

Towards a Credibility Analysis Model for Online Reviews

Research-in-Progress

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Abstract

In digital transformations era, user-generated reviews have become important sources of information, and they play a significant role in users' decision-making process. However, the overwhelming number of online reviews with unknown reviewers has made it difficult for users to find credible information. This paper conceptualizes a credibility analysis model for online reviews by synthesizing the related literature and using the Heuristic-Systematic Model (HSM). The credibility analysis model demonstrates factors affecting online reviews credibility (e.g., argument strength, review objectivity, review sidedness, internal consistency, reviewer credibility, external consistency, information rating, and structural factors). Moreover, the proposed model examines the moderating role of product/service types on the relationships between reviews credibility and its antecedents. To refine the model and our hypotheses, we plan to interview users of online reviews. Then, the hypotheses and model will be tested through a quantitative approach.

Keywords: Reviews credibility, heuristic-systematic model, decision making, online reviews

Introduction

Digital innovations have considerably transformed the world of business and society in the last decade. These transformations have facilitated the proliferation of user-generated content such as online reviews. Through online reviews, people can readily share their experience and attitudes towards services or products. Previous research has shown that online reviews can shape user behavior (Gupta and Harris 2010), product sales (Eslami and Ghasemaghaei 2018) and the reputation of a brand (Chakraborty and Bhat 2018). In addition, according to a report by Nielsen (2012), after family members and friends, reviews generated by users are believed not only as the most influential, but also as the most trustworthy source of information for decision making on services or products (Aghakhani et al. 2017; Luo et al. 2015).

Despite the attractiveness and importance of online reviews in the decision-making process, users' skepticism towards the credibility of online reviews is relatively high (Shan 2016). This is because of the anonymous nature of reviewers and the massive amount of unfiltered information (Cheung et al. 2009). Prior research makes influential contributions to understanding different characteristics of online reviews and their influence on credibility (Cheung et al. 2012; Cheung et al. 2009; Huang et al. 2018; Luo et al. 2015; Shan 2016). Some studies have stated that "argument strength" and "source

credibility” are main factors which influence the degree of information impact (Sussman and Siegal 2003). A few other studies have concluded that factors such as “*review objectivity*”, “*review sidedness*”, “*external consistency*” (Luo et al. 2015), “*structural factors*” (Huang et al. 2018; Ketron 2017), and “*information rating*” (Cheung et al. 2009; Luo et al. 2015), have an influence on users’ evaluation of online reviews.

However, to date, no study has analyzed the effect of all the antecedent factors of online reviews credibility such as review objectivity, review sidedness, and structural factors, simultaneously. Further, there is a lack of research that proposes a comprehensive model with metrics to analyze the credibility of online reviews considering these factors. Moreover, to date, there is little work that has examined the influence of “*internal consistency*” on review credibility. This research aims to fill these gaps.

While there are several definitions for credibility in the literature, based on Wathen and Burkell (2002), and Cheung et al. (2012), in this paper, we define credibility as: “believability” or “the characteristic that makes people trust and believe something or someone”. An online review which is viewed as credible “is accepted and believed by the receiver and affects their subsequent behavior” (Chaiken 1980; Cheung et al. 2012; Wathen and Burkell 2002).

This paper is a part of a larger research project that focuses on the credibility of online reviews in an attempt to develop a comprehensive credibility model with measures for online reviews. To do this, we address the following research question: *What are the antecedents of the credibility of online reviews?* This paper conducts a systematic literature survey on online reviews and aspects of credibility. We then use the Heuristic-Systematic Model (HSM) to develop a conceptual model for credibility analysis. Our future work will involve refining and testing the model through qualitative and quantitative approaches to measure the impact of content related factors (systematic processing), and environmental factors (heuristic processing) on information credibility.

The remainder of this paper is organized as follows. We start with the literature review, which includes the data collection method, related works and theoretical background of dual process theories (i.e. the heuristic-systematic model and the elaboration likelihood model). Then, we develop our hypotheses and propose the conceptual model. In the last section, we explain future areas of this research.

Literature Review

This research aims to explore antecedents of the credibility of online reviews and develop a credibility analysis conceptual model by synthesizing the related literature that deals with online reviews and its credibility. To this end, included studies had to have “*the credibility of online reviews*” as the main construct. We searched through well-known journal databases including ScienceDirect, google scholar, Emerald, etc. to find articles about online review credibility. We applied different keywords such as: “credibility of online reviews”, “online review credibility”, “credible online reviews”, “credible e-WOM”, “credibility of e-WOM”, and “e-WOM credibility”. A total of 122 related articles were identified and analyzed. Secondly, the citations of identified papers were reviewed. It added 32 more articles to our dataset. After analyzing the titles, abstracts and in some cases the whole sections of each identified article, 42 were found to be closely related to this research.

Based on the synthesis of articles, we present Table 1 that illustrates the most relevant research focused on the credibility of online reviews. Check marks in Table 1 show contributing factors in each study. For example, Cheung et al. (2009) investigated the impact of normative factors (related to social aggregation and consensus) and informational factors (related to content) on review credibility, using dual process theory. They found that source credibility, recommendation consistency, recommendation rating, and argument strength significantly influence credibility evaluation. However, recommendation sidedness and recommendation framing were found to be insignificant. Lis (2013) studied credibility factors of e-WOM from consumers’ perspective. Their results revealed that aggregated rating, trustworthiness, and expertise (reviewer) have a positive impact on the credibility of online recommendations. In addition, involvement, moderates the relationship between these factors. Ketron (2017) studied the impact of quality of grammar and mechanics on review

credibility through the lens of the Elaboration Likelihood Model (ELM). Results showed that reviews with the high quality of grammar and mechanics perceived more credible, while online reviews with low quality of grammar and mechanics are not as credible. According to this study, quality of grammar and mechanics is more important for online reviews with a shorter length and reviews related to experience products.

We explore the antecedents of online reviews credibility from dual-process theories. Dual process theories were originally formulated under the principle of psychology. It provides a comprehensive view of individuals' information processing strategies. The Heuristic-Systematic Model (HSM) (Chaiken 1980) and the Elaboration Likelihood Model (ELM) (Petty and Cacioppo 1986) are two of the most predominant dual-process models. Based upon HSM and ELM antecedent factors of online reviews credibility can be classified into two groups: (1) *Systematic information processing* in HSM (central route in ELM); and (2) *Heuristic information processing* in HSM (peripheral route in ELM). Systematic processing factors are related to the content of information such as argument strength. While the heuristic processing factors are associated with environmental characteristics of information such as source credibility and information consistency (Luo et al. 2015).

Most previous studies (e.g., see Table 1) have used ELM to explore the credibility of online reviews. ELM assumes that readers take either the central or peripheral route to make decisions (Cheung et al. 2012; Watts and Zhang 2008). However, some studies (Eslami and Ghasemaghaei 2018; Zhang et al. 2014) have used HSM to examine the impact of online reviews on consumers' decision-making. HSM highlights that heuristic and systematic processing may occur simultaneously or independently (Watts and Zhang 2008). Our study develops the research model based on HSM rather than ELM because we believe, in online reviews platforms, content-related and environmental factors often co-exist, and readers may refer to these factors concurrently to make decisions (Watts and Zhang 2008; Zhang et al. 2014).

Table 1. Summary of Existing Literature

Study	Theory	Argument Strength	Information Objectivity	Information Sidedness	Internal Consistency	Reviewer Credibility	External Consistency	Review Framing	Information Rating	Structural Factors
(Cheung et al. 2009)	Dual Process Model	✓		✓		✓	✓	✓	✓	
(Baek et al. 2012)	HSM ELM					✓	✓	✓		
(Cheung et al. 2012)	ELM	✓		✓		✓	✓			
(Luo et al. 2013)	ELM	✓				✓				
(Lis 2013)	ELM					✓	✓		✓	
(Luo et al. 2014)	ELM	✓		✓		✓	✓		✓	
(Shih et al. 2015)	ELM	✓				✓				
(Luo et al. 2015)	ELM	✓	✓	✓		✓	✓		✓	
(Ketrion 2017)	ELM					✓		✓		✓
(Huang et al. 2018)	ELM							✓		✓
Present Study	HSM	✓	✓	✓	✓	✓	✓		✓	✓

Conceptual Model and Hypotheses

Using the HSM and building upon our literature analysis, we propose a comprehensive credibility analysis conceptual model for online reviews. It considers argument strength, information objectivity, information sidedness, internal consistency, reviewer credibility, external consistency, information rating, and structural factors as the antecedents of online reviews credibility.

We have not considered “*review framing*” in our model. Review framing indicates the valence of an online review—that is, whether an online review could be from incredibly positive to exceedingly negative (Baek et al. 2012; Huang et al. 2018). We believe that it is not logical to hypothesize negative reviews are more credible than positive ones or vice versa because generally in online reviews there are combinations of positive and negative reviews and people use both to make a decision. In addition, although prior studies (Baek et al. 2012; Cheung et al. 2009) hypothesized that negative reviews are more credible than positive ones, they could not support this hypothesis. As a result, we have not considered this factor in our model. The next section describes our hypotheses and conceptual model which illustrates the antecedent factors of online reviews credibility.

Our proposed credibility analysis model is shown in Figure 1. Using HSM, we propose two aspects in our conceptual model: 1) Systematic information processing (Content-related factors) and 2) Heuristic information processing (environmental factors). Next sections describe these factors in more details.

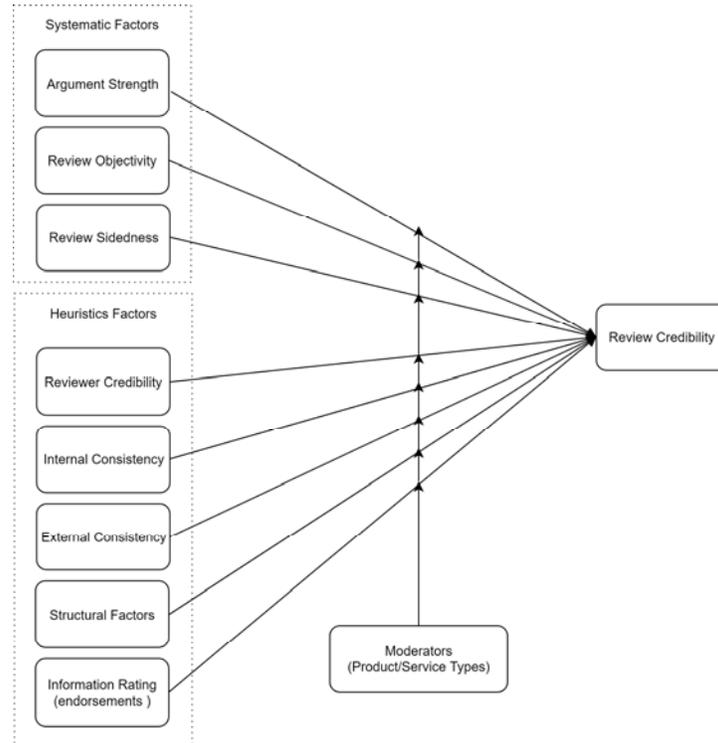


Figure 1. Credibility Analysis Conceptual Model for Online Reviews

Systematic Processing Factors

Prior studies (Sussman and Siegal 2003; Watts and Zhang 2008) often consider information quality as the only systematic factor which impacts information readers’ cognition; however, more recent studies (Cheung et al. 2012; Cheung et al. 2008; Luo et al. 2015) consider it as an unclear measure since information quality contains several components that could exert different influences on readers. In this paper, based on the prior studies (Baek et al. 2012; Cheung et al. 2012; Kim et al. 2018; Luo et al. 2015; Park and Kim 2008) we include three factors of information quality, namely, argument strength, information objectivity, and information sidedness as the systematic antecedents of online reviews credibility.

Argument Strength

Argument strength is described as the plausibility of the argumentation or the persuasive strength of information (Luo et al. 2015; Shih et al. 2015). It is the extent to which the receiver of information feels the argument as convincing. Previous studies (Kim et al. 2018; Shan 2016) have empirically revealed that argument strength will directly influence the attitude of the reader towards that information. If the received information has sufficient justification to its argument, the reader will consider it as credible information; on the contrary, if the received information does not contain a convincing argument, the receiver will be inclined to treat it as not credible information (Luo et al. 2013). Thus,

H1: An online review with a strong argument is more likely to be credible.

Review Objectivity

Subjective content is commonly colored by the opinion of the writer and, therefore, does not provide precise information and should be attributed to the writer's personal reason. On the other hand, objective content contains more factual details and it is not affected by the writer's opinion. Prior studies (Baek et al. 2012; Park and Kim 2008) find that objectivity/subjectivity of information can influence the attitude of the receiver. Results reveal that content with objective information is observed as more credible than content with subjective information since objective content is more concrete, factual, and rational (Park and Lee 2008). Thus:

H2: An objective review is more likely to be credible.

Review Sidedness

Review sidedness shows whether an online review is one-sided (either positive or negative) or two-sided (both positive and negative). Prior studies showed that two-sided content is usually seemed to be more convincing than its counterpart (one-sided) (Cheung et al. 2012; Cheung et al. 2009). Receiving information on two-sided reviews would enhance the completeness of a review because two-sided reviews usually discuss both advantages and disadvantages of a product/service. On the other hand, one-sided reviews just discuss either advantages or disadvantages of a product/service. Thus, two-sided reviews are more likely to have more factual details than one-sided reviews, which are usually perceived positively or negatively biased. This influence can be clarified by attribution theory (Crowley and Hoyer 1994). Based on this theory two-sided information weakens skepticism of receiver and consequently strengthen the information believability; thus, we hypothesize that:

H3: A Two-sided review is more likely to be credible.

Heuristic Processing Factors

As stated above, heuristic information processing refers to none content-related factors, which capture environmental antecedents of online reviews credibility. We consider reviewer credibility, internal consistency, external consistency, structural factors, and information rating as the heuristic factors.

Reviewer (source) Credibility

Reviewer credibility can be defined as the extent to which an information source (writer) is perceived to be, trustworthy, competent, and believable by a reader (Cheung and Thadani 2012). Source credibility includes two main dimensions for that: expertise (ability) and trustworthiness (Cheung and Thadani 2012). Prior studies observed that online information receiver considered source credibility (writer) as a significant sign of information credibility (Cheung et al. 2012; Cheung et al. 2009). People more easily accept and believe information from a highly reliable source, because they consider credible sources more competent. In contrast, the reader is less likely to adopt information that the source has low credibility. Hence, we hypothesize that:

H4: An online review from a reputable source is more likely to be credible than one from a less reputable reviewer.

Internal Consistency

Internal consistency indicates the consistency between review content and review valence (e.g. 1 to 5 stars rating). Considering review content and review valence come from two different sources, review content might not match with the review valence (stars rating). This internal inconsistency confuses the receiver of the review and consequently impairs the accuracy of a review (Li et al. 2018). Because according to cognitive dissonance theory (Hinojosa et al. 2017), people try to maintain a consistent set of attitudes and cognitive inconsistencies cause psychological tension. Therefore, we believe that internal consistency has a positive impact on the review credibility. Thus,

H5: An online review which has a high consistency between valence (star rating) and content is more likely to be credible.

External Consistency

In online review platforms, a particular review often is seen with a set of other reviews. Individuals can adopt a review easily which is consistent with the majority of reviews (Aghakhani et al. 2017). A general technique to evaluate the whether a review is credible is to compare it with other reviews (external consistency) because according to the spreading-activation model (Collins and Loftus 1975), things will go on smoothly when the existing facts are consistent with former information and belief. Then, readers are more likely to adopt an online review which is consistent with most reviews, and also individuals are more likely to be doubtful toward a review which is apposed most reviews. Therefore, we believe that external consistency has a positive impact on the review credibility. Thus,

H6: An online review which is consistent with the majority of reviews (has an external consistency) is more likely to be credible.

Structural Factors

Structural factors refer to readability, grammar, mechanics, etc. The role of structural factors in online reviews context is completely related to the heuristic cues. These heuristics cues indicate certain qualities about the writer of information; for example, lack of attention to details or lack of education (Ketron 2017). Previous research (Huang et al. 2018; Ketron 2017) demonstrates the importance of structural factors, particularly in an online context. The results document that structural factors influence credibility evaluation of online reviews because they are one of the few signs of writer's experience and knowledge with a product/service (Ketron 2017). Therefore, we hypothesize that:

H7: An online review with high quality of structural factors is more likely to be credible.

Information Rating

Based on a study by Pornpitakpan (2004), a reader's attitude towards information will be influenced by other community members' attitudes. According to related literature (Cheung et al. 2009; Luo et al. 2015) information rating represents the total rating of a content (endorsements of a review), which is given by other readers or members. In fact, opinions of other readers, which form information rating, can be one of the shortcuts used to evaluate information. Thus, we hypothesize the positive influence of information rating on readers' perception of review credibility. Thus,

H8: An online review with high information rating (endorsements) is more likely to be credible.

Moderators (Role of Product/Service Types)

Chiu et al. (2005) investigated the relationship between online information quality and behavioral intention of users across search, experience, and credence products or services. Search products or services are those products or services which we can acquire full information and evaluate them before using or purchasing them (e.g. electronics). Experience products or services are those products or services which we cannot evaluate before using or purchasing them, but we can evaluate them after using or purchasing them (e.g. travel/ holiday/ hotel, restaurant, beauty salon, haircut). Credence products or services are those products or services which we cannot evaluate even after purchasing or using them in a short term (e.g. health products/ multivitamins, medical services/ psychotherapy, home repairs) (Weathers et al. 2015).

Prior research (Baek et al. 2012; Ghasemaghaei and Hassanein 2016) has shown that users evaluate online reviews for each category differently because search products or services usually involve more objective assessment. On the other hand, experience and credence products or services naturally tend to be more subjective. Therefore, during the evaluation of information, users concentrate more on heuristic factors. However, reviews related to search products/services are more objective in nature, which enables users to reduce the impact of heuristic factors and focus on systematic cues. Therefore, we predict that product/service types can influence the reader's evaluation of information credibility. However, we do not postulate that product/service types have a straight impact on credibility since it is not logical to hypothesize that reviews of some products or services are more credible than the other ones. This is the opposite of common sense. On the other hand, it is more logical to hypothesize that readers of different products or services use different influencing factors to different degrees to assess online reviews credibility. Thus, we hypothesize that the effects of antecedents of reviews credibility on readers are moderated by product/service types.

H9: Systematic factors for the search products/services are more influential in credibility assessment of online reviews; while, for experience and credence products/services heuristic factors are more influential.

Conclusion and Future Plans

This paper is a part of a larger research project that focuses on the credibility of online reviews and aims to develop a comprehensive credibility analysis model as well as measures for online reviews. We plan to conduct research to achieve our aims in three phases.

In the first phase, which is the focus of this paper, we identify the antecedent factors of online reviews credibility by drawing the heuristic-systematic model (HSM) and synthesizing existing literature. Consequently, we propose a conceptual model for the credibility analysis of online reviews. As ongoing research, we will conduct the next two phases. In the second phase, the conceptual model will be refined through a qualitative method (e.g., in-depth interview). At this stage, interview questions have been developed, focusing on how information readers utilize user-generated reviews, how information users evaluate the credibility of the content of reviews, and how information users evaluate the credibility of the reviewer. In the third phase, the hypotheses will be tested, and the model will be validated using a quantitative method. Finally, the model measures the impact of content-related factors (systematic processing), and environmental factors (heuristic processing) on information credibility.

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