

Full Length Research Paper

An investigation of online review helpfulness based on movie reviews

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This paper aims to propose a conceptual model to investigate the determinants of review helpfulness for movie reviews based on uncertainty reduction theory and review quality framework. Model of customer review helpfulness is built based on review quality framework. Movie reviews from IMDB (<http://imdb.com>) are collected. The proposed hypotheses are tested with logistic and multiple linear regressions. The results show that review extremity, review length, review timeliness, and review reputation have significant effects on the helpfulness of movie review. In addition, in extreme reviews, positive reviews are more helpful to customers than negative reviews. This study provides an in-depth understanding of what makes movie reviews helpful for customers. The findings have implications for research on information quality in electronic commerce, and provide online retailers with suggestions for developing reviews guidelines and designing recommendation system.

Key words: Online review, review helpfulness, movie review, uncertainty reduction theory.

INTRODUCTION

As a new type of word-of-mouth information, online consumer review is playing an increasingly important role in consumers' purchase decisions (Chen and Xie, 2008; Cheung et al., 2008). Online user reviews are regarded as digitalized word of mouth (Dellarocas, 2003) and found to be influential on product sales and consumer decision-making (Duan et al., 2008; Lee et al., 2011). The researches about online reviews are increasingly available in recent years (Chen et al., 2008; Chen et al., 2004; Chevalier and Mayzlin 2006; Clemons et al., 2006; Ghose et al., 2007; Hu et al., 2008). Researchers have studied the impact of online reviews on the product sales and researches have shown that customer reviews have a positive influence on sales. Online product reviews contains amount of emotional information and customers'

opinions to the products and these opinion information are important for customers to make purchasing decision. In order to understand the word of mouth of product and compare the word of mouth between different brands, Pang et al. (2002) and Turney (2002) studied the issue of sentiment analysis and opinion mining using different methods; while Liu et al. (2005) and Popescu and Etzioni (2005) considered this issue in details and extracted customer's opinion on each product feature and presented the review summary in form of feature-opinion.

This review summary is helpful for customer to judge and compare different products from the point view of product feature and for seller to master the customer's opinion on products in time.

However, as the availability of customer's reviews

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becomes widespread, the strategic focus shifts from the mere presence of customer reviews to the reviews evaluation and use of the reviews (Susan and David, 2010). In the literatures of informatics, information has strong linked with uncertainty (Nelson, 1970), and high-quality information can reduce the uncertainty for customers in purchasing decision. In order to reduce the product quality uncertainty, customers often need to seek perceived helpful reviews about the product. Unfortunately, there are a large number of reviews for a product, and it is difficult for customers to evaluate the helpfulness of reviews. Therefore, it is very important for online retail sites to provide and recommend more helpful reviews, which provide greater potential value to customers. Presently, most online retailers provides review "helpfulness" vote mechanism to help customers to recognize helpful reviews. However, the helpful votes are not a useful measure for evaluating recent reviews because the helpful votes are accumulated over a long period of time, and hence cannot be used for review placement in a short-term time (Ghose et al., 2007). It is necessary for online retailer to analysis what constitutes a helpful review and to design a more effective review recommend system.

What makes an online review helpful to customers and how to classify helpful reviews and unhelpful reviews have attracted more and more researchers in recent years. However, most researches are from computer science field and these researches have not provided enough theoretical foundation for how factors impact on the helpfulness of reviews. Based on the information economics, Susan and David (2010) develop and test a model of customer review helpfulness. In a model, Susan and David (2010) analyze the effects of review extremity and review depth on the helpfulness of review.

This study indicated that the product type (search goods and experience goods) affect the perceived helpfulness of the review. Although the authors studied this issue effectively and drew meaningful conclusions, they only considered the review extremity and review depth in the research model. Some factors that might influence the review helpfulness are not concluded in the model. For example, according to the persuasive communication theory, communicators high in expertise and trustworthiness tend to be more persuasive than communicators with low standing on these factors (Ajzen 1992). So, the source characteristics might influence the perceived helpfulness of reviews. Additionally, Susan and David (2010)'s research shows that customers have different perception of the helpfulness of reviews between search goods and experience goods; thus, it is necessary to develop and test a full research model for single product type.

Based on the discussion above, this study focuses on an experienced goods-movie, and attempts to look at factors that impact on the helpfulness of online movie reviews. Employing the prior studies about the review

quality, we develop and test a theoretical model. The model incorporates five major factors, namely: review extremity, review objectivity, review length, review timeliness, and reviewer reputation. Drawing on the uncertainty reduction theory, we will examine the effects of five factors on the helpfulness of movie review.

THEORETICAL FRAMEWORK AND HYPOTHESIS

Uncertainty reduction theory (Berger and Calabrese, 2006) provides a relevant foundation to address the role of online customer reviews in the consumer decision process. Customers often lack enough knowledge of a product or of the outcomes of consuming that product. In order to reduce the purchasing risk associated with the uncertainty and maximize the outcome value, they will seek information on product quality and seller quality. Consumers can reduce the quality of uncertainty by drilling down to obtain more details about these information (Hu et al., 2008). For search goods, it is relatively easy to obtain information on product quality prior to interaction with the product. Consumers can learn about the value of the products by trying to understand the returns policy and product warranty. However, for experience goods, it is relatively difficult and costly to obtain information on product quality prior to interaction with the product. Consumers still need to actively seek other information, such as online reviews to reduce the high purchasing uncertainty. According to the uncertainty reduction theory, the reviews that can reduce the purchase uncertainty are perceived helpful for customers. In this paper, we investigate what make helpful reviews through analyzing how different factors help consumer to reduce the product quality uncertainties.

Barbara and Peter (2005) defined perceived helpfulness as composed of two dimensions: content quality and source quality, as shown in Figure 1.

As mentioned above, Chen and Tseng (2010) developed a review quality framework and employed an effective information quality framework. The review quality framework comprised nine dimensions. The experiment for the performance of the IQ dimensions indicated that some dimensions are not effective in discriminating review quality. Therefore, we choose the top-5 effective dimensions in this paper, namely, believability, objectivity, reputation, timeliness, appropriate amount of information. According to each dimension in the Figure 1, we define the following detailed factors of review quality framework.

Source quality

We use the reputation dimension to evaluate the source quality. The reputation is the extent to which the author of a review is trusted or highly regarded (Chen and Tseng, 2010). In this paper, we measure this dimension based

Table 1. Descriptive statistics for dataset.

Number of movies	Number of reviews	Number of reviewer	Average reviews of reviewer
200	2328	2163	69.59

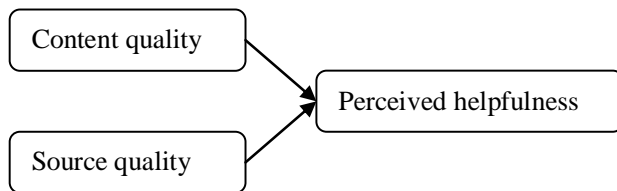


Figure 1. Model of perceived helpfulness (Barbara and Peter, 2005).

on the number of reviews written by the reviewer and the quality of these reviews.

Content quality

We use the dimensions of Believability, Objectivity, Timeliness, and Appropriate Amount of Information to evaluate quality of the review content. Believability is the extent to which an online review is regarded as valuable to the receivers. In this paper, we measure Believability based on the review extremity. Objectivity is the extent to which an online review is biased (Chen and Tseng, 2010). In this paper, we measure Objectivity based on the sentimental inclination of the review. Timeliness is the extent to which the review is timely and up-to-date. We measure the timeliness based on the interval between the current review and the first review of the product. Appropriate amount of information is the extent to which the volume of information in a review is sufficient for decision-making. We measure the dimension based on the length of the review.

According to the above explanation of the each dimension, we developed our research model as shown in Figure 2. In the following hypotheses, we will analyze the effect of each factor on the helpfulness of online review.

Hypotheses

Rating extremity and review helpfulness

Different from the seller-created product information and third-party product review, the online consumer reviews are posted by users based on their personal experiences (Chen and Xie, 2008). In most of the review websites, the customers' rating for product ranges from one star to five

stars. The rating represents the subjective attitude of customer to the product; one star expresses the extremely negative attitude to the product, while the five stars express the extremely positive attitude to the product. Both of the two ratings represent an extremely rating for the product; the other middle ratings represent the moderate rating. The valence of consumer product reviews may serve as a proxy for underlying product quality, especially for experience products such as books and movies that are difficult for consumers to evaluate prior to purchase (Senecal and Nantel, 2004). The prior researches showed that review valence influences the customers' perception of the review value. The extent to which customers focus on product reviews may be affected by the review valence, and these difference further impacts on the helpfulness of reviews. Researchers showed that there are more extreme reviews than moderate reviews on Amazon.com and other sites (Dellarocas et al., 2005), because people are more likely to engage in interpersonal communication when they have very positive and very negative experiences (Anderson, 1998). Reviews providing clearly positive evaluations help consumers make a purchase they will value, while clearly negative evaluations help consumers avoid a purchase they may otherwise regret. So, we think that whether positive or negative, extreme reviews should be judged as more helpful because they have clear implications for reducing perceived uncertainties during purchase decision. In contrast, moderate reviews are relatively uninformative because they contain ambiguous information (relative to extreme reviews) and therefore do not provide a clear guide for customers' perception of the product quality. Therefore, we hypothesize:

H1: Reviews extremity positively influences the helpfulness of online reviews. Movie reviews with extreme ratings are more helpful than movie reviews with moderate ratings.

Review subjectivity and Review helpfulness

The subjective emotions contain positive and emotions negative emotions. Typically, e-WOM product review is written to either recommend or discourage others from buying the product (Sen and Dawn, 2007). Previous researches demonstrated that the two emotions have different impact on consumers' purchasing decision and consumers pay more attention to negative information than to positive information (Herr et al., 1991). In

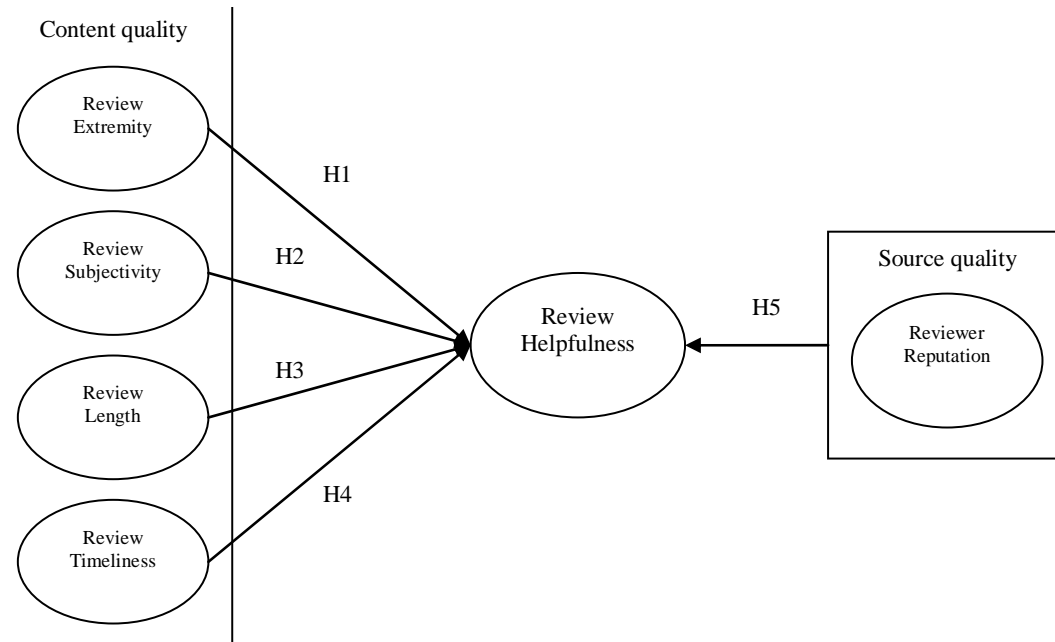


Figure 2. Model of customers' review helpfulness.

traditional WOM literatures, many researchers indicated that negative WOM influenced the consumers' decision more than positive WOM. When a person gave an opinion about a product, negative ones may be more credible than positive ones. They explained the reasons for the observation. For example, the findings of impression formation in psychological field (Skowronskij, 1989), in the process of evaluating product for specific people give higher weight to negative information about evaluated product than positive information. This is because of people have different response strength in facing negative or positive information; and negative information contributes more to the final impression than positive information. In retailing field, Ahluwalia et al. (2000) found that consumers usually think that negative information is more diagnostic than positive information, so they depend on the negative information in making purchasing decision.

However, recent researchers draw different conclusions from prior studies. For example, product type (utilitarian product and hedonic product) moderates the effect of review valence and readers exhibit a negativity bias for utilitarian product reviews only (Sen and Dawn, 2007). For hedonic product reviews, customers are more likely to trust positive opinions. They applied the attribution theory paradigm (Curren, 1987; Mizerski, 1982) to explain the inferences made by readers about the reviewer's motivations in posting the review. According to the attribution theory paradigm, consumers are more likely to infer that the reviewer's negative reviews about a hedonic product were motivated by personal reasons unrelated to the product's quality. Thus, people think that the negative

reviews about a hedonic product are lack of trust, and thus the effect of negative reviews on the uncertainty reduction during purchasing making is reduced. Affective confirmation hypothesis (Adaval, 2001) also offers support for this conclusion. The author found that customers gave greater weight to attribute information when this information was consistent with their mood than when it was inconsistent with their mood. When reading product reviews for hedonic products consumers likely anticipate a positive mood because they are looking forward to choosing a product that will make them feel good. According to the affective confirmation hypothesis, the effect of negative reviews on the customers' decision making is reduced as it is inconsistent with their anticipated mood (Adaval, 2001; Pham, 1998). Therefore, we hypothesize:

H2: The positive inclination of reviews has positive impact on the helpfulness of reviews for experience goods. The positive movie reviews are more helpful for customers than negative movie reviews.

Review length and review helpfulness

Consumers are often lack of full information on product quality when they make purchase decisions. In order to reduce the purchase uncertainty, consumers need to seek online consumer reviews about the product quality before making purchase decisions (Chen and Xie, 2008). Information from a non-marketer has been shown to be especially credible (Herr et al., 1991). However, seeking

information is costly and time consuming, and there are trade-offs between the perceived costs and benefits of additional search (Stigler, 1961). Research showed that the amount of information is especially beneficial to the consumer if the information can be obtained without additional search costs (Johnson and Payne, 1985) and information length can increase information diagnostically. Differ from the reviews for search goods, which contain factual information about the product's objective attributes, the movie review contains mainly personal subjective information such as opinions, feelings; thus, longer movie reviews contain more subjective information in the reviews. So the additional subjective information in long reviews will provide more suggestions for the consumers and reduce the perceived uncertainty during purchase decision process. Therefore, we hypothesize

H3: Review length has positive effect on the helpfulness of the movie review.

Review timeliness and review helpfulness

According to the definition in IQ theory, timeliness represents how timely and up-to-date the information is. In many IQ dimension frameworks, the timeliness generally is categorized as context factor, which highlights the requirement that IQ must be considered within the context of the task at hand (Ballou and Pazer, 1985; Delone and Mclean, 1992; Jarke and Vassiliou, 1997; Wang and Strong, 1996; Zmud, 1978). Therefore, the high quality information must be timely for our task. According to Nelson (1974), search goods are those for which consumers have the ability to obtain information on product quality prior to purchase, while experience goods are products that require sampling or purchase in order to evaluate product quality. It is difficult to evaluate the quality of the experience goods based on objective standard and the quality of experience goods only be obtained through customers' experiences. Research shows that a quarter of a motion picture's total revenue comes from the first two weeks (Dellarocas et al., 2004). During this period of film showing movie fans have high expectations and are highly eager for the movie reviews. Therefore, WOM activities are the most active during a movie pre-release and opening week (Liu, 2006). Some previous studies showed that product reviews written early tend to get more user attention on e-commerce website (Jindal and Liu, 2008; Liu et al., 2007). In information search contexts the research showed that rapid response to information queries enhanced the perceived value of information because the speed of response may signal the information provider is knowledgeable (Weiss et al., 2006). From the uncertainty reduction theory perspective, the earlier published movie reviews are more valuable for audiences to reduce the film watching uncertainties. Therefore, we hypothesize:

H4: Review timeliness has a positive effect on the

helpfulness of the movie review. The earlier published movie reviews are more helpful.

Reviewers' reputation and review helpfulness

Product reviews embody the consumers' subjective perception to the products, especially reviews for the experience products. To some degree, online reviews are not verifiable and may not be objective and credible to potential customers (Hu et al., 2008). The customers perhaps cannot obtain the credible evaluation only by reading the review content. In order to improve the credibility of the reviews customers need to focus on the author of the review. Credibility of information is often positively related to the trustworthiness of the information source (Wilson and Sherrell, 1993). User reputation refers to the extent to which the user is able to provide trustworthy information (Bristor, 1990). Information source credibility is generically recognized to play a role for the effectiveness of communication (Hovland and Weiss, 1951) and to influence consumers' perceptions and attitudes towards objects (Frewer et al., 1998). The reviews published by different authors have different influence on the customers. The reviews written by reviewers with better quality reputations have greater impact on the customers' purchase decisions (Hu et al., 2008). According to the uncertainty reduction theories, reviews from high reputation writer will help decrease a product's quality uncertainty. From the perspective of information receiver, the information from highly reputation writer is more trusted or highly regarded (Bristor, 1990). The information provider's depth of knowledge positively influences the information receiver's perceived value of the provider's information (Weiss et al., 2006). These findings show that consumers will give more weight to the reviews from high reputation writer when they make a purchase decision. Therefore, we hypothesize:

H5: Reviewers' reputation has positive effect on the helpfulness of review. The reviews from high quality reviewers are more helpful than those from low quality reviewers.

RESEARCH METHODOLOGY

Data collection

For validating the hypotheses in this paper we collect the movie reviews from IMDB.com. IMDB.com is the largest online movie review website with over 57 million visitors each month (Noi et al., 2010), in which the users are from all over the world (<http://www.alex.com/>).

We developed a c# program to collect the movie reviews and reviewer information from IMDB.com. Firstly, we randomly selected 200 movies from IMDB.com using a random counter on the movie identification number; we expect that 200 movies is a well representation of the movies across the websites. Secondly, we

Table 2. Descriptive statistics for dataset.

Variable	Mean	SD	Min	Max
Rating	7.08	2.98	1	10
Extremity	0.87	0.33	0	1
Word Count	278.55	192.49	33	1277
Elapsed Days	509.76	817.69	0	3809
Reviewers' reputation %	29.53	30.79	0	1
All votes	178.74	212.68	51	1747
Helpfulness %	53.35	20.41	1.56	1

collected all reviews from the selected movies. For studying the impact of reviewer-based features on helpfulness, we also retrieved all past reviews for each reviewer, and collected the related information for each of the past reviews.

For raising the robustness of our research, we filtered the movie reviews through the following processes. Because some reviews written recently have not been rated fully, we only preserve reviews written ten days ago. For observing the rating's influence we eliminate the reviews not rating for the movie. To ensure the model robustness we only keep the reviews with more than 10 votes. The details about the final dataset are in Table 1.

Variables

We can operationalize the variables of our model using the collected data. As defined usually in the previous papers, we define the percentage of people who thought the review helpful as the dependant variable (Helpfulness %). This was derived by dividing the number of people who voted the review helpful by the total votes.

The explanatory variables are from factors in the research model including review extremity, review subjectivity, review length, review timeliness, and reviewer reputation. We construct a dummy variable to measure the review extremity (Extremity). The ratings in IMDB.com range from 1 star to 10 stars. Specifically, ratings of 5 and 6 were classified as moderate reviews while ratings nearer the endpoints of the scale (1, 2, 3, 4, 7, 8, 9, 10) were classified as extreme reviews. We also ran our analysis with another specification of extreme reviews where ratings in the middle of the scale (4, 5, 6, and 7) were classified as moderate reviews while other ratings were classified as extreme reviews. The results were identical to our current results, and are hence omitted for brevity. We construct another dummy variable to measure the review subjectivity (Subjectivity). Ratings of 1, 2, 3 and 4 were classified as negative reviews while ratings of 7, 8, 9, and 10 were classified as positive reviews. Review length is measured by the words count of the review (Word Count). In past researches the review timeliness was measured usually by the difference between the date of review and the release date of the product (Ghose and Ipeirotis, 2006), but in movie review website there are some reviews published before the movie is released (Liu, 2006), which leads to the interval of the date of review and the release date of the movie meaningless. Thus, we measure the variable with the interval days (Elapsed days) between the current review and the first review of the movie because we only care for the impact of the different published dates on the helpfulness of reviews. We measure the reviewer reputation using the average helpfulness of the past reviews written by the reviewer (Reviewers' reputation). It is noteworthy that the reviewers' reputation changes with time because we just consider the past reviews for each point in time in measuring the variable. The descriptive statistics for the variables are included in Table 2.

Empirical model

For testing the H1, we included the dummy variable Extremity to the model. Extremity equals to 1 for the extremity reviews and equals to 0 for the moderate reviews. For the hypotheses from H3 to H5, the modeling processes are same. We included the corresponding variables into the model. Since the dependent variable is a percentage, this could hide some potentially important information (Susan and David, 2010). We included the total number of votes on each review's helpfulness as a control variable (All votes). The first empirical model is:

$$\text{Helpfulness\%} = \beta_1 \text{Extremity} + \beta_2 \text{WordCount} + \beta_3 \text{Elpseddays} + \beta_4 \text{Rating} + \beta_5 \text{ReviewerReputation} + \beta_6 \text{AllVotes} + \varepsilon \quad (1)$$

For test the H2, we build the second regression model. We included the dummy variable Subjectivity to the model. Subjectivity equals to 1 for the positive reviews and equals to 0 for the negative reviews. The second empirical model is:

$$\text{Helpfulness\%} = \beta_1 \text{Subjectivity} + \beta_2 \text{WordCount} + \beta_3 \text{Elpseddays} + \beta_4 \text{Rating} + \beta_5 \text{ReviewerReputation} + \beta_6 \text{AllVotes} + \varepsilon \quad (2)$$

RESULTS

The results of the regression analysis for model 1 are included in Table 3. As indicated in Table 3, the model 1 fitted the data quite well, with a highly significant likelihood ratio ($p=0.000$), and an adjusted R2 of 0.423.

To test the H1, we examined the terms of Extremity. As shown in the Table 3, the Extremity (0.0011) was statistically significant; the positive coefficient of Extremity (0.0312) showed that the extreme reviews are more helpful than moderate reviews. Therefore, we support H1. In hypothesis 3, we expect the length of review has positive effect on the helpfulness of the review. From Table 3, we found that the word count has a significant relationship with the helpfulness. The positive coefficient of Word count (0.0242) showed that the H3 is supported.

To test the H3.1, we examined the coefficient of the Elapsed Days in Table 3. The Elapsed Days (0.000) was statistically significant. The Elapsed Days of the review has negative (-0.0100) effect on the helpfulness of the review, which indicated that earlier reviews were more helpful for customers. Therefore, the H4 is supported.

The results also provided strong support for H5, which hypothesizes that the reviewer reputation influences the helpfulness of the reviews. This support is indicated by the significant term Reviewers' reputation (0.0000) in the model. The positive coefficient of Reviewers' reputation (0.0789) showed that the reviewers' reputation has a positive effect on the review helpfulness. From Table 3, we found that the All votes does not have a significant relationship with the helpfulness.

To examine the relationship of the review subjectivity with the helpfulness of the review, we split the data into two subsamples, extreme reviews and moderate reviews. The analysis of the model 2 from the extreme reviews is shown in Table 4. The analysis of the model indicates a

Table 3. Regression output for full sample.

Variable	Coefficient	Standard error	t-value	Sig.
(Constant)	0.3831	0.0272	14.089	0.0000
Extremity	0.0312	0.0217	0.4378	0.0011
Word Count	0.0242	0.0932	0.5822	0.0134
Elapsed Days	-0.0100	0.0000	-5.9136	0.0000
Reviewer Reputation	0.0789	0.0137	5.7513	0.0000
All Votes	0.4476	0.0319	14.2123	0.4273

F=112.167, sig. =0.000, R²=0.423.

Table 4. Regression output for extreme reviews.

Variable	Coefficient	Standard error	t-value	Sig.
(Constant)	0.3408	0.0453	7.5139	0.0000
Subjectivity	0.0161	0.0219	0.5734	0.0018
Word Count	1.6765	0.4584	3.7763	0.0102
Elapsed Days	-0.2311	0.0000	-6.2003	0.0200
Reviewer Reputation	0.1002	0.0190	5.3499	0.0000
All Votes	1.2626	0.0702	18.0175	0.0567

F=162.7727; sig. =0.000, R²=0.417.

good fit, with a highly significant likelihood ratio ($p=0.000$), and an adjusted R² of 0.417. We support H2 (Table 4).

DISCUSSION

The results of the study show that content-related factors and reviewer-related factors both influence the review helpfulness. In content-related factors, review extremity, review subjectivity, review length, and review timeliness have significant effects on the helpfulness of reviews for experience goods. In reviewer-related factors, the reviewers' reputation measured with the past performance of a reviewer positively affects the review helpfulness. As a result, our findings contribute to the literature on information quality within the context of online reviews and deepen our understanding to the perceived helpfulness of reviews for experience goods.

From a theoretical perspective, this research adopted uncertainty reduction theory and review quality framework to build a theoretical framework and to understand the factors affecting the perceived helpfulness of reviews for a special experience goods-movie. Specifically, our study provides an interesting contrast to the findings of Susan and David (2010) that for experience goods, reviews with extreme ratings are less helpful than reviews with moderate ratings. In contrast, we found that for movie reviews, reviews with extreme ratings are more helpful than reviews with moderate ratings. The prior study for book reviews (Forman et al., 2008) also drawn

same conclusions as our findings. These conflicting findings indicate that review extremity not only has different impact on the helpfulness of reviews across different product types (experience goods and search goods), but also has different impact on the helpfulness of reviews in different experience goods. Therefore, we think that the simple categorization of search and experience goods in studying the perceived helpfulness of reviews might omit some potential factors. As Susan and David (2010) said, products can be described as existing along a continuum from pure search goods to pure experience goods. Although, mp3 player and movie both are experience goods, the extent to which they belong to experience goods is different. Mp3 player involves a mix of search and experience attributes, and some important attributes such as capacity, supported standard can be obtained by customers prior to purchase, while movie is closer to the pure experience goods than mp3 player. Subjective taste plays a more important role in evaluating the movie quality, and users expect to read a personalized, highly subjective reviews, describing the quality of the movie that are not described by the product objective description. Adopting more concise product categorization might deepen our understanding to this issue. Further, our results indicate that the two different extreme reviews, that is, positive extreme reviews and negative extreme reviews have asymmetry impact on the perceived helpfulness of reviews: positive reviews are more helpful than negative reviews for experience goods. This finding is consistent with the prior research of Sen and Dawn

(2007), who found that readers of hedonic product reviews are more likely to attribute the negative opinions expressed to the reviewer's internal (or non-product related) reasons, and therefore the negative reviews are less useful.

Based on Hypothesis 2, we find that an increase in the review length has a positive and statistically impact on review helpfulness for movie. Our findings support the notion that the added information of reviews can help the decision process by increasing the consumer's confidence in the decision. For experience goods, longer reviews often include more subjective feeling and more subjective evaluation about the product. This added information can increase the perceived helpfulness of reviews. This conclusion is consistent with the results of Susan and David (2010)'s research.

We also find that the timeliness of review influences the helpfulness of movie reviews. The earlier published movie reviews are more helpful to customers. This finding is consistent with the notion that the speed of information response can effectively enhance the perceived value of information (Weiss et al., 2006). Specifically, during the early period of film showing, the movie reviews are more helpful for movie fans in reducing the watching uncertainties.

In addition, the reviewer-related features also increased the helpfulness of the product review. Specifically, we found that the past history of a reviewer is an effective predictor for the helpfulness of the future reviews written by the same reviewer. The high reputation reviewers are more likely to generate helpful reviews in future. This is consistent with prior research, such as Forman (2008), who found that social information about reviewer is likely to be an important predictor of consumers' buying decisions. Facing with an overload of information in the form of numerous reviews from numerous reviewers, community members choose information using source characteristics as a convenient and efficient heuristic device. In information processing literature, the prior research also has drawn same conclusions. People evaluate message by an interactive combination of message source and message content (Pornpitakpan, 2004), in particular, message content is weighted by the credibility or expertise of the message source (Gilly et al., 1998; Hass 1981).

Prior research has indicated that the consumer reviews increase both the usefulness and social presence of the website (Kumar and Benbasat, 2006). The presence of consumer reviews can increase the customer perception of the website. Further, researchers found that the perceived helpful reviews have greater value to online retailers, such as increased sales (Chen et al., 2008; Chevalier and Mayzlin, 2006; Clemons et al., 2006; Ghose and Ipeirotis, 2006). On the basis of these findings, this paper studies the determinants to the perceived helpfulness of online customer reviews. The results deepen our understanding of how the online reviews reduce quality uncertainty during purchase process. The

findings also have practical implications for online retailers. Firstly, online retailers can guide users to write more helpful reviews for experience goods using the findings of this study. For example, the reviewers should provide clearly evaluations that either positive or negative for the experience goods. Reviewers should be encouraged to write reviews as much earlier as possible. The length of reviews is also important for experience goods; thus, retailers should encourage the customers to provide reviews as much length as possible. Secondly, the findings in this study can be used by online retailers to design an effective reviews recommendation system. The recommendation system has become a necessary part in many websites, including social networks, retail websites. Recommending the valuable reviews can help consumers to make a better decision more easily. The presence of recommendation system also increases the perceived usefulness of the websites (Kumar and Benbasat, 2006). This study shows that the review valence, review length, review timeliness, and reviewer reputation have significant related with the helpfulness of the reviews. Online retailers can build helpfulness model with these factors to predict the helpfulness of reviews as earlier and recommend most helpful reviews to customers as earlier as possible. Thirdly, our study also shows that not only the content-related factors, but also the reviewer-related factors affect the perceived helpfulness of the reviews. Therefore, providing convenient ways to obtain the reviewer information can aid the consumers' judgments of reviews. In fact, on many sites such as Amazon, information about the reviewer is highly salient, and more voluminous than information on the products they review.

Conclusion

The perceived helpful reviews reduce the purchase uncertainties and improve the customer perception of the websites. This paper contributes to electronic commerce research and literature by studying the determinants to the helpfulness of online movie reviews. Drawing on the uncertainty reduction theory and information quality framework, we build a theoretical model. According to the findings, content-related factors (review extremity, review subjectivity, review length, and review timeliness) and reviewer-related factor (reviewer reputation) are influential on the review helpfulness for experience goods. The study has implications for research on information quality in electronic commerce, and provides suggestions for reviews recommendation and reputation system designing for online retailers.

As with any study, there are some limitations to the present study, and these limitations present opportunities for future research. Firstly, our research only focuses on an experience goods—movie reviews, and it is yet unknown whether our findings hold in other experience goods. In future we could gather more online reviews

from other experience goods to confirm our results. Secondly, although this research studies the effect of the reviewer expertise on the review helpfulness, the research model could also be extended to include other possible reviewer-related factors, such as reviewers' exposure. Different from the reviewer expertise, reviewers' exposure refers to the exposure of a reviewer in the online community. According to the analyst fore-cast literature, consumers may pay more attention to reviews written by higher exposed reviewer. Prior research showed that reviews written by higher exposed reviewer have greater impact on the product sales (Hu et al., 2008), which might be because the reviews issued by these reviewers reduce perceived uncertainties. Future studies could apply the related theory to study the role of reviewers' exposure in the review helpfulness. Finally, although we consider the impact of review subjectivity on the helpfulness of the reviews, the review subjectivity only is measured with the limited magnitude of star rating. The content of review expresses reviewer's attitude to the product in detailed manner. Future research could apply the emotion analysis and opinion mining technique to investigate the comprehensive subjectivity in reviews. Thus quantitative analysis for the review subjectivity may provide more insights into perceived helpfulness of reviews.

Conflict of interest

The authors have not declared any conflict of interests.

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