



The effect of product review balance and volume on online Shoppers' risk perception and purchase intention



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ABSTRACT

Online reviews are viewed as an important source of information enabling online shoppers to assess the quality of products/services. An important function of reviews is to reduce the risk and uncertainty that online buyers perceive relating to the product purchase. There are many aspects of reviews that may influence risk perception. This study examines the effect of social consensus in product reviews, represented by review balance and volume, on online shoppers' risk perception, uncertainty, attitude and subsequent purchase intention, using a quasi-experimental design and online questionnaires. Results show that the four proposed risk concerns are good predictors of online shoppers' overall risk in e-commerce; perceived risk is a major determinant of online shoppers' attitude toward purchasing, which in turn determines their purchase intention. However, no significant causal effect between perceived uncertainty and purchase intention was found.

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1. Introduction

It is widely accepted that online reviews are crucial components in today's online commerce. Different attributes of online reviews influence product sales. For example, large review volumes normally indicate popularity of products and are associated with increased product sales [1,2]; reviews with five stars stimulate product sales, while those with one star function in the opposite way [3,4]. It is generally accepted that review attributes or cues influence product sales by providing signals relating to the purchasing decision. However, the underlying psychological mechanisms by which cues influence the purchasing decision is not fully understood.

The literature contains several contradictions on the effect of review-related cues on purchase-related variables. For example, consider the effect of review valence (the positivity or negativity of reviews) on perceived helpfulness of reviews. Mudambi and Schuff found that reviews with extreme ratings are considered less helpful than those with moderate ratings when the product in question is an experience product (e.g., books & movies) but not a search product (e.g., computer, camera) [5]. However, Forman et al. suggest that reviews with

moderate ratings are less helpful than those with extreme ratings for books [6], which are typical experience goods.

The aforementioned discrepancy is not unique. Chevalier and Mayzlin [2] show that the negative effect of incremental negative reviews on product sales could outweigh the positive effect of incremental positive reviews in the context of book sales; that is, one-star reviews have a stronger impact on book sales than five-star reviews [1]. However, Clemons et al. claim that high-end reviews have a greater impact than low-end reviews in the context of beer sales. Clemons et al. explain that this discrepancy results from the difference in the attributes of these two products. Similarly, another interesting finding is that negative reviews can also lead to sales growth if these reviews are informative as well as detailed. That means if reviewers clearly outline pros and cons of products and provide sufficient information supporting their viewpoints, online reviews will definitely stimulate product sales even though the tone of the review content is negative. The conjecture from researchers was that negative attributes of products did not concern online shoppers as much as they did reviewers [3].

These examples show that the interaction effects of cues may be important when attempting to understand what signals customers attributes to cues. In particular, we choose two specific characteristics — *review balance* (the ratio of positive and negative reviews [7,8]) and *review volume* (the quantity of reviews) — for two reasons. First, we believe that the combination of review balance and volume reflects a *social consensus* towards a product or service that can override the impact of details in review content [12]. The impact of details in reviews on purchases can be mixed. For example, it is claimed that the increase

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of subjective expression in review content could drive up product sales [3], while this effect would be negative when reviews contain a mixture of slightly objective and highly subjective comments [3]. We believe that when a social consensus toward a product or service is formed, the effect of any specific detail within a review on the purchase decision may be less important. This is supported by the finding that a combination of high average rating together with high volume of reviews forms a good predictor for high product sales [9]. Second, we are also interested in the interactive effect between review balance and review volume. Many papers have addressed the importance of review balance and review volume [1–4,9–11], but make little mention of their interactive effect.

Our second objective is to explore the psychological mechanisms by which the social consensus represented by review balance and volume influences purchase intention. We believe that the social consensus influences potential online buyers' risk perceptions, in turn influencing uncertainty related to the purchase and purchase intention. Uncertainty in e-commerce is believed to arise from the possibility that transactions may not be completed due to fraud, counterfeit products, prolonged product delivery, and so on [13]. Online reviews provide a possible way for online shoppers to acquire information about products or services from a third party and thereby lessen associated uncertainty in purchase intention. Prior studies do indicate that high uncertainty in e-commerce is likely to result in high risk perceptions, in turn hindering online shoppers' intention to engage in transactions [13]. However, unlike most studies that simply treat uncertainty as a background concept, we provide a direct and systematic measure of uncertainty and associated risk perceptions.

The current study contributes to the extant literature in the following ways. First, we explore the effect of social consensus in reviews represented by two important cues relating to online reviews – *review balance* and *review volume*, as well as their interactive effect – on purchase intention. Second, we study the underlying psychological mechanisms by which the social consensus in reviews influences purchase intention. In particular, we posit that it works through mitigating risk and uncertainty perceptions, as well as shaping attitude towards the product. Third, we implement a direct measure of perceived risk in online transactions as well as exploring its potential antecedents. Based on the study by Laroche et al. of risk perceptions in general shopping [14], we measure how risk perceptions – such as perceived financial risk, social risk, performance risk, and psychological risk – constitute online shoppers' overall risk perception of online reviews and, in turn, impact their perception related to uncertainty and purchase intention.

The remainder of the paper is organized as follows. First, we review and discuss the literature related to risk perceptions, uncertainty, review balance and review volume and propose the research hypotheses and model examined in this study. Next, we explain the experiment design and data collection procedure employed in the study. In the following section, we present a summary and a discussion of our results. The paper concludes with a discussion of the contributions and limitations of this study.

2. Theoretical background and hypotheses

2.1. Approaches to studying the effect of online reviews

There are many interesting findings on the effect of reviews on online buyers. For example, negative reviews are considered more informative than positive reviews in the sense of helping consumers discriminate high-quality products from those of low quality [22]. If reviews with substantial supportive evidence are viewed as high-quality reviews and the ones with insufficient information are viewed as low-quality reviews, studies show that high-quality negative reviews have a stronger impact on the attitude toward products than low-quality ones. The attitude toward purchasing becomes less favorable as the number of high-quality negative reviews increases [22]. Negative

reviews may trigger sales *growth* if reviewers clearly outline the pros and cons of products and provide sufficient information supporting their viewpoints [3]. This is very interesting because in most of the findings of econometric models, negative reviews seem to always have a harmful influence on product sales growth. Yin et al. find that the discrete emotion, such as anger or anxiety, embedded in seller reviews may affect their helpfulness rating [27]. Baum and Spann show that the consistency between online reviews written by previous consumers and the recommendation from a recommender system are important [28]. All these findings indicate that the psychological processing of cues embedded in online reviews could vary conditionally, although the final outcome may look simple and straightforward.

Based on a review of studies since 2000, we find that present literature on online reviews can be briefly classified into three main streams. The first stream focuses mainly on the content of reviews and generally employs content-analysis techniques such as text mining to explore linguistic traits in reviews [34,35]. For example, Pavlou and Dimoka uncovered that semantic patterns embedded within seller reviews (reviews focusing on the service provided by sellers) can reveal reviewers' trust over sellers [36]. The second stream of studies normally employs econometric methods to build predictive models [5,37]. For example, Mudambi and Schuff built a Tobit regression model and found that the helpfulness of reviews is a mathematical function of review extremity and review depth moderated by product type [5]. The third stream studies consumer behavior related to online reviews through a psychological lens [38,39]. For instance, Awad and Ragowsky's study reveals that online reviews can alter online shoppers' trust belief by shifting their attitude toward sharing opinions and responding to others, though gender differences exist in this regard [39].

Each stream has its own focus and pros and cons. In particular, text mining methods are mainly used to *uncover underlying patterns* in online reviews while econometric models attempt to *predict* variables such as sales, sales growth, price premiums, product ratings among others based on review characteristics. These two approaches are more prevalent in mainstream studies of online reviews. Causal behavioral models are used to understand people's reaction to certain stimuli pertaining to online reviews and are better suited to *studying the psychological mechanisms* underlying the impact of review characteristics on purchase-related decisions. Our study uses this approach. In particular, we seek to show that social consensus in reviews represented by review balance and volume will influence shoppers' purchase intention by impacting their perceived risk and uncertainty, as well as their attitude toward purchasing the product.

2.2. Uncertainty and purchase intention in e-commerce

Uncertainty is considered an important factor determinant of buyers' willingness to engage in an online transaction and much effort has devoted to look for possible ways to mitigate it. Online shoppers' familiarity of websites impacts their trust in the vendor, and trust, in turn, is assumed to mitigate uncertainty [15]. Gregg and Walczak indicate that improving the quality of e-images or photos on webpages may be another effective way to reduce uncertainty [16]. In the context of online reviews, Weathers et al. [17] investigate the impact of information vividness in reviews on reducing uncertainty, based on comparison of reviews with pictures, no pictures, third party evaluation, and highly-controlled information. They find that for search products such as electronic devices, third-party reviews are comparatively more effective than other information sources in reducing uncertainty and enhancing information credibility; conversely, for experience products such as food, pictures in reviews and merchant-provided product reviews are found to be comparatively more effective. Unlike these studies, which simply treat uncertainty as a background concept without direct measurement, Pavlou et al. measure uncertainty directly, and show that online shoppers' trust, website informativeness, product diagnosticity, and social presence on a website can effectively lessen uncertainty in online

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