Summer 6-27-2016

A THEORETICAL APPROACH TO ONLINE REVIEW SYSTEMS: AN INFLUENCE OF REVIEW COMPONENTS MODEL

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Abstract

Effective online review component design plays a critical role in facilitating online transactions. Although there is abundant evidence that consumer reviews have significant impact on product sales, the design of consumer review systems and its impact on consumers' beliefs about online reviews and subsequent purchase decisions have not yet been thoroughly examined. Little theoretical knowledge is available about how review components may influence consumers' beliefs, attitudes and behavior. In this paper, we develop a conceptual model for measuring the impact of review components on the beliefs and behavior of online customers. In developing the theoretical model (called the influence of review components model, or IRCM), we synthesize the theory of reasoned action with theories in social psychology, consumer behavior, and trust to categorize review components and conceptualize the salient beliefs of consumers toward online reviews. We expect that IRCM and its empirical results provide an initial guideline for a rigorous approach to designing online review systems and testing their effectiveness before full deployment

Keywords: Online Review, Review Components, Theory of Planned Behavior, Online Word-of-Mouth systems.

1 INTRODUCTION

Online review systems are a valuable information channel for consumers to assess the quality of products and services prior to making purchase decisions, particularly for high involvement products (Park and Kim, 2009). With recognition of the importance of online reviews, previous scholarly work has mainly investigated the effect of online consumer reviews on two facets: the impact of online reviews on product sales estimated from econometric models through second-hand data, such as the total number of reviews, ratings and review valence (e.g., Liu, 2006; Duan et al., 2008; Godes and Mayzlin, 2004; Chau and Xu, 2012; Ghose, and Ipeirotis, 2011; Ye et al., 2011); and the relationship between consumers' beliefs about online reviews and purchase behavior based on structural equation modelling (SEM) through primary data, such as questionnaire surveys (e.g., Plotkinaa and Munzelb, 2016). Most prior studies were conducted in a single research context such as Amazon, eBay, and Yahoo Movies. However, very few e-commerce sites have developed and designed identical online review systems: for example, Yelp and TripAdvisor have become travelers' go-to web sites for finding reviews of restaurants, hotels and tourist attractions, but their online review systems are designed differently with different components.

Research that attempts to identify how to design a useful online review system for consumers is limited (Jiang and Guo, 2015). Online review systems are viewed as a key source of electronic word-of-mouth (eWOM) (Kuehl, 1999; Ba and Paul, 2002; Chen and Xie, 2005) and comprise different components such as rating score, textual areas, usefulness indicators, and other unique components. Designing an effective online review system requires an understanding of how consumers' reactions to the system can change in their beliefs and behavior. Consumers may react to review contents, to reviewers' credibility, and review ratings. Various online review system components are designed toward honestly and accurately conveying other consumers' opinions and experiences to potential and future customers. Understanding how online customers are affected by exposure to online review system components helps to predict their reactions to user-generated content (UGC).

This paper attempts to address this knowledge gap by posing the following research questions:

1. What are the most important and useful online review system components for online customers to make purchase decisions?
2. How do these components influence consumers' beliefs about online reviews in terms of different information characteristics (e.g., review valence, review information quality and credibility)?
3. How do these online review system components and consumers beliefs jointly influence purchase decisions?

In answering these questions, we draw on the theory of reasoned action, or TRA (Ajzen, and Fishein, 1969, 1980), and its synthesis with a host of other theories in social psychology and consumer behavior, to develop the influence of review components model (IRCM) for explaining the process by which each component may influence the beliefs of consumers regarding online review information and purchase behavior. IRCM hypothesizes that online review components influence consumers' purchase intentions by influencing their salient beliefs related to product or service information conveyed by online reviews, which in turn may change attitudes toward online reviews, leading to changes in purchase decisions.

Testing IRCM necessitates parsing online review systems into review components and categorizing the components based on their potential impacts on consumers' beliefs. Hence, we test the IRCM in a two-phase process. In the first phase, we summarize and identify existing review components, using consumers' beliefs as the theoretical basis for categorizing them, and collect data for selecting the most important components in each category. In the second phase, we develop instruments to measure constructs for beliefs, attitude and purchase behavior, and take steps to extensively check their

reliability and validity. This model is tested in a quasi-experimental research context. Structural equations modeling (SEM) via Mplus (Muthén and Muthén 2003) will be used for data analysis. We expect that the analysis of results can provide a possible insight into the process by which online review system components impact the behavior of online customers. The rest of the paper is structured as follows. The next section provides the theoretical background for the research model,which is followed by the conceptualization of our research model in section three. Section four provides the proposed research design. The final section rounds-off with the expected contributions of the research and concluding remarks.

2 THEORETICAL BACKGROUND

The categorization of review system components and the conceptualization of our research model are based on the identification of consumers' salient beliefs related to online reviews and the role of such beliefs in shaping their attitudes toward review information and purchase behavior. TRA (Ajzen and Fishbein, 1969, 1980), and a host of other theories related to social referents and their impact on behavior provide the theoretical background for the conceptualization process in this study.

2.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) was first introduced by Ajzen and Fishbein (1969, 1980). The purpose of TRA is to facilitate the linkage between behavior, attitude and intention. Intention in TRA is a function of two determinants: personal and social. Attitude is the personal determinant that reflects favorable or unfavorable feelings about performing a behavior. Secondly, an individual's perception of social pressure, called the subjective norm, refers to an individual's perception of the desires of referents (significant people, such as friend and family), regarding whether she should perform or not perform a behavior (Karahanna et al., 1999). Moreover, attitude is a function of behavioral beliefs (b_i) and evaluation (e_i) (Ajzen and Fishbein, 1980) where b_i is the belief (subjective probability) that behavior b will result in consequence i, and e_i is the evaluation or desirability of consequence i. Similarly, the subjective norm is a function of the normative belief and motivations. The normative belief refers to an individual's belief that specific referents "think that he should or should not perform the behavior" and his motivation to comply with what these persons or groups think (Ajzen and Fishbein 1980, p. 69). Subjective norm is not included in this study since no formation will be available to consumers pertaining to the expectations of their salient referents regarding their usage of online reviews. Specifically, attitude and subjective norms are two key constructs of the theories of reasoned action (TRA) and planned behavior (TPB) (Ajzen 1991; Ajzen and Fishbein 1980) and capture the influence of behavioral beliefs (i.e., attitude) and normative beliefs (i.e., subjective norms). Normative beliefs mainly focus on examining the influence of perceived social pressure. In the TPB model, Ajzen (1991, p.195) defined normative beliefs are "concerned with the likelihood that important referent individuals or groups approve or disapprove of performing a given behavior". As a result, the construct, subjective norms, is usually measured by asking respondents to rate the extent to which important others would approve or disapprove of their performing a given behavior (e.g., Titah and Barki, 2009). Thus, an indispensable condition for the formation of social pressure is the existence of important referents when a consumer tries to make purchase decisions. In this case, it means that an important referent may tell the consumer what the referent thinks he should buy and the consumer may or may not accept this information. Although online reviews represent others' opinions but most reviewers do not know each other in the e-commerce context. These reviewers (i.e., other consumers) are not significant people, such as friend and family of a consumer who tend to purchase a product or service. Their opinions cannot form social pressure that a consumer will perceive. In the experimental online review context, we mainly focus on examining the impact of online review components on consumers' behavioral beliefs, which subsequently influence their attitudes toward purchase behavior. Thus, we only model online reviews as extra product information that influence consumers' behavioral beliefs and attitudes toward purchase behavior. Subjects will typically be seeing the assigned scenario, as shown in Appendix A,

and will therefore not have been able to receive cues from *significant* referents upon which to draw normative inferences. This implies that no relevant perceived social normative influences would exist at the time of the online review influence test. "When questioned about social normative influences in the absence of such influences, subject may either correctly indicate that they do not have a normative belief either way, or attempt to guess what the social normative influences of their salient referents would be" (Davis, 1986, p37). Thus, this is similar to the development of technology acceptance model (TAM), which was adapted from the TRA, but excluded the subjective norm component of the TRA (Davis, 1989).

2.2 Influence of Review Components Model (IRCM)

We formulate the IRCM based on TRA as presented in Figure 1. The conceptualization of IRCM requires the identification of consumers' salient beliefs regarding categories of online review system components that influence them. Saliency of multidimensional beliefs is an important consideration in understanding consumers' attitude and behavior (Burnkrant and Page, 1988). For example, the salient behavioral beliefs of TAM include "perceived ease of use" and "perceived usefulness," which influence consumers' attitude toward new technology acceptance (Davis et al., 1989, Taylor and Todd, 1995). We initially identify five salient beliefs and corresponding categories of components as follows.

2.2.1 Beliefs Regarding Perceived Review Valence

In this study, we define review valence as the consumers' perceived degree of positive or negative expression in online reviews. Numerous scholars have examined the saliency of behavioral beliefs about perceived valence and their impact upon consumers' attitude(Chintagunta, et al., 2010; Park and Nicolau, 2015; Plotkinaa and Munzelb, 2016). The valence of online reviews refers to the evaluation of the direction of reviewers after experiencing a product or service, typically expressed as positive and negative. Reviewers can express their positive or negative attitudes toward a product or service through two review components, including text review and rating score components. Hence, we posit the following:

H1. The rating score component influences consumers' review valence beliefs.

H2. The review text component influences consumers' review valence beliefs.

2.2.2 Beliefs Regarding Perceived Information Credibility and Quality

We will examine two beliefs: the degree of consumers' perceptions toward online reviews in terms of information quality (perceived information quality); and the degree of consumers' perceptions toward online reviews in terms of informant trustworthiness (perceived information credibility). We utilize the two belief constructs to demonstrate whether or not online reviews are an accurate performance and quality indicator of a product or service; and whether or not online reviews are trustworthy. In B2C e-commerce, information quality is often referred as the quality of contents presented on a web site and an important factor that can be measured in terms of credibility, accuracy, and believability (Barnes and Vidgen, 2002).

Online buyers and sellers have limited direct interaction because online transaction processes finish automatically via third-party platforms. Such a scenario creates information asymmetry in the e-commerce context. For example, buyers may not be fully informed about the quality of goods. As a consequence, online consumers have to make purchase decisions mainly based on the description information offered by sellers and other cues, such as online reviews contributed by earlier consumers. However, online reviews provided by other consumers may not able to precisely show the true information regarding the product or service they intend to purchase (Fung and Lee, 1999; Gao et al., 2015), and may even include false comments (Mukherjee et al., 2012; O'Connor, 2008). We argue that in the uncertain situation resulting from information asymmetry, consumer beliefs regarding perceived credibility and perceived information quality can be used as two important predictors of actual risk

taking behavior (i.e., buying or refusing a product/service as suggested by online reviews). This is in line with earlier studies examining the impact of information quality and credibility on sellers' trustworthiness (Ba and Pavlou, 2002; Pavlou and Dimoka, 2006). E-commerce sites have designed and developed various online review system components to increase consumers' perceptions of information quality and credibility. For example, reviewer credibility components include but are not limited to, identity disclosure, reviewer level and reputation (Park and Nicolau, 2015). Moreover, sellers' responses to review information can also help consumers to make judgments about information quality and credibility. Most online review systems also allow consumers to rate the quality of a review after experiencing related products or services, by voting on the usefulness of the review. Furthermore, review text is directly related to information quality. Hence, we posit the following:

H3. The review text component influences consumers' information quality beliefs.

H4. The review evaluation component influences consumers' information quality beliefs.

H5. The sellers' response message component influences consumers' information quality beliefs.

H6. The sellers' response message component influences consumers' credibility beliefs.

H7. The reviewer credibility component influences consumers' information credibility beliefs.

2.2.3 Belief Regarding Perceived Diagnosticity

Prior studies into online reviews have examined their impact on consumers' purchase behavior from the perspective of diagnosticity. Perceived diagnosticity refers to the degree of consumers' perceptions toward online reviews in terms of their helpfulness and usefulness for purchase decisions. More and more online review systems stress on designing and developing review components that can convey more diagnostic pieces of information. For example, Tripadvisor.com and Tmall.com have both designed components that automatically summarize keywords mentioned in large and unstructured review contents. Extant online review literature has suggested that customers tend to perceive that extreme ratings or strong opinions are likely to be more diagnostic and helpful for them to make purchase decisions than average ratings or ambiguous viewpoints (Mudambi and Schuff, 2010; Qiu et al., 2012; Herr et al. 1991). This is in line with the accessibility-diagnosticity model (Feldman and Lynch, 1988), believing that an individual's belief, attitude or intention depends on any piece of information that is used as an input for product judgment. The probability of using any piece of information is decided by the accessibility of that information from an individual's memory, the diagnosticity of that information, and the accessibility and diagnosticity of other information. The accessibility-effect occurs when the product information significantly shapes the way a consumer thinks about a product and such information is retrieved from their memories, while the diagnosticity-effect emerges when consumers feel that received product information (i.e., online review information) allows them to have a better product judgment and to apply the review information as an input to form product attitude (Kempf and Smith, 1998).

Based on the purpose of this study in determining the impact of online review components on consumers' beliefs, attitude and behavior, our experiments do not set-up real scenarios and use a virtual hotel brand so that participants in this research do not have prior knowledge of the given hotel and cannot retrieve any information from their memories. Thus, the accessibility-effect from an individual's memory will not be applied in this situation. Since review contents are text-based, the differences in review contents should play an important role regarding perceived diagnosticity in terms of different text characteristics, such as review elaborateness and readability (Park and Nicolau, 2015), rational and emotional reviews (Wu and Wang, 2011). Moreover, we argue that response messages from sellers can also help consumers to evaluate products. Hence, we posit the following:

H8. The review text component influences consumers' diagnosticity beliefs.

H9. The sellers' responding message component influences consumers' diagnosticity beliefs.

2.2.4 Attitude and Purchase Behavior

Moreover, following the TRA model, we posit the following:

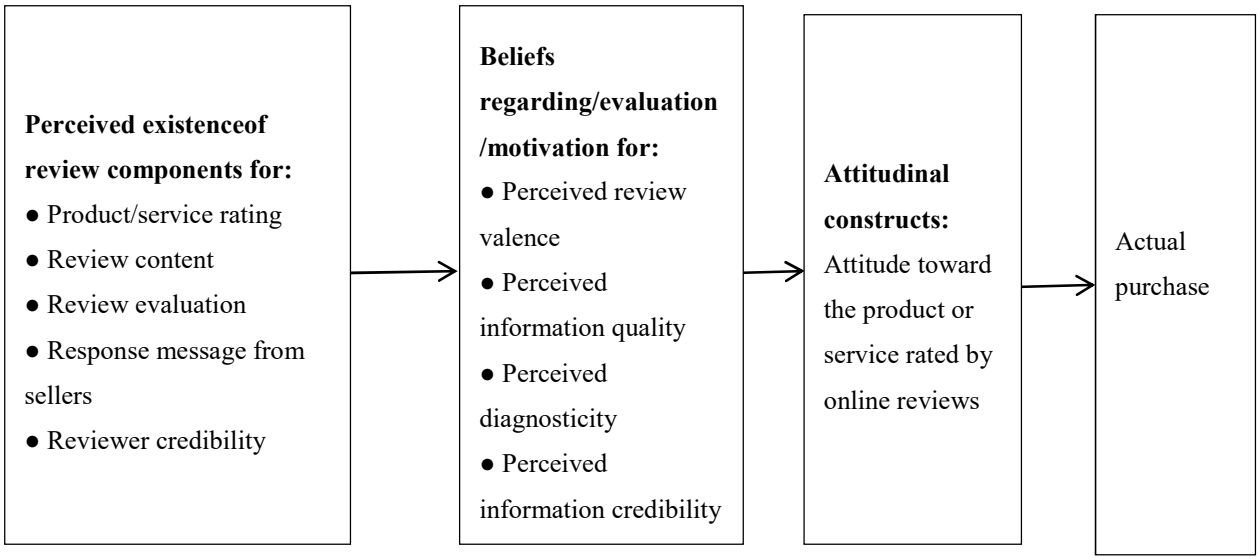
H10. Favorable behavioral beliefs regarding perceived valence of a review (i.e., positive valence) positively influences attitude towards purchase.

H11. Favorable behavioral beliefs regarding perceived information quality of a review (i.e., high quality) positively influences attitude towards purchase.

H12. Favorable behavioral beliefs regarding perceived information credibility of a review (i.e., high credibility) positively influences attitude towards purchase.

H13. Favorable behavioral beliefs regarding perceived information diagnosticity of a review (i.e., high diagnosticity) positively influences attitude towards purchase.

H14. Favorable attitudes have a positive influence on purchase intentions.



Notes: We define the *perceived* existence of component categories as the perception of participants regarding the presence of these categories after their exposure to the assigned scenario. The component categories listed here is subject to change after a full review of websites and literature, focus group discussions, eye tracking data, and surveys.

Figure 1. . The Influence of Review Components Model

3 RESEARCH DESIGN

3.1 Phase I: Identification of Important Review Components

In the first phase of the study, we will utilize questionnaire surveys, focus groups and eye tracking software to identify the relative importance of review components. This will help to reduce the complexity of experimental design and thereby focus on examining the most important elements. We

define online review system components as the elements that show review information from different aspects, including ratings, review text, volume of reviews, review usefulness indicators, responses to reviews from product/service providers, and so on. Thus, we first need to identify the core online review system components. A total of 200 e-commerce and third-party review websites will be examined. These sites will be selected based on web ranking data offered by Alexa, which provides traffic data, global rankings and other information for 30 million websites. The resulting list will be augmented by a review of the literature and a survey of 50 potential online consumers from students at Chinese and USA universities, in two rounds of data collection.

Second, the focus group technique will be used to help us to develop component categories according to consumers' beliefs about online reviews (e.g., information readability, information quality and information credibility) and classifying components into these categories according to their functions. The exact number of component categories will be determined using the saturation method, whereby categories are developed out until no distinctly new category emerges. The relative importance of each component is evaluated on a scale 0 to 10 through group discussions. Each focus group will take a loose, semi-structured interview format so that participants may comfortably express their beliefs, opinions and experiences related to using online reviews.

Third, we will develop a survey instrument to further measure the relative importance of review components. Two pilot tests will be carried out prior to administering the survey. The objective of the two pilot tests is to ensure the clarity of wording and instructions in the survey. The first pilot plans to invite 60 subjects and ask them to evaluate the importance of each component on a scale 0 to 10, to comment on the clarity of the questionnaire, and to identity important components. A second pilot test will be conducted with another 60 subjects. Finally, the survey will be administered to 250 participants. The final importance of components will be calculated through the average value of importance ratings obtained from the surveys and focus groups.

Fourth, we will utilize eye tracking to observe the relative importance of review components. Eye tracking offers the ability to analyze user interaction between review system components and how much time a user spends gazing upon a specific component. An analysis of eye movements over components allows us to know if consumers view review components in a particular order and how viewing times varies. A total of 50 participants will be asked to view a scenario containing all categories of components and the viewing times and order of each component will be recorded. Finally, for each component category, the two most important components will be identified based on their eye tracking data and the final importance rating.

3.2 Phase II: Construct Measurement and Instrument Development

Our model includes five belief constructs, one attitudinal construct, and one purchase decision construct. The scales for measuring these constructs were adapted from the extant literature. In order to assess the convergent and discriminant validity of scales, we will adopt the sorting procedure suggested by Moore and Benbasat (1991), repeated in two rounds. Four information system (IS) professors will be invited to judge each round. Prior to actual sorting, a set of instructions and a practice run with items unrelated to the study will be used to help judges to understand the procedures. Cohen's Kappa index and item placement ratios (Cohen, 1960; Moore and Benbasat, 1991) will be used to check the initial validity of the instrument.

3.3 Methodology and Sample Data

Testing our conceptual model requires a controlled setting in which the impacts of various component categories can be measured. We will apply a quasi-experimental design in which each participant is manipulated by viewing a review scenario containing a specific combination of component categories. Thus, our experimental design consists of full-factorial combinations of n component categories, which will require creating 2^n different scenarios containing different component categories. Scenario 1 contains all review component categories. The other scenarios lack

one or more categories. We carry out two pilot tests to modify and finalize the instrument, the experiments and the protocol. The travel industry is used as the simulation experiment context because travel-related purchase decisions (e.g., choosing a hotel to stay) have been perceived as a high involvement product purchase behavior which requires travelers to reply on an extensive use of online reviews (Gretzel and Yoo, 2008; Bronner and de Hoog, 2011; Duverger, 2013). All participants in this study will be asked to assume that they are the decision maker in their families to decide which hotel to stay in for a 7-day holiday. The only source of information that they can rely on will be the online reviews shown in the scenarios. Participants will be required to answer questions regarding the presence or absence of each component on their assigned scenarios and to record their perception of each component as either 0 (perceived not to be present) or 1 (perceived to be present). Finally, participants will complete the instrument for measuring beliefs, attitudes, and purchase decisions.

4 EXPECTED CONTRIBUTIONS

On the theoretical side, the current study is expected to provide several contributions. First, by an extensive review of the extant literature and 200 e-commerce websites, an extensive typology of review components will be developed and the relative importance of review components will be examined. Second, our study is arguably one of the first attempts to develop a theoretical model of the influence of online review components in e-commerce. Theoretically, this study may contribute to the information systems literature regarding online reviews.

ACKNOWLEDGEMENTS

This work was supported by "Fundamental Research Funds for the Central Universities" (Projects no. 2014B18914 and 2014B01414). This work was also supported by Jiangsu Provincial Natural Science Foundation of China (Project no. BK20150823).

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APPENDIX A: Scenario (Sample)