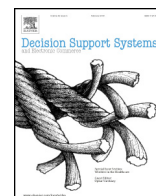




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Review popularity and review helpfulness: A model for user review effectiveness

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ABSTRACT

The wide adoption and perceived helpfulness of online user reviews on consumers' decision making have energized academic research on the assessment of review effectiveness. Although the literature probed the impacts of user reviews on various elements of review effectiveness independently, little research has done to examine them jointly. Inspired by communication theories, we conceptualize a framework for user review effectiveness in which we focus on the joint assessment of its first two elements: Review Popularity and Review Helpfulness. We develop our hypotheses regarding the effects of the user review determinants on both Review Popularity and Review Helpfulness, and further develop an operational model to empirically test our hypotheses using data collected from Amazon. Our study suggests that disentangling Review Popularity and Review Helpfulness in assessing review effectiveness is not only conceptually sounding, but also managerially beneficial. We find that Review Popularity is as important as Review Helpfulness in review effectiveness evaluations. Review determinants may play opposite roles on Review Popularity and Review Helpfulness (e.g., valence), and can drive review effectiveness via Review Popularity or Review Helpfulness or both. These findings offer new insights for various decision makers to harvest user review effectiveness in online markets.

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1. Introduction

As a powerful marketing communication mix for online markets with important impact on product sales (e.g., [1,8,9,16]) and consumers' willingness-to-pay (e.g., [29,30]), online user reviews have attracted much attention in the literature. A key managerial decision for involved decision makers (e.g., review hosting firms like Amazon) is managing user reviews to elevate user review effectiveness. The literature recognizes that review effectiveness is a complex construct which ultimate product sales or consumers' willingness-to-pay is an incomplete criterion for its evaluation and thus begins to study review helpfulness recently (e.g., [20,27,31]). Conceptually, this progression on understanding review effectiveness is parallel to the inquiry on the effectiveness of traditional marketing communication mix (e.g., advertising) since review helpfulness is an intermediate measure of review effectiveness preceding the ultimate measures of review effectiveness like product sales and consumers' willingness-to-pay.

The empirical studies on review helpfulness were largely motivated and made possible by the settings of review hosting firms which often provide consumers' judgment publically on whether a review is helpful. Take Amazon for example, for each user review, consumers not only read its rating and text content, but also see how many votes it attracts from their peer users and how many votes, among the votes attracted,

are helpful. The lack of an appropriate conceptualization of review helpfulness has perhaps facilitated different operationalizations of review helpfulness, mainly for a matter of convenience. For example, review helpfulness is often operationalized as the ratio of the number of helpful votes to the number of votes received (e.g., [8,14,20,31]). This operationalization of review helpfulness is conveniently constructed, but has a shortcoming: a review with high ratio of helpful votes does not always warrant its helpfulness to consumers. For example, the helpfulness of a review with only few votes which happen to be all helpful votes is not endorsed by consumers even if the review has the highest ratio of helpful votes at 100%. The literature recognizes the importance of the number of votes received in review helpfulness assessment, but is unclear on what role it plays in the assessment. Researchers have attempted to address the problem with different approaches. The first approach posits that the number of votes should play a weighting role in review helpfulness. Namely, review helpfulness should be measured by a product of the ratio of helpful votes and the number of votes, which leads to the operationalization of review helpfulness as the count of helpful votes (e.g., [3,5]). This idea is interesting, but incurs a similar caveat: a review receiving one hundred helpful votes is not perceived to be helpful to consumers if the review attracts one thousand votes in total, because only 10% are helpful votes. The second approach posits that the number of votes should play a sample selection role in review helpfulness (e.g., [14]). Namely, the ratio of helpful votes is sampled by those voted reviews, and thus should be corrected with sample selection in the estimation. However, limiting the role of number of votes as a

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sample selection ignores the behavioral underpinnings of consumers' voting and offers little help for review decision makers. The third approach posits that the number of votes should play no role in review helpfulness by assuming that the number of votes and the ratio of helpful votes are independent (e.g., [24]). Although this approach recognizes the difference between review readership and review helpfulness, it ignores the dependence between the two: a helpful vote of a review first has to be a vote of the review, but the reverse may not be true.

The different operationalizations of review helpfulness further guide different empirical specifications for studying how review determinants affect review helpfulness, resulting in mixed findings. We summarize in Table 1 the main characteristics of the studies on review helpfulness in the literature. Take the effect of review valence on review helpfulness for example, [20] argues that the conformity hypothesis drives the non-linearity of the effect which is also moderated by product types: the effect is U-shaped for search products (e.g., [8,20]), but inverted U-shaped for experience products (e.g., [14,20]). These studies significantly improve our understanding of the effect of review valence on review helpfulness, but questions remain. For example, it is unclear how the conformity hypothesis and the moderation of product types may apply for those studies where the effect of review valence on review helpfulness is either linearly increasing when review helpfulness is operationalized as the ratio of helpful votes (e.g., [22]) or linearly decreasing when review helpfulness is operationalized as the count of helpful votes (e.g., [5]).

For decision makers (e.g., review hosting firms, sellers, and buyers) to better understand and/or manage review helpfulness, it is important to have a conceptual framework for review effectiveness in which review helpfulness can be defined and the impacts of review determinants on it can be examined. With the inspiration of the marketing communication effectiveness models (e.g., [15]), we posit that review effectiveness is multi-dimensional and has review helpfulness as an important element. We organize the rest of the paper as follows. We first develop our conceptual framework of user review effectiveness and our hypotheses on how review determinants affect various elements of review effectiveness. Next, we develop an operational model to empirically test our hypotheses and compare our model to the existing models in the literature using two data sets collected at Amazon.com. We further highlight how our model may be used to support various decision makers for harvesting review effectiveness. We finally discuss the limitations and future research of our study.

2. Conceptual framework and hypothesis development

2.1. Conceptual framework

The effectiveness of communication mix is well studied in the marketing literature. There are two perspectives to understand the complexity and richness of communication effectiveness. From communication outcome perspective, the hierarchy-of-effects model on advertising by [15] is widely adopted. This model argues that in the long term, the effectiveness of marketing communications is a conversion process of three effects: cognitive effect, affective effect, and conative effect. For example, an effective advertising makes a high proportion of the targeted consumers aware, a high proportion of the aware consumers like, and a high proportion of the liking consumers purchase. Recently, the hierarchy-of-effects model has inspired the multi-stage model development and empirical examination of the email effectiveness in viral marketing where email effectiveness is conceptualized as a multi-dimensional construct (e.g., [6]).

From consumer information processing perspective, the accessibility-diagnostics framework on word-of-mouth (WOM) is also commonly recognized. This framework argues that consumers activate different types of information processing when a piece of information is received, thus offers the consumer behavioral underpinnings for the hierarchy-of-effects model (e.g., [10]). Because online user reviews are essentially electronic WOM, this framework has recently been adopted by researchers to study review helpfulness which is conceived as a corresponding communication outcome of information diagnostics (e.g., [20]). Similarly, the multi-process conceptualization for review effectiveness has also begun to emerge in the literature. Researchers suggest that participation of reviews and polarity of reviews may be driven by two different voting behaviors of consumers and should be studied separately (e.g., [24]).

Inspired by these two perspectives on the effectiveness of communication mix, we sketch a conceptual framework for review effectiveness in Fig. 1. The first element of review effectiveness is *Review Popularity*. This element represents the propensity of a review in attracting consumer attention (e.g., [24]), and is similar to the awareness component in [15] and the information accessibility component in [10]. For example, a review may attract many or few reads or votes by the consumers. The next element of review effectiveness is *Review Helpfulness*. This

Table 1
The effects of review determinants on review helpfulness.

Study	Product/seller	Data source	Review helpfulness	Review determinants			
				Valence	Depth	Life	Volume of votes
Forman et al. [8]	Book	Amazon	Ratio	V-Shaped	n.a.	n.a.	n.s.
Ghose and Ipeirotis [9]	Audio Video Digital Camera DVD	Amazon	Ratio	V-Shaped	n.a.	n.a.	Positive or NS
Mudambi & Schuff [20]	Music CD MP3 Video Game Digital Camera Cell Phone Laser Printer	Amazon	Ratio	U-Shaped (search goods) And Inverted U-Shaped (experience goods)	Positive	n.a.	Negative (search goods) or NS (experience goods)
Yin et al. [31]	Seller	Yahoo	Ratio	U-Shaped	Positive	n.a.	n.a.
Pan and Zhang [22]	Experiential Utilitarian	Amazon	Ratio	Monotonously Increasing	Positive	Positive	n.a.
Kuan et al. [14] (2015)	DVD Book	Amazon	Ratio	Inverted V-Shaped	Positive	Positive	n.a.
Salehan and Kim [24] (2016)	Mobile Phones TVs Laptops TV Mounts	Amazon	Ratio	n.a.	Positive	n.a.	n.a.
Cao et al. [3] (2011)	Software	CNET	Count	V-Shaped	Positive	Negative	n.a.
Chen and Lurie [5] (2013)	Restaurant	Yelp	Count	Monotonously decreasing	Positive	Positive	n.a.

Ratio = Percentage of Helpful Votes among Total Votes. Count = Number of Helpful Votes.
n.a. = Not Available, n.s. = Not Significant.

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