012; Hughes and Cohen, 2011; Lee et al., 2011; Mudambi and Schuff, 2010; Pan and Zhang, 2011). Since the importance of eWOM for sales is supposed to be higher in industries like the movie or video game industry, a review analysis in these markets is more promising than in others (Dellarocas et al., 2010; Duan et al., 2008a; Zhu and Zhang, 2010). Moreover, products for which the Internet is the predominant distribution channel are appropriate for online customer review analysis (Chen and Xie, 2008). To use a product category that already has been focused on offers the chance to draw comparisons with prior findings (Duan et al., 2008a). Further reasons are data availability (Dellarocas et al., 2010; Duan et al., 2008b) or the absence of monetary incentives for review manipulation (Cao et al., 2011).

In the end, the choice for a product category depends on the purpose of the study. Books, DVDs, CDs, video games or software are usually supposed to represent experience products while digital cameras and mobile phones are common examples for search goods. This enables researchers to measure differences in effects for search and experience goods (Duan et al., 2009; Pan and Zhang, 2011; Sen and Lerman, 2007; Willemsen et al., 2011; Yang and Mai, 2010). Clemons et al. (2006) (2006) choose the craft beer industry for their investigations because it is a repeat purchase product which allows for an analysis of online customer reviews on repeated sales. Dellarocas et al. (2010) study the propensity to write a review after consumption and work with movie data because movies tend to be rated soon after watching them.

## **4.3 Data Sources**

The variety of data sources is rather limited with 39 out of 55 studies relying on six different review websites from various industries and Amazon being the most popular one. Only a minority of the authors justifies the selection of the particular review website they choose (Cao et al., 2011; Duan et al., 2009; Forman et al., 2008; Hu et al., 2012; Hughes and Cohen, 2011; Jeacle and Carter, 2011; Li et al., 2010; Pan and Zhang, 2011; Park et al., 2012; Zhang, Ye, et al., 2010; Zhu and Zhang, 2010). Unrestricted accessibility of the entire review history serves as an essential requirement (Cao et al., 2011; Hughes and Cohen, 2011). The major criterion is the size or popularity of the review platform because as more products and reviews are available a more elaborate sampling is possible (Cao et al., 2011; Duan et al., 2009; Forman et al., 2008; Jeacle and Carter, 2011; Koh et al., 2010; Pan and Zhang, 2011; Park et al., 2012; Zhu and Zhang, 2010). The type and currency of the explicit figures for customer review and sales data which are provided by the website are important determinants for the selection as well (Cao et al., 2011; Jeacle and Carter, 2011). Further appreciated features are a sophisticated product categorization and multiple sort options within these (Cao et al., 2011; Duan et al., 2009; Jeacle and Carter, 2011). Another important factor is the censorship of reviews which Pan and Zhang (2011) and Zhang et al. (2010) suppose is on a minimum level on Amazon in comparison with other online retailers. Hughes and Cohen (2011) and Yang et al. (2004) use search engines to determine an appropriate review website.

With regards to the comparability of results from different review platforms it has to be mentioned that differences in the rating systems exist. While Amazon, Barnes and Noble, CNET and TripAdvisor operate a five-star ratings system (Cao et al., 2011; Chaves et al., 2011; Chevalier and Mayzlin, 2006; Pan and Zhang, 2011), Booking.com (Chaves et al., 2011) and GameSpot.com (Zhu and Zhang, 2010) use ranges from 1 to 10 whereas on Yahoo! Movies users rate by letters from A to F (Schlosser, 2011).

#### **4.4 Data Extracted**

Further important aspects that differentiate articles from each other are the figures that actually have been derived from the product review data. This especially depends on whether the product or the review is the unit of analysis. We note that product-related data such as the number of reviews or the average rating is sometimes observed directly on the product level (Chen et al., 2011; Chen and Xie, 2008; Chevalier and Mayzlin, 2006; Duan et al., 2009; Forman et al., 2008; Lee et al., 2011; Li and Hitt, 2008; Li and Hitt, 2010; Park et al., 2012; Ye et al., 2009; Zhu and Zhang, 2010) and sometimes aggregated from review-related data (Archak et al., 2011; Dellarocas et al., 2010; Duan et al., 2008b; Ghose and Ipeirotis, 2011; Hu, Bose, et al., 2011; Hu, Liu, et al., 2011; Zhang, Craciun, et al., 2010). The latter studies therefore use the product as their unit of analysis but still extract review-related data.

Review volume, review valence and sales are the most often used product-related figures. This fact is not surprising as this information is needed to study the effect of online customer reviews on sales or review manipulation. The price of the product is usually needed to control for the effect of prices on sales (Archak et al., 2011; Chevalier and Mayzlin, 2006; Feng and Papatla, 2011; Forman et al., 2008; Ghose and Ipeirotis, 2011; Hu et al., 2009; Park et al., 2012; Willemsen et al., 2011; Yang and Mai, 2010; Ye et al., 2009; Ye et al., 2011; Zhou and Duan, 2012; Zhu and Zhang, 2010). The product release date – often in combination with review date and time – is necessary to differentiate the age of products (Forman et al., 2008) and thus their stage in the product lifecycle (Chen and Xie, 2008; Li and Hitt, 2010) or diffusion (Duan et al., 2009), to rule out pre-release reviews (Dellarocas et al., 2010) or to construct the sample (Li and Hitt, 2008). Additional information such as product features (Chen and Xie, 2008; Li and Hitt, 2010) or certain categorizations like the genre of a movie (Dellarocas et al., 2010; Schlosser, 2011) are added depending on the purpose of the study. As no sales data for Amazon is available, most studies using customer reviews from Amazon rely on the sales rank as a proxy for sales (e.g. Archak et al., 2011; Chevalier and Mayzlin, 2006).

For the review-related data we perceive that early studies focus on the review rating which is criticized by Archak et al. (2011) and Schlosser (2011). Archak et al. (2011) argue that one-dimensional ratings are not capable of reflecting the multiple aspects of product experience and evaluation by a customer. Thus, over time the review text became a matter of deeper interest (Cao et al., 2011) and is usually approached by content analysis (Archak et al., 2011; Chaves et al., 2011; Hughes and Cohen, 2011; Money et al., 2011; Pan and Zhang, 2011; Schlosser, 2011; Willemsen et al., 2011) or text mining (Cao et al., 2011; Decker and Trusov, 2010; Ghose and Ipeirotis, 2011; Korfiatis et al., 2012; Li et al., 2010; Xu et al., 2011). Review length is primarily examined in connection with review helpfulness (Ghose and Ipeirotis, 2011; Mudambi and Schuff, 2010; Pan and Zhang, 2011; Willemsen et al., 2011; Zhang, Craciun, et al., 2010). Further review attributes obtained are for example information about the reviewer's preferences (Clemons and Gao, 2008) or multidimensional ratings (Chintagunta et al., 2010; Duan et al., 2008b; Schlosser, 2011; Yang and Mai, 2010).

## **5 Discussion**

Our systematic literature review uncovered 49 high quality journal articles from a variety of disciplines that use customer review data. The analysis reveals that online customer reviews are a topic of growing interest in many research areas. While only 16 articles were published between 2004 and 2009, this number tremendously increased within the last years with 33 studies being published in 2010 and 2011. Online customer review data is used for various purposes. The majority of the studies we review draws upon online customer review data to examine either the effect on sales, review

helpfulness, or biases and fraud in eWOM. Other approaches concentrate on a particular business case and study customers' opinion on certain products. The results of the studies are not throughout consistent and only few phenomena such as the overly average customer rating are generally agreed upon. The causal relations between a product's sales and reviews, the review helpfulness and possible manipulation seem to be intertwined and depending on the business context. We observe that so far research is restricted to a relatively limited set of products and review data sources. Our understanding of the characteristics of online customer reviews and especially their role in the process of the purchase decision making remains restricted.

Based on our in-depth insights, we therefore derive a research agenda that is twofold. First, we focus on the research topics that have been addressed using customer review data. We use our literature review to derive gaps in this area and outline important research questions that should be addressed (cf. Table 2). Second, we focus on the data that has been used to derive these insights. We identify potential biases in previous studies and formulate research questions to address these concerns (cf. Table 3).

<b>Research Topic</b>	<b>Findings in literature review</b>	<b>Research questions to be addressed</b>
Effect on Sales	<ul style="list-style-type: none"> <li>• Inconsistencies between findings of different studies with regards to the impact of customer reviews on sales.</li> </ul>	<ul style="list-style-type: none"> <li>• How can the inconsistencies between previous studies be resolved? What are the major drivers?</li> </ul>
	<ul style="list-style-type: none"> <li>• The direction of the causal relationship between sales, prices and review valence is disputable.</li> </ul>	<ul style="list-style-type: none"> <li>• Is there a reciprocal effect between sales, prices and review valence? How are firms' pricing strategies influenced by sales and review valence?</li> </ul>
	<ul style="list-style-type: none"> <li>• Most paper focus on one vendor that is influenced by the customer reviews. However, the impact on the whole market remains unclear.</li> </ul>	<ul style="list-style-type: none"> <li>• Does the influence of customer reviews differ between different vendor types and qualities?</li> </ul>
Bias and Fraud	<ul style="list-style-type: none"> <li>• A variety of biases such as the underreporting, purchase or price bias have been identified. Further research on the impact of these biases is crucial to ensure the validity of results derived from customer reviews. Deliberate manipulations are largely ignored.</li> </ul>	<ul style="list-style-type: none"> <li>• How does the impact of the identified biases differ between different systems? How do incentives for customer reviews influence the occurrence of the biases? How can context specific information be used to extend the usefulness of the aggregated product rating? How can review manipulations be detected?</li> </ul>
Review Helpfulness	<ul style="list-style-type: none"> <li>• Studies have mainly focused on identifying drivers of helpfulness ratings based on existing reviews.</li> </ul>	<ul style="list-style-type: none"> <li>• How can customer review systems be designed to incentivize more helpful reviews? How does indicated helpfulness influence customer decision making?</li> </ul>

*Table 2. The effect of customer reviews: Findings and Research Opportunities*

The results of this paper have important implications for researchers on eWOM. We analyze the state of the art in the literature based on online customer reviews. To our best knowledge, no study with similar contributions on such a broad literature base has been conducted so far. We reveal that obtaining reliable and generalizable results in this research area is, despite the mass of publicly available data, very complex and the common knowledge generated so far is rather limited. In order to fully exploit these promising datasets, we provide an agenda of emerging starting points for new research projects. The detailed insights on study designs and methods enable researchers to make informed decisions about their methodology in future studies, but call for researchers' attention to potential pitfalls when relying on previous findings in this area.

Findings in literature review	Research questions to be addressed
<ul style="list-style-type: none"> <li>• Most studies focus on a similar set of products, mostly entertainment, electronics and books.</li> </ul>	<ul style="list-style-type: none"> <li>• What is the impact of customer reviews in the context of different product groups (e.g. clothes, services)?</li> </ul>
<ul style="list-style-type: none"> <li>• Most studies are limited to a small set of review websites. Therefore, we doubt that the current research results are applicable to customer reviews general. Furthermore, studies mainly have focused on products or reviews as unit of analysis and neglected the review system artifact.</li> </ul>	<ul style="list-style-type: none"> <li>• What is the impact of the customer review system itself? How do differences in the design or the functionality influence the creation and the use of customer reviews?</li> </ul>
<ul style="list-style-type: none"> <li>• Most of the studies are conducted on an Anglo-American or Asian background. Little is known about the influences of online customer reviews in different markets (except Chaves et al. (2011), Koh et al. (2010)).</li> </ul>	<ul style="list-style-type: none"> <li>• What is the impact of intercultural differences on (a) the content of reviews, (b) its length, (c) perceived helpfulness, (d) participation in reviewing activities, and (e) the influence of customer reviews on sales?</li> </ul>

Table 3. Customer reviews as a data source: Findings and Research Opportunities

## References

- Archak, N., Ghose, A., Ipeirotis, P. G. (2011). Deriving the Pricing Power of Product Features by Mining Consumer Reviews. *Management Science*, 57 (8), 1485–1509.
- Breazeale, M. (2009). Word of mouse. *International Journal of Market Research*, 51 (3), 297–318.
- Cao, Q., Duan, W., Gan, Q. (2011). Exploring determinants of voting for the “helpfulness” of online user reviews: A text mining approach. *Decision Support Systems*, 50 (2), 511–521.
- Chaves, M. S., Gomes, R., Pedron, C. (2011). Analysing reviews in the Web 2.0: Small and medium hotels in Portugal. *Tourism Management*, (in press), 1–2.
- Chen, Y., Fay, S., Wang, Q. (2011). The Role of Marketing in Social Media: How Online Consumer Reviews Evolve. *Journal of Interactive Marketing*, 25 (2), 85–94.
- Chen, Y., Xie, J. (2008). Online Consumer Review: Word-of-Mouth as a New Element of Marketing Communication Mix. *Management Science*, 54 (3), 477–491.
- Cheung, C. M. K., Thadani, D. R. (2012). The impact of electronic word-of-mouth communication: A literature analysis and integrative model. *Decision Support Systems*, 54 (1), 461–470.
- Chevalier, J. A., Mayzlin, D. (2006). The Effect of Word of Mouth on Sales: Online Book Reviews. *Journal of Marketing Research*, 43 (3), 345–354.
- Chintagunta, P. K., Gopinath, S., Venkataraman, S. (2010). The Effects of Online User Reviews on Movie Box Office Performance: Accounting for Sequential. *Marketing Science*, 29 (5), 944–957.
- Clemons, E. K., Gao, G. “Gordon” (2008). Consumer informedness and diverse consumer purchasing behaviors: Traditional mass-market, trading down, and trading out into the long tail. *Electronic Commerce Research and Applications*, 7 (1), 3–17.
- Clemons, E. K., Gao, G. “Gordon”, Hitt, L. M. (2006). When Online Reviews Meet Hyperdifferentiation: A Study of the Craft Beer Industry. *Journal of Management Information Systems*, 23 (2), 149–171.
- Davis, A., Khazanchi, D. (2008). An Empirical Study of Online Word of Mouth as a Predictor for Multi-product Category e-Commerce Sales. *Electronic Markets*, 18 (2), 130–141.
- Decker, R., Trusov, M. (2010). Estimating aggregate consumer preferences from online product reviews. *International Journal of Research in Marketing*, 27 (4), 293–307.
- Dellarocas, C. (2003). The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms. *Management Science*, 49 (10), 1407–1424.
- Dellarocas, C., Gao, G. (Gordon), Narayan, R. (2010). Are Consumers More Likely to Contribute Online Reviews for Hit or Niche Products? *Journal of Management Information Systems*, 27 (2), 127–157.

- Dellarocas, C., Zhang, X., Awad, N. F. (2007). Exploring the value of online product reviews in forecasting sales: The case of motion pictures. *Journal of Interactive Marketing*, 21 (4), 23–45.
- Duan, W., Gu, B., Whinston, A. B. (2008a). The dynamics of online word-of-mouth and product sales—An empirical investigation of the movie industry. *Journal of Retailing*, 84 (2), 233–242.
- Duan, W., Gu, B., Whinston, A. B. (2008b). Do online reviews matter? — An empirical investigation of panel data. *Decision Support Systems*, 45 (4), 1007–1016.
- Duan, W., Gu, B., Whinston, A. B. (2009). Informational Cascades and Software Adoption on the Internet: an Empirical Investigation. *MIS Quarterly*, 33 (1), 23–48.
- Feng, J., Papatla, P. (2011). Advertising: Stimulant or Suppressant of Online Word of Mouth? *Journal of Interactive Marketing*, 25 (2), 75–84.
- Forman, C., Ghose, A., Wiesenfeld, B. (2008). Examining the Relationship Between Reviews and Sales: The Role of Reviewer Identity Disclosure in Electronic Markets. *Information Systems Research*, 19 (3), 291–313.
- German Academic Association for Business Research (2011). VHB-JOURQUAL 2.1. Retrieved 31. March, 2012, from <http://vhbonline.org/en/service/jourqual/vhb-jourqual-21-2011/>.
- Ghose, A., Ipeirotis, P. G. (2011). Estimating the Helpfulness and Economic Impact of Product Reviews: Mining Text and Reviewer Characteristics. *IEEE Transactions on Knowledge & Data Engineering*, 23 (10), 1498–1512.
- Godes, D., Mayzlin, D. (2004). Using Online Conversations to Study Word-of-Mouth Communication. *Marketing Science*, 23 (4), 545–560.
- Harvey, C., Kelly, A., Morris, H., Rowlinson, M. (2010). *Academic Journal Quality Guide*. The Association of Business Schools, London, United Kingdom.
- Hennig-Thurau, T., Gwinner, K. P., Walsh, G., Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the Internet? *Journal of Interactive Marketing*, 18 (1), 38–52.
- Hu, N., Bose, I., Gao, Y., Liu, L. (2011). Manipulation in digital word-of-mouth: A reality check for book reviews. *Decision Support Systems*, 50 (3), 627–635.
- Hu, N., Bose, I., Koh, N. S., Liu, L. (2012). Manipulation of online reviews: An analysis of ratings, readability, and sentiments. *Decision Support Systems*, 52 (3), 674–684.
- Hu, N., Liu, L., Sambamurthy, V. (2011). Fraud detection in online consumer reviews. *Decision Support Systems*, 50 (3), 614–626.
- Hu, N., Pavlou, P. A., Zhang, J. (2009). Overcoming the J-shaped Distribution of Product Reviews. *Communications of the ACM*, 52 (10), 144–147.
- Hu, Y., Li, X. (2011). Context-Dependent Product Evaluations: An Empirical Analysis of Internet Book Reviews. *Journal of Interactive Marketing*, 25 (3), 123–133.
- Hughes, S., Cohen, D. (2011). Can Online Consumers Contribute to Drug Knowledge? A Mixed-Methods Comparison of Consumer-Generated and Professionally Controlled Psychotropic Medication Information on the Internet. *Journal of Medical Internet Research*, 13 (3), e53.
- Jansen, J. (2010). *Online Product Research*. Pew Research Center's Internet & American Life Project, Washington, D.C.
- Jeacle, I., Carter, C. (2011). In TripAdvisor we trust: Rankings, calculative regimes and abstract systems. *Accounting, Organizations & Society*, 36 (4/5), 293–309.
- Katz, E., Lazarsfeld, P. F. (1955). *Personal Influence: the part played by people in the flow of mass communications*. Free Press, Glencoe, Illinois.
- Koh, N. S., Hu, N., Clemons, E. K. (2010). Do online reviews reflect a product's true perceived quality? An investigation of online movie reviews across cultures. *Electronic Commerce Research and Applications*, 9 (5), 374–385.
- Korfatis, N., García-Bariocanal, E., Sánchez-Alonso, S. (2012). Evaluating content quality and helpfulness of online product reviews: The interplay of review helpfulness vs. review content. *Electronic Commerce Research and Applications*, 11 (3), 205–217.
- Lee, J., Lee, J.-N., Shin, H. (2011). The long tail or the short tail: The category-specific impact of eWOM on sales distribution. *Decision Support Systems*, 51 (3), 466–479.

- Li, X., Hitt, L. M. (2008). Self-Selection and Information Role of Online Product Reviews. *Information Systems Research*, 19 (4), 456–474.
- Li, X., Hitt, L. M. (2010). Price Effects in Online Product Reviews: an Analytical Model and Empirical Analysis. *MIS Quarterly*, 34 (4), 809–831.
- Li, Y.-M., Lin, C.-H., Lai, C.-Y. (2010). Identifying influential reviewers for word-of-mouth marketing. *Electronic Commerce Research & Applications*, 9 (4), 294–304.
- Money, A. G., Barnett, J., Kuljis, J. (2011). Public Claims about Automatic External Defibrillators: An Online Consumer Opinions Study. *BMC Public Health*, 11 (Supplement 4), 332–345.
- Mudambi, S. M., Schuff, D. (2010). What Makes a Helpful Online Review? A Study of Customer Reviews on Amazon.com. *MIS Quarterly*, 34 (1), 185–200.
- Nelson, M. K. (2008). Watching Children. *Journal of Family Issues*, 29 (4), 516–538.
- Okoli, C., Schabram, K. (2010). A Guide to Conducting a Systematic Literature Review of Information Systems Research. *Sprouts: Working Papers on Information Systems*, 10 (26), 1–49.
- Pan, Y., Zhang, J. Q. (2011). Born Unequal: A Study of the Helpfulness of User-Generated Product Reviews. *Journal of Retailing*, 87 (4), 598–612.
- Park, J., Gu, B., Lee, H. (2012). The relationship between retailer-hosted and third-party hosted WOM sources and their influence on retailer sales. *Electronic Commerce Research and Applications*, 11 (3), 253–261.
- Schlosser, A. E. (2011). Can including pros and cons increase the helpfulness and persuasiveness of online reviews? The interactive effects of ratings and arguments. *Journal of Consumer Psychology*, 21 (3), 226–239.
- Sen, S., Lerman, D. (2007). Why are you telling me this? An examination into negative consumer reviews on the Web. *Journal of Interactive Marketing*, 21 (4), 76–94.
- Webster, J., Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, 26 (2), 13–23.
- Willemsen, L. M., Neijens, P. C., Bronner, F., De Ridder, J. A. (2011). ‘Highly Recommended!’ The Content Characteristics and Perceived Usefulness of Online Consumer Reviews. *Journal of Computer-Mediated Communication*, 17 (1), 19–38.
- Xu, K., Liao, S. S., Li, J., Song, Y. (2011). Mining comparative opinions from customer reviews for Competitive Intelligence. *Decision Support Systems*, 50 (4), 743–754.
- Yang, J., Mai, E. (Shirley) (2010). Experiential goods with network externalities effects: An empirical study of online rating system. *Journal of Business Research*, 63 (9/10), 1050–1057.
- Yang, Z., Fang, X. (2004). Online service quality dimensions and their relationships with satisfaction: A content analysis of customer reviews of securities brokerage services. *International Journal of Service Industry Management*, 15 (3), 302–327.
- Yang, Z., Jun, M., Peterson, R. T. (2004). Measuring customer perceived online service quality. *International Journal of Operations & Production Management*, 24 (11), 1149–1174.
- Ye, Q., Law, R., Gu, B. (2009). The impact of online user reviews on hotel room sales. *International Journal of Hospitality Management*, 28 (1), 180–182.
- Ye, Q., Law, R., Gu, B., Chen, W. (2011). The influence of user-generated content on traveler behavior: An empirical investigation on the effects of e-word-of-mouth to hotel online bookings. *Computers in Human Behavior*, 27 (2), 634–639.
- Zhang, J. Q., Craciun, G., Shin, D. (2010). When does electronic word-of-mouth matter? A study of consumer product reviews. *Journal of Business Research*, 63 (12), 1336–1341.
- Zhang, Z., Ye, Q., Law, R., Li, Y. (2010). The impact of e-word-of-mouth on the online popularity of restaurants: A comparison of consumer reviews and editor reviews. *International Journal of Hospitality Management*, 29 (4), 694–700.
- Zhou, W., Duan, W. (2012). Online user reviews, product variety, and the long tail: An empirical investigation on online software downloads. *Electronic Commerce Research and Applications*, 11 (3), 275–289.
- Zhu, F., Zhang, X. (Michael) (2010). Impact of Online Consumer Reviews on Sales: The Moderating Role of Product and Consumer Characteristics. *Journal of Marketing*, 74 (2), 133–148.