REVISIT THE INFORMATION ADOPTION MODEL BY EXPLORING THE MODERATING ROLE OF TIE STRENGTH: A PERSPECTIVE FROM CONSTRUAL LEVEL THEORY

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Abstract

Previous studies on review information adoption, drawing upon dual process theory, focus on the important roles of two key review-related factors namely argument strength and source credibility, but pay less attention to the social relationships between review sources and recipients. To fill this research gap, based on the construal level theory, we articulate that tie strength moderates the impacts of argument strength and source credibility on content diagnosticity. A survey was conducted to examine the proposed research model and hypotheses and the results showed that the relationship between argument strength and content diagnosticity is stronger when tie strength is weak than when tie strength is strong while the relationship between source credibility is stronger when tie strength is strong than when tie strength is weak. The theoretical and practical implications of the study are also discussed.

Keywords: eWOM, information adoption, dual process theory, construal level theory, tie strength
1 INTRODUCTION

In today’s life, the development of network technology is rapid and widespread, encouraging the proliferation of electronic Word-Of-Mouth (eWOM). Topics related to eWOM has been attracting researchers’ attention because it plays a significant role in consumer’ product evaluation (Gupta and Harris 2010) and purchase decision (Filieri and McLeay 2014; Senecal and Nantel 2004). Among these studies, dual process theories (e.g., Elaboration Likelihood Model) appear to be valid perspectives in explaining the impacts of eWOM (Cheung et al. 2008; Filieri and McLeay 2014).

EWM was so attracting and interesting for both researchers and Internet users partially because people can no longer rely merely on friends for advice on purchase decisions; strangers help each other. Zhang and colleagues (2013) also indicated that online reviews were mostly contributed by strangers on the Internet. But with the rivial completion of electronic commerce, it is not always a good idea to give credit to strangers’ reviews. Recent researches indicated a continuously intensifying tendency of manufacturing and manipulating online reviews (Dellarocas 2006; Floh et al. 2013; Hu et al. 2011; Hu et al. 2012). Thus, it is entirely possible that when doing purchase decisions, online consumers prefer to friends’ help again. And it cannot be ignored that such more cautious way of users’ eWOM adoption may cause different results and new perspectives for information adoption literature. Nowadays some websites, such as Dianping.com from China (www.dianping.com), recognizes such change and try to integrate the eWOM services with social networking services, enabling users to gain online acquaintances easily and build relationships with each other. Thus, online reviews can come from online friends.

The relationship between sources and recipients and how such relationship affects the information adoption process has rarely been investigated in previous studies. To fill this research gap, this study revisit the information adoption model by considering the effect of tie strength between users. With different tie strength, online users will form different information process. So our study tries to answer the following research question:

RQ: What is the role of tie strength in user information adoption?

Drawing upon the Construal Level Theory (CLT), we propose a research model to capture the moderating role of tie strength to advance the original dual process theories. Specifically, we combine social distance with CLT to explain the different mechanisms of information processing for users with different tie strength.

2 THEORETICAL BACKGROUND

2.1 Elaboration Likelihood Model and Information Adoption Model

The main theoretical framework of the study, Elaboration Likelihood Model (ELM), is a persuasion theory (Petty and Cacioppo 1986). When a person is exposed to a message, it models how the characteristics of the message influence the person’s attitude formation and subsequent behaviour (Ho and Bodoff 2014). Specifically, ELM posits two information processing routes: the central route entails careful scrutiny of the information, whereas the peripheral route uses environmental cues to decide whether to accept a message (Cheung et al. 2009). Consistent with this view, Sussman and Siegal (2003) adopted ELM and proposed the information adoption model to explain people’s information adoption behaviors in computer-mediated communication contexts (Cheung et al. 2008).

In this study, we attempt to use the ELM and information adoption model to understand the user’s eWOM adoption. However, different from the original information adoption model, we attempt to examine a new mediator “content diagnosticity”. Content diagnosticity is used to describe to which extent the content of a piece of information can solve a consumer’s problem (Li et al. 2013). The earlier notion of the construct is from the helping behaviour literature, associated with the ability of
problem solving. Recent research pointed out that in the context of online purchasing, content diagnosticity is consistent with the concept of problem solving when the consumers confront the problem of making purchasing decisions (Li et al. 2013). So we believe content diagnosticity fits our research context well and can be used as the mediator in the information adoption model.

2.2 Construal Level Theory and Social Distance

Another important theory of this study is Construal Level Theory (CLT). According to CLT, high-level construal reflects a general understanding of the object, whereas low-level construal reflects the details and specifics of the object. Evolved from the relationship between psychological distance and people’s knowledge about low- and high-level features of objects, an association would be established (Trope and Liberman 2003). Such association is overgeneralized, leading people to use high-level processing orientation for distal objects and low-level processing orientation for proximal objects (Liviatan et al. 2008).

In light of CLT, the current study seeks to understand the impact of social distance on individual’s eWOM adoption. Social distance has been defined as a measure of the closeness between participants in a strategic interaction and acknowledged to have a profound influence on individual decisions (Buchan et al. 2006). Prior studies demonstrated that people have typically more low-level knowledge about socially closer others. Idson and Mische (2001) also pointed that actions of a socially distant person would more likely be represented in terms of abstract and superordinate characteristics, such as traits, whereas the same actions performed by a close other would more likely be represented in terms of more concrete and subordinate features, such as contextualized behaviours. Similarly, Zhao and Xie (2011) also demonstrated that people’s mental representations of close others’ behaviours are often at a low and concrete level, whereas distant others’ behaviours are construed at a high and abstract level.

In this research, we adopt tie strength as the indicator of social distance. Tie strength represents the level of intensity of the social relationship between consumers (Steffes and Burgee 2009). With different tie strength, online users will form different information processes. Prior researches indicated the relationship between tie strength and trust. Tsai and Ghoshal (1998) suggested that parties of strong ties are likely to be trustworthy. More recently, Zhang and colleagues (2013) extrapolated that tie strength posits positive impacts on source credibility.

In online eWOM contexts, online reviewers would attempt to establish some social connections with others. Through their online interactions like checking for others’ review updates, posting comments to others’ reviews or initiating discussions on certain products, tie strength could become stronger and social distance becomes closer. So in this paper, based on CLT combined with social distance, we try to explain how different tie strength of online consumers influences their adoption of online reviews.

3 RESEARCH MODEL AND HYPOTHESES
**Figure 1. Research Model**

We propose our research model in Figure. 1. In this model, argument strength and source credibility of eWOM are regarded as two critical predictor of consumer’s review evaluation of content diagnosticity. The dependent variable information adoption is influenced by content diagnosticity. Furthermore, the impact on content diagnosticity of source credibility and argument strength are sensitive to tie strength.

### 3.1 The central route and peripheral routes in information processing

Literature shows that source credibility and argument strength are vital factors in communication judgment (Cacioppo et al. 1983; Wathen and Burkell 2002).

Source credibility can be defined as recipients’ perception about the credibility of the source of a review rather than the content of this message (Chaiken 1980). It captures the expertise and trustworthiness of the information source (Cheung et al. 2008). In the current research, source credibility is operationalized as user’s general evaluation about all sources on the website. And we define review content diagnosticity as the extent to which a review discriminates between alternative interpretations of a problem and possible solutions to it (Herr et al. 1991); it describes the ability of problem solving of a review. Access to highly diagnostic information allows recipients to solve their problem more effectively.

Recent studies on ELM (e.g., (Ho and Bodoff 2014)) showed that when depth of processing is low, the peripheral route would occur. If a user finds the comments are posted by high-credibility individuals, he/she would be more likely to perceive it of high content diagnosticity. Thus, we hypothesize:

**H1. Source credibility positively affects content diagnosticity.**

Argument strength is the extent to which the message recipient views the argument as convincing or valid in supporting its position (Chaiken 1980). A high level of argument strength indicates that the information is justified and compelling (Byrne 1971). In previous ELM research, central route occurs when depth of processing is high. In our context, the higher strength of content-based arguments consumers perceive, the more likely they would think the information as content diagnostic. Similar to source credibility, argument strength in our research also represents user’s general evaluation about all the reviews on the website. So we propose:

**H2. Argument strength positively affects content diagnosticity.**

According to information adoption model, individuals will adopt information if he/she regards it as helpful or useful. The variable content diagnosticity can reflect to which extent can the content of a review solve consumer’s problem (Cheung et al. 2008). According this definition, it can be suitably regarded as a description of helpfulness. In research of helping behaviour, problem solving occurs when advisers give advisees information about what to do with a problem (Bhattacherjee and Sanford 2006). The notion of perceived content diagnosticity is consistent with the concept of problem solving (BACH 1967). And in the context of online shopping, problem solving occurs when the advisees confront a problem of purchase decision (Cheung et al. 2008). A highly diagnostic review can help the consumer facilitate judgment or purchase decisions and therefore has great chance to be adopted by review recipients. Thus, we hypothesize:

**H3. Content diagnosticity positively affects information adoption of review recipients.**

### 3.2 The Moderating Effect of Tie Strength

As we said before, tie strength is the level of intensity of the social relationship between consumers or degree of overlap of two individuals’ friendship (Steffes and Burgee 2009). According to Wirtz and Chew (2002), eWOM is a social behavior, and consumers will interact with people from a spectrum of various degrees of tie strength, ranging from strong primary (e.g. a spouse) to weak secondary (e.g. a
seldom-contacted acquaintance). When tie strength among online individuals becomes stronger through their online interactions, individuals will establish social connections for a probability decreasing with their relative social distance (Boguñá et al. 2004). From this perspective, we investigate the question combined with Construal Level Theory, which links people’s mental representations and the psychological distance of the information (Song et al. 2014). CLT studies on distancing and persuasion has pointed that persuasion was highest when participants experienced a small (as opposed to large) amount of distance and received low level, concrete (rather than high-level, abstract) persuasive messages (Nan 2007). For example, as psychological distance increases, advertisements featuring higher level construal - core, central claims - will yield greater receptivity, while as psychological distance decreases, advertisements with low-level construal - peripheral claims - will produce greater receptivity (Dhar and Kim 2007).

In this paper, we extrapolate when weaker tie strength between individuals in online review sites, which leads to social distance increases, online eWOM reviews featuring higher level construal - core, central route (e.g., argument strength) - become more persuasive. By contrast, when tie strength is stronger and social distance decreases, the lower level, concrete, or peripheral features (e.g., source credibility) of eWOM is more persuasive. It is notable that tie strength in our research indicates user’s overall relationship with others, not a certain user on the website. Thus, we propose:

\[ H4. \] The effect of source credibility on content diagnosticity is stronger when tie strength between review provider and recipient is higher than when it is lower.

\[ H5. \] The effect of argument strength on content diagnosticity is stronger when tie strength between review provider and recipient is lower than when it is higher.

4 METHODOLOGY

4.1 Research settings

We employ a famous Chinese online review site named Dianping.com (www.dianping.com) as the research context, since it provides social services like commenting to or liking a review, following a reviewer to check his/her reviews and send him/her virtual gifts. This feature enables online interaction and stronger tie strength among users. So Dianping.com is appropriate for the research.

4.2 Measures

All items were adapted from validated measures in prior studies (see Appendix A) and measured by multi-item scales with five-point Likert scales, from 1=strongly disagree to 5=strongly agree. Some minor changes were made in the wording of the items to fit Chinese expression, tone and the specific research context. Since the instruments were originally developed in English, we translated the items into Chinese. After making sure that no ambiguity of the sentences or misrepresentation of the original items occurred during translation, we conducted the survey in China. We also conducted a pilot survey and the feedback was used to refine our items and make the final survey.

4.3 Data collection

We distributed URLs of the questionnaire to participants found by three ways: 1) friends who have experience of using Dianping.com; 2) reviewers whose contact ways were shown on Dianping; 3) followers of the Dianping’s official micro-blog account. Messages sent to them included the URL of the questionnaire and a brief introduction of our study. To encourage participation, some incentives (e.g., prepaid phone card) were provided through a lucky draw.

We sent 1000 invitation letters and finally gathered 230 usable responses. In the sample, a clear majority (71.7%) has used the internet over six years, indicating abundant experience. 61.3% of the respondents were female and 38.7% were male. The average age was 22 years old.
We checked the scores of three items of tie strength from all the useable responses. Then we calculated the value of tie strength of every single record by taking the average of these three items. Subsequently an average value of tie strength was worked out by taking the average of the value of tie strength in all the 230 records, which turned out to be 3.0058. Finally, we grouped data by the value of tie strength: Low-TS group (the group with lower value than average), containing 115 records; and High-TS group (the group with higher value than average), also containing 115 records.

5 DATA ANALYSIS

To address the nonresponse bias, we compared the means of variables for the first 1/4 and the last 1/4 of the samples, and no significant difference was found. Common method bias was evaluated by single factor approach, and the exploratory factor analysis (EFA) indicated that 31.12% of the predicted variance was attributed by the first principle component, suggesting that common method bias was not a critical concern to the study. Partial Least Squares (PLS) Graph 2.0 was used to analyse the data and examine the hypotheses. PLS could simultaneously assess the measurement model and the structural model, and it requires a relatively small sample size, without restriction on normal distribution, so it is more suitable for exploratory analysis (Chin et al. 2003). Following the two-step analytical procedures, we examine the measurement model and the structural model respectively.

5.1 Measurement model

The measurement model was assessed by the full sample and each subgroup separately. Reliability, convergent validity, and discriminant validity were three indicators of the goodness of the measurement model. Reliability can be assessed by using composite reliability, and average variance extracted (AVE) (Fornell and Larcker 1981). Fornell and Larcker (1981) proposed 0.7 and 0.5 as the threshold value of composite reliability and AVE, respectively. Table 1 shows all the constructs were of good reliabilities. Convergent validity was assessed by checking the loadings to see if items within the same construct have high loading values. Loadings of all the items on their respective latent construct were all higher than 0.7 in this study, indicating good convergent validities. Besides, Discriminant validity could be assessed by comparing the square root of AVE of a construct and correlations of that construct with the other constructs: if the square root of AVE is higher than any correlations related to this construct, acceptable discriminant validity is indicated (Fornell and Larcker 1981). The results show that all the constructs have good discriminant validity.

<table>
<thead>
<tr>
<th></th>
<th>Composite Reliability</th>
<th>AVE</th>
<th>AS</th>
<th>CD</th>
<th>IA</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td>.909</td>
<td>.714</td>
<td>.845</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>.926</td>
<td>.807</td>
<td>.300</td>
<td>.898</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>.871</td>
<td>.627</td>
<td>.382</td>
<td>.600</td>
<td>.792</td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>.854</td>
<td>.600</td>
<td>.483</td>
<td>.252</td>
<td>.262</td>
<td>.775</td>
</tr>
<tr>
<td><strong>Low-TS group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td>.914</td>
<td>.725</td>
<td>.851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>.925</td>
<td>.804</td>
<td>.386</td>
<td>.897</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>.873</td>
<td>.633</td>
<td>.446</td>
<td>.589</td>
<td>.796</td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>.853</td>
<td>.603</td>
<td>.412</td>
<td>.281</td>
<td>.332</td>
<td>.777</td>
</tr>
<tr>
<td><strong>High-TS group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td>.894</td>
<td>.678</td>
<td>.823</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>.929</td>
<td>.813</td>
<td>.250</td>
<td>.902</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>.869</td>
<td>.627</td>
<td>.356</td>
<td>.643</td>
<td>.792</td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>.830</td>
<td>.552</td>
<td>.514</td>
<td>.292</td>
<td>.226</td>
<td>.743</td>
</tr>
</tbody>
</table>

Table 1. Reliability and discriminant validity

**Note:** The numbers in bold in diagonal row of the correlation matrix are the square root of AVE. AS, argument strength; CD, Content Diagnosticity; IA, information adoption; SC, source credibility.
5.2 Structural Model

With adequate measurement models, the hypotheses were tested by examining the structural models. In order to see different influence among people with different levels in tie strength, we depict the structural models for combined group, the Low-TS group, and High-TS group respectively. As with the explanatory power of the structural model, information adoption had $R^2$ values of 0.361 for the combined dataset, 0.347 for Low-TS group and 0.413 for High-TS group, making interpretation of path coefficients meaningful. Besides, with a one-tailed five percentage level of significance, the acceptable T-value in this study would be 1.650.

Following Keil et al (2000), the moderating effect of tie strength was tested by comparing path coefficients of the same relationship for low-TS group and high-TS group based on the PLS analysis (see appendix B for the method). The results indicated that source credibility had significant effect on content diagnosticity in both combined group ($\beta=0.140$, $t=2.015$) and High-TS group ($\beta=0.222$, $t=2.310$), but insignificant in Low-TS group ($\beta=0.147$, $t=1.075$) In contrast, argument strength was significant for both combined group ($\beta=0.333$, $t=3.185$) and Low-TS group ($\beta=0.326$, $t=3.599$) but insignificant for High-TS group ($\beta=0.135$, $t=0.845$). In other words, H1 was not supported for low-TS group and H2 was not supported for high-TS group. Also, content diagnosticity had significant effect on information adoption in combined group ($\beta=0.600$, $t=10.937$), Low-TS group ($\beta=0.589$, $t=6.618$), and High-TS group ($\beta=0.643$, $t=11.341$), respectively. Thus, H3 was supported. Further, Table 2 listed the path coefficients comparison results, showing the significantly different path loadings for low-TS group and high-TS group. So H4 and H5 are supported.

<table>
<thead>
<tr>
<th>Construct (-&gt;CD)</th>
<th>Combined group</th>
<th>Low-TS group</th>
<th>High-TS group</th>
<th>Low-TS group vs High-TS group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argument strength</td>
<td>.233***</td>
<td>3.185</td>
<td>.326***</td>
<td>3.599</td>
</tr>
<tr>
<td>Source credibility</td>
<td>.140**</td>
<td>2.015</td>
<td>.147</td>
<td>1.075</td>
</tr>
</tbody>
</table>

Table 2. Model summary: statistical comparison of path coefficients

Note: *p<0.05, **p<0.01, ***p<0.001

6 DISCUSSIONS

6.1 Implications

This study offers an insight into dual process and provide a relatively new method of data processing.

First, this study empirically examines the role of tie strength in individual’s review adoption. Prior studies on information adoption model pay little attention to the relationship between review source and recipients. We fill this research gap by pointing out that argument strength and source credibility has different impacts on content diagnosticity in terms of different tie strength between users: argument strength has a stronger impact when tie strength is weak while source credibility has a stronger impact when tie strength is strong. The findings enrich the previous literature on information adoption by identifying the boundary conditions under which the two factors play their roles.

Second, this study extends the applicable scope of the Construal Level Theory by applying it in the context of information adoption. CLT is an important theory for it provides a more general framework to explain individuals’ decision making. However, the applicability of this theory in the context of information adoption has not been well examined. We takes CLT to theorize the moderating role of tie strength and the results confirm the validity of CLT in such context.
Apart from the theoretical implications, this study also has some practical implications. First, eWOM service providers should pay attention to improving the social networking functions to enhance users’ social tie strength, for example giving some incentives to let users express their experiences about the product, share and discuss their evaluation and suggestion, enable online users to build a relationship. Second, because tie strength has significantly moderating effect on users’ perception and subsequent adoption of reviews, an inviting system or alike encouraging users to invite friends to join the website should be established, which can help them get advice from friends more easily.

6.2 Limitations

This study also has several limitations. First, the research context of this study only adopts a single online review site (i.e., Dianping.com) in a single culture (i.e. China). It will limit the generalizability of the findings. Second, this study focused on the effect of tie strength on mechanisms of eWOM adoption, so some other factors are not included. Third, for convenience, we found participants from reviewers whose contact ways were shown on Dianping, which may cause selection bias.

Appendix A. Measurements

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Credibility (SC)</td>
<td>1. People who left these reviews are knowledgeable.</td>
<td>(Cheung et al. 2008; Sussman 2003)</td>
</tr>
<tr>
<td></td>
<td>2. People who left these reviews are experts.</td>
<td></td>
</tr>
<tr>
<td>Integrity</td>
<td>3. People who left these reviews are trustworthy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. People who left these reviews are reliable.</td>
<td></td>
</tr>
<tr>
<td>Argument Strength (AS)</td>
<td>1. The arguments of these reviews are convincing.</td>
<td>(Cheung et al. 2009; Zhang 1996)</td>
</tr>
<tr>
<td></td>
<td>2. The arguments of these reviews are persuasive.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The arguments of these reviews are strong.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. The arguments of these reviews are good.</td>
<td></td>
</tr>
<tr>
<td>Content Diagnosticy (CD)</td>
<td>1. The reviews helped me familiarize myself with the product.</td>
<td>(Jiang and Benbasat 2007)</td>
</tr>
<tr>
<td></td>
<td>2. The reviews helped me evaluate the product.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The reviews helped me understand the performance of the product.</td>
<td></td>
</tr>
<tr>
<td>Tie Strength (TS)</td>
<td>1. I often kept in touch these reviewers.</td>
<td>(He and Wei 2009; Levin and Cross 2004)</td>
</tr>
<tr>
<td></td>
<td>2. I frequently communicated with these reviewers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. My relationships with these reviewers were very close.</td>
<td></td>
</tr>
<tr>
<td>Information Adoption (IA)</td>
<td>1. To what extent do you agree with review?</td>
<td>(Cheung et al. 2009)</td>
</tr>
<tr>
<td></td>
<td>2. Information from review contributed to my knowledge of discussed product/service.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Review made it easier for me to make purchase decision. (e.g., purchase or not purchase).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Review has enhanced my effectiveness in making purchase decision.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Review motivated me to make purchase action.</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B. Path Coefficients Comparison Method (Keil et al. 2000)

\[
S_{pooled} = \sqrt{[(N_1 - 1)/(N_1 + N_2 - 2)] \times SE_i^2 + [(N_2 - 1)/(N_1 + N_2 - 2)] \times SE_j^2}
\]

\[
t = (PC_1 - PC_2)/\sqrt{S_{pooled} \times [(1/N_1 + 1/N_2)]}
\]

where \( S_{pooled} \) is the pooled estimator for the variance; \( t \) is the t-statistic with \( N_1 + N_2 - 2 \) degrees of freedom; \( N_i \) is the sample size of dataset for group \( i \); \( SE_i \) is the standard error of path in structural model of group \( i \); \( PC_i \) is the path coefficient in structural model of group \( i \).
References


