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Impact of informational factors on online recommendation credibility: The moderating role of source credibility

Chuan Luo [a,*], Xin (Robert) Luo [b], Laurie Schatzberg [b], Choon Ling Sia [c]

[a] Laboratory for Financial Intelligence and Financial Engineering, Southwestern University of Finance and Economics, Chengdu, China
[b] Anderson School of Management, University of New Mexico, Albuquerque, NM, USA
[c] Department of Information Systems, The City University of Hong Kong, Hong Kong, China

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ABSTRACT

This study investigates the moderating effect of recommendation source credibility on the causal relationships between informational factors and recommendation credibility, as well as its moderating effect on the causal relationship between recommendation credibility and recommendation adoption. Using data from 199 responses from a leading online consumer discussion forum in China, we find that recommendation source credibility significantly moderates two informational factors' effects on readers' perception of recommendation credibility, each in a different direction. Further, we find that source credibility negatively moderates the effect of recommendation credibility on recommendation adoption.

1. Introduction

Traditional word-of-mouth (WOM) has been shown to play an important role on consumers' purchase decisions (e.g., [2]). With the popularization of the Internet, more and more consumers have shared their past consuming experiences (i.e., online consumer recommendation) online, and researchers often refer to this online WOM as electronic word-of-mouth (eWOM). Given the distinct characteristics of Internet communication (e.g., available to individuals without the limitation of time and location, directed to multiple individuals simultaneously), eWOM has conquered known limitations of traditional WOM. In general, eWOM has global reach and influence. In China, many online consumer discussion forums support eWOM, and much previous research [3,7,12,13,21] demonstrates that because eWOM provides indirect purchasing knowledge to readers, the recommendations on these forums can significantly affect their attitudes towards various kinds of consuming targets (e.g., stores, products and services).

Various prior studies have postulated large numbers of antecedent factors which can affect information readers' cognition towards the recommendations, and many of them stem from elaboration likelihood model (ELM) (e.g., [20,21,28,33]). In essence, ELM [22] assumes that there are two distinct routes that can affect information readers' attitude toward presented information: (1) the central route that considers the attitude formation (or change) as the result of the receivers' diligent consideration of the content of the information (informational factors); and (2) the peripheral route that requires less cognitive work attuned to simple cues in the information to influence attitude (information-irrelevant factors). ELM suggests two factors, named information readers' motivation and ability, can be the significant moderators to shift the effects of central and peripheral factors on readers' perception of information credibility. Other researchers [24,27] posit that the peripheral factor – source credibility – may also have a moderating rather than a direct effect on the causal relationship between the informational factors and the information credibility; this view is consistent with the attribution inference [8,9] which states information source characteristics will have a joint effect with other factors to affect the readers' perception towards the information.

Because researchers have not yet systematically investigated this issue, we do not know whether source credibility can moderate the informational factors' effects on information credibility in eWOM context. Further, it is unknown whether source credibility can moderate the effect of information credibility on information adoption. Furthermore, if source credibility can be a moderator of some causal relationships between the independent factors and the dependent factor, will the effect be positive on these causal relationships, or negative? In general, this research will systematically investigate the moderating effect of source credibility in ELM. We believe that further exploring these unanswered questions is both interesting and crucial as the work will help scholars further understand the application scope of attribution inference [8,9] on this point.

* Corresponding author at: Impact of Informational Factors on Online Recommendation Credibility: The Moderating Role of Source Credibility. Tel.: +86 28 87092220; fax: +86 28 87355185.
E-mail address: luochuan@swufe.edu.cn (C. Luo).

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As stated above, this study will discuss and analyze two key research questions:

(1) Will the effects of informational factors on information readers' perception of recommendation credibility be changed, or remain static as a function of source credibility?
(2) Can source credibility moderate the effect of recommendation credibility on recommendation adoption?

We collected field data from the members of a famous online consumer discussion forum in mainland China, and conducted statistical analyses to examine the hypotheses stemming from the research questions. Based on the findings of the analyses, this research makes several contributions for researchers and practitioners:

(1) This study discovers a new finding that source credibility significantly moderates the causal relationships between the two informational factors and perceived recommendation credibility. It further finds that the internal moderating mechanisms on these two factors are completely different. Further, source credibility significantly moderates the effect of recommendation credibility on recommendation adoption.
(2) This study provides pragmatic insights for eWOM practitioners: The findings may guide recommendation composers to write more influential recommendations and may aid the administrators of the online consumer discussion forums to further improve the design and management of these forums.

2. Electronic word-of-mouth in online consumer discussion forums

An online consumer discussion forum is a virtual platform where members share their consuming experiences and viewpoints. Members get purchasing suggestions and opinions from one another by reading each other's online recommendations. This sharing results in a new wave of virtual word-of-mouth communication termed eWOM, which has several advantages over traditional WOM.

First, from the eWOM administrators' perspective, eWOM content is traceable since recommendations on a product/service/shop are written and available on the forum site; thus, the content is also somewhat controllable [20]. Practitioners can reformat or reorder the recommendations to suit forum members' or forum patrons' (the merchants) interests. This sequencing and formatting flexibility allows marketers to directly harness eWOM content within their marketing strategies. Second, from the eWOM participants' viewpoint, eWOM attenuates the restrictions of time and location, as recommendations are usually kept for a long period that allows members to read it at their own pace [30]. This asynchronous communication enlarges the communicating network by allowing large number of contributors and audiences to participate [3], and such easily accessible communication makes eWOM forums attractive places for Internet users to seek specific product/service/shop information.

However, eWOM still has limitations. Because recommendations are from unknown individuals, readers are increasingly skeptical about the credibility of the recommendations. Recommendations posted by unknown members in the forum will not be assessed in the same way as WOM information from their family or friends. Thus, to reconsider the influence of the recommendation source credibility, not only involving its direct effect, but also its moderating effect on other eWOM antecedent factors, is interesting and important.

3. Theoretical background and hypotheses

3.1. Elaboration likelihood model

The Elaboration Likelihood Model (ELM) of persuasion is a theory of information processing [22] that suggests that there are two routes, central and peripheral, to persuasion. ELM indicates that the central route involves carefully scrutinizing the content of the information, so the information readers' cognition on the content of the information determines its influence [22,33]. Many previous studies [4,28,34] often consider the information quality (e.g., information persuasiveness and information completeness) as the most important central (informational) factor, and they have empirically confirmed its significant effect on readers' perception of information credibility: the higher the information quality, the more likely the information readers believe the information.

According to ELM, the peripheral cues also have significant influences during the readers' information processing and peripheral cues are content-irrelevant indicators that information readers use to assess the information [22]. Although ELM indicates that these cues might comprise an infinite number of variables, much previous research [3,28,34] asserts that source credibility is the most salient cue in eWOM context since many other kinds of peripheral cues are hard to acquire online, and these research has consistently confirmed source credibility's positive effect on readers' information credibility perception.

Besides, ELM conceives that the information readers' attitude formation or change is dependent upon the degree of elaboration likelihood. When elaboration likelihood is high, information readers will put more cognitive effort to evaluate the quality of the received information, they will carefully consider the issues delivered by the information. Thus, informational factors tend to be the most significant determinants to the information readers' attitude. However, when the elaboration likelihood is low, information readers employ less cognitive effort to evaluate the content of the received information; instead, they utilize information-irrelevant factors (peripheral route) to assess the information. In sum, as elaboration likelihood level decreases, central factors' effect on information readers' perception, attitude or belief will also be attenuated, whereas the effects of peripheral factors become more important. Subsequent studies [4,28,34] indicate that information readers' motivation and ability are the two key factors which can induce readers' degree of elaboration likelihood, and they have empirically confirmed these factors' significant moderating effects on both central and peripheral factors. Sussman and Siegal [28] further point out that the central and peripheral routes are the extremes of a single underlying elaboration likelihood level. In daily situations, the effect of information will involve both central and peripheral factors simultaneously.

Furthermore, research [31] suggests that in the information persuasion process, information readers will first evaluate the information's credibility; then, information credibility will determine how much the readers adopt the viewpoint of the received information. Information credibility is defined as the extent to which one perceives information to be believable [16], and is a strong predictor of information readers' further action [3,25]. Unless the information readers believe that the received information is credible, they are not likely to adopt the information [17,21]. In general, information credibility mediates the causal relationships between central/peripheral factors and information adoption.

3.2. The sub-dimensions of information quality

Although previous studies [4,28,34] have consistently confirmed the significant effect of information quality on readers' credibility perception, they consider it as a single variable in their research model. Other research [15,32] reveals that information quality comprises two distinct sub-dimensions: information persuasiveness and information completeness. This viewpoint is consistent with actual online recommendations. For instance, a recommendation composer may discuss a restaurant with very persuasive language concerning the service received, while providing no information about the food or the overall ambiance. In this case, the recommendation scores high on persuasiveness and low on information completeness. Thus, we

manipulate recommendation persuasiveness and completeness as two separate informational factors in our research model. Recommendation persuasiveness is defined as the extent to which the reader views the argument of the recommendation as convincing or valid in supporting its position [3]. Recommendation completeness indicates the extent to which the recommendation covers a wide range of salient aspects and thus provides sufficient information [15]. We believe that this refinement will help researchers and practitioners better understand the nuanced impact that recommendation quality has on attitude formation or change.

3.3. The moderating effect of source credibility

ELM has identified two important contextual factors affecting elaboration likelihood: information readers' motivation and ability. Consistent with ELM predictions, prior studies [28,34] empirically confirmed these two factors' interactive effect with both central and peripheral routes on information readers' perception or attitude towards the received information. Both studies use a complex information processing context. However, when readers process simple information that requires only minor cognitive effort, Tushman et al. [29] show that even information readers with low motivation and/or low ability can easily understand the content, and so the moderating effects of motivation and ability are attenuated. As this research is conducted to detect how the recommendation readers process and judge simple online recommendations, we do not repeat previous research into motivation and ability. Rather, based on previous theoretical research [8,9], we propose that source credibility will be a significant moderator during simple recommendation persuasion processing. As shown in Fig. 1 below, we manipulate source credibility as a moderator in the research model to explore its moderating effects.

Source credibility is defined as an information reader's perception of the expertise and trustworthiness of a source [26]. In an online consumer discussion forum, recommendation readers can evaluate the composer's source credibility using various cues, such as by viewing the composer's rank awarded by the forum administrators, or by scrutinizing the profile of the composer to get more detailed information (e.g., the composer's other recommendations, his/her activities in this forum, as well as other members' evaluation of this composer). Previous research [3,14] finds that source credibility can directly form or change a reader's attitude, and that information provided by a highly credible source will produce a greater effect on perceived information credibility. Thus, the readers are more inclined to adopt the viewpoint of the information.

In contrast, other research suggests that the role of source credibility in information processing is more complex. Sussman and Siegal [28] believe that source credibility will bias the information processing by changing the information readers' propensity to support or suspect the content of the information. This viewpoint is similar to Pornpitakpan [24], who notes that source credibility interacts with several variables, such as informational factors, to jointly affect attitudes of information readers. From this perspective, some investigations further test source credibility's moderating effect in different contexts. For instance, Moore et al. [18] detected a significant interaction between source credibility and argument strength on advertising readers' attitude; Stoltenberg and Davis [27] found that when providing career and study skill information to undergraduate students, the argument quality had a greater effect on the students' attitude and behaviors if it is provided by a highly credible source. These findings are consistent with attribution inference [8,9] that suggests that when source credibility is low, a reader will discount the value of the information content they receive [11]; in so doing, they determine that the recommendation is not as credible as one provided by a highly credible source. As a result, the recommendation claims made by a low-credibility source are less likely to change the information readers' attitude.

Although these scholars have confirmed that some antecedent factors' effects on information credibility perception will be modified by a reader's perception of source credibility, they have not systematically explored the source credibility's precise moderating effect on the two sub-dimensions of information quality (i.e., information persuasiveness and information completeness). Thus, the scope of application, as well as the type of source credibility' moderating effects proposed by previous theoretical research [8,9,24] remain unknown, and are the subject of the current study.

Building upon the attribution inference and related theoretical research [8,9,24], we propose that, in an online consumer discussion forum, source credibility moderates the causal relationships of the two sub-dimensions of recommendation quality (recommendation persuasiveness and completeness) upon the perception of recommendation credibility.

We expect that a highly persuasiveness recommendation from highly credible source will have a stronger effect on the recommendation credibility compared with one from a less credible source. We expect that a highly credible source may strengthen the recommendation readers' confidence in their judgment about the persuasive strength of the recommendation. In this way, the effect of a highly persuasive recommendation on its credibility will be increased. For the highly persuasive recommendation from a less credible source, the persuasive impact will be lessened [8,9]. Further, we

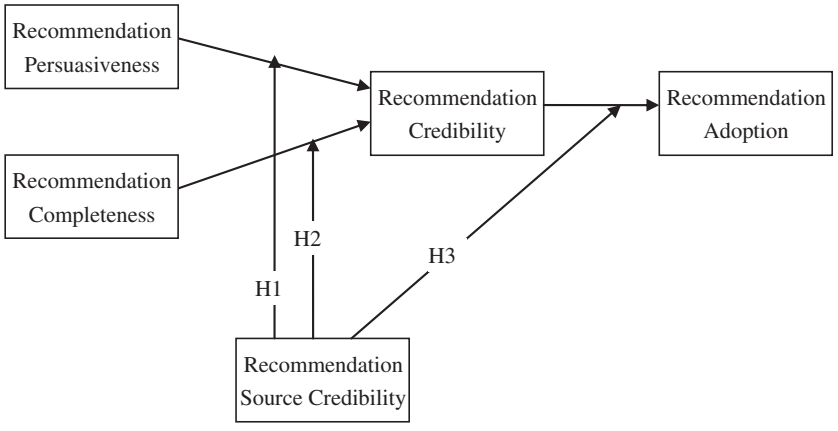

Fig. 1. Research model.

suppose that recommendations providing complete information, if from highly credible source, will have a stronger effect on recommendation credibility compared with the one from a less credible source. We assert that a highly credible source will induce the readers to perceive the obtained information as more authentic, and thus consider it more credible. In contrast, if the recommendation is from a less credible source, the readers may doubt the authenticity of the content, and thus consider the recommendation less credible, even if it contains comprehensive information. Specifically, we hypothesize:

H1. The higher the recommendation source credibility, the more the recommendation persuasiveness affects perceived recommendation credibility.

H2. The higher the recommendation source credibility, the more the recommendation completeness affects perceived recommendation credibility.

We further conjecture that source credibility and recommendation credibility have an interactive effect on readers' recommendation adoption,[1] because some previous research [24,28] shows that a highly credible source may strengthen the recommendation readers' confidence in their judgment. Thus, we propose that even if recommendation readers perceive the current recommendation to be credible, if they find the recommendation composer's source credibility to be low, they may be reluctant to adopt the viewpoint of that recommendation. Thus, the positive effect of recommendation credibility on recommendation adoption will be attenuated. However, if the credible recommendation is composed by a highly credible source (e.g., a famous member who has written many valuable recommendations in the forum), source credibility may further strengthen the readers' judgment of the current recommendation. In this way, the recommendation readers may be more likely to adopt the viewpoint of the recommendation; that is to say, high source credibility will enhance recommendation credibility's positive effect on recommendation credibility. Specifically, we hypothesize:

H3. The higher the recommendation source credibility, the more the recommendation credibility affects recommendation adoption.

4. Methodology

4.1. Field data

The research model was tested using the field data collected from a popular online consumer discussion forum (www.koubei.com, which means "word of mouth" in Chinese) in China. We believe that the field data from people who use online consumer discussion forums in their daily lives can enhance the practical value of this research. We have several reasons to choose Koubei. First, it is a very popular online consumer discussion forum with more than 50 million members as of early 2011. Second, its large member base generates significant content for recommendation readers of various topics. Third, Koubei provides a platform for its members to post classified listings and share their past consuming experience at brick-and-mortar shops such as dining, apartment rentals and entertainment. Koubei content is quite different from forums chosen by previous research [3,34], which mostly comment on products, or services such as traveling. We believe that researching the Koubei forum can help us further understand online recommendations' influence by applying the concepts to this new research context.

Koubei administrators award forum members a certain rank based on their activities (e.g., number of logins, number of recommendations, number of responses to others' recommendations, and the quality of the member's recommendations). A member's rank can help other members evaluate his/her credibility. Furthermore, other members can scrutinize the profile of a Koubei recommendation composer. Each member's profile page contains his/her other recommendations, activities in the forum, as well as other members' evaluations of the composer, etc. So, generally speaking, forum members can evaluate the credibility of the composer using various cues.

In sum, we conceive Koubei as a suitable forum for our research because it is one of the most popular online consumer discussion forums with a huge member base in China and with various forum features that facilitate recommendation readers' evaluation of all the theoretical constructs in our research model.

Koubei has sub-websites for various cities in mainland China, which allows us to select sample candidates nationwide. We randomly selected Koubei members from the member list shown on the sub-websites from 7 key cities ("Key cities" are defined by Koubei and shown on the top of the main webpage) and another 50 important cities (determined by considering geography and demographics). These 57 cities cover all 33 provinces in mainland China. During this sample candidate selection process, we also deliberately selected various categories of Koubei members (using initial registration date and participation data from members' profile page) to ensure that our sample adequately reflects the actual member demographics of Koubei. Appendix A shows Koubei's main page and simple descriptions. Appendix B shows a typical recommendation page on this forum.

We sent invitations by email to these randomly selected Koubei members via the Koubei email system. The invitation informed members of the purpose of the study, and that we would pay each participant 20 RMB (approximately $3.50 USD) for their participation. If they agreed to participate, we first required them to read one recommendation based on their current need or interest, and after they finished reading it, we then sent them a questionnaire to complete.

There are three main sections in the online questionnaire. In the first section, we asked the participants to record the hyperlink of the recommendation into a field in the online questionnaire. In this way we confirmed they had read one new recommendation, and that they could complete the questionnaire based on this new information. We were also able to identify what kind of recommendations they read. Upon the confirmation, we then sent participants the second part of the questionnaire. This part included the question items for all the constructs in our theoretical model. All of the question items for the theoretical constructs are reflective indicators in this study, and we used a Likert-type 7-point scale except for the demographic questions. We also told them specifically that there were no "correct" answers to any of the questions and they should complete them based on their real perception. The third section included questions about the participants' demographics and their e-payment account (e.g., PayPal ID) for their compensation.

All the instrument items for the constructs in the research model were adapted from previous research [15,25,28,32–34] with some amendments to fit the context of our research. Please refer to the Appendix C for details. Since the original instruments were in English, we first translated the questions into simplified Chinese and then engaged two native Chinese speakers (each an associate professor in information system in a prestigious university in China) to check our translations. Disagreements in wording and meaning were resolved through further discussion. Before the main field data collection, we also invited twenty Koubei members to pre-test the questionnaire, and all of them reported no difficulties in understanding the questions.

[1] We would like to give our thanks to one anonymous reviewer for this constructive suggestion.

4.2. Sample demographics

The main field data collection lasted two months. During this period, we selected 1125 Koubei members and emailed them invitations. If they did not reply within two weeks, we then sent a reminder email. Of these, 456 agreed to participate in our study, but, for a variety of reasons, 257 of them did not complete the questionnaire. Ultimately, 199 persons fully completed the questionnaires. Thus, we had a sample size of 199 and a response rate of 17.7%, which is comparable to similar online studies with random consumer populations [3].

As shown in Table 1, participants come from many of the targeted Chinese cities and provinces. Respondents represent various occupations including student, clerk, worker, and manager; some had more than five years' experience on Koubei and others had registered just a few days before the invitation. As a whole, the group is generally representative of the forum member population and with the demographic characteristics of Chinese netizens as reported by China Internet Network Information Center [5]. All of the respondents indicated that they could easily understand the full content of the recommendations with minor cognitive effort.

5. Results

5.1. Measurement model analyses

The descriptive statistics for all constructs in our research model are shown in Table 2. Convergent validity is used to judge the extent to which each measurement item is related to its corresponding theoretical construct. Discriminant validity indicates the extent to which the items in a construct are distinct from those of other constructs. As also shown in Table 2, composite reliability exceeds 0.90 for all constructs, Cronbach's Alpha exceeds 0.90, and the average variance extracted (AVE) exceeds 0.70.

Table 3 shows that the square roots of the AVEs of all constructs are much larger than all other cross-correlations. These results are all beyond the Fornell and Larker [10]'s corresponding threshold criterion values.

Table 4 shows the factor loading and cross-loading for all constructs. All but two of the loadings are above 0.7 (SCRD5 and RCRD1 are very close) and the cross-loading are much lower than the loading. Thus, our constructs exhibit sufficient convergent and discriminant validity.

Multicollinearity indicates the extent to which an independent variable varies with other independent variables; excessively high multicollinearity would challenge the statistical assumption that the independent variables are truly independent of one another. We find that the variance inflation factors (VIF) of all independent variables are lower than 10, which indicates the absence of multicollinearity in our data [19]. To examine the presence of common method bias, we applied Harman's single factor test suggested by Podsakoff et al. [23] in this research. The result of the principal components factor analysis reveals that the first factor does not account for a majority of the variance, nor does any single factor emerge from the factor analysis. This indicates that common method bias is not a major issue in our data.

Table 1
Sample demographics.

Participants (of 1125)		199	17.7%
Cities (of 57)		29	50.9%
Provinces (of 33)		15	45.5%
Gender	Male	87	44%
	Female	112	56%
Age range	<20	16	8%
	20–24	149	75%
	25–29	30	15%
	30+	4	2%
Education	High school graduate	5	3%
	Bachelor's degree	110	55%
	Master and above	84	42%

Table 2
Descriptive results and internal consistency of model constructs.

Construct items	No. of items	Means	Standard deviation	Cronbach's alpha	AVE	Composite reliability
Recommendation persuasiveness (RPE)	6	5.09	1.235	0.947	0.792	0.958
Recommendation completeness (RCP)	4	4.15	1.467	0.937	0.842	0.955
Recommendation source credibility (SCRD)	5	4.72	1.139	0.925	0.773	0.944
Recommendation credibility (RCRD)	4	5.21	1.104	0.963	0.901	0.973
Recommendation adopting (RADOP)	3	5.02	1.090	0.904	0.803	0.924

5.2. Structural model analyses

SPSS was used for the structural model analyses, and all data were standardized preceding the data analyses. We used linear regression to test the main effects, which include the recommendation persuasiveness and recommendation completeness' direct effects on recommendation credibility, as well as the recommendation credibility's direct effect on recommendation adoption. The results of these tests can help us confirm/disconfirm previous research's findings in this research context.

As shown in Table 5, the full model is significant, with $F = 88.978$ and $P < 0.001$; the adjusted R^2 is 47.1%. The result shows that RPE can significantly affect readers' perception of credibility at $P < 0.001$ level, which is consistent with previous research's findings. However, RCP is not significant in our model, which indicates that it cannot influence recommendation credibility. Besides, we also find that the perception of the recommendation credibility can significantly and positively affect online readers' recommendation adoption, with $F = 180.176$, $T = 13.423$ and $P < 0.001$, the adjust R^2 is 47.8%.

In order to further examine the potential common method bias, we applied partial correlation procedure suggested by Podsakoff et al. [23]. The partial correlation results show that, when controlling other variables in the theoretical model, the correlation between RPE and RCRD is still significant, whereas the correlation between RCP and RCRD is insignificant.

We then tested the moderating effects (two-way interactions) of source credibility on the causal relationships between the independent variables and dependent variable (H1, H2 and H3). We first tested the moderating effects of source credibility on the causal relationships

Table 3
Square root of AVE and cross-correlations.

	RPE	RCP	SCRD	RCRD	RADOP
RPE	0.890				
RCP	0.617	0.918			
SCRD	0.594	0.513	0.879		
RCRD	0.689	0.461	0.705	0.949	
RADOP	0.611	0.398	0.558	0.686	0.896

Table 4
Factor loadings and cross-loadings for all constructs.

	RPE	RCP	SCRD	RCRD	RADOP
RPE1	0.714			0.307	
RPE2	0.756				
RPE3	0.830				
RPE4	0.742				
RPE5	0.741	0.304			
RPE6	0.747				
RCP1		0.818			
RCP2		0.865			
RCP3		0.829			
RCP4		0.829			
SCRD1			0.799		
SCRD2			0.817		
SCRD3			0.740		
SCRD4			0.739	0.315	
SCRD5			0.699	0.310	
RCRD1	0.361		0.312	0.697	
RCRD2	0.309			0.774	
RCRD3			0.330	0.705	0.304
RCRD4	0.338		0.307	0.701	
RADOP1					0.725
RADOP2					0.792
RADOP3					0.782

Table shows loading or cross-loading >0.3.

between the two informational factors and recommendation credibility. We predict that source credibility will positively moderate both factors' effects on readers' perception of recommendation credibility. To test these predictions, we built moderated multiple-regression models. First, the two product terms were built by multiplying the standardized values of source credibility and the two independent factors individually. Then, we put the two independent variables, added the moderator variable, and finally added the two product terms into the model to test if the product terms have significant effect on the dependent variable. The significance of the product terms indicates the moderating effect of the moderator on each independent variable.

As shown in Table 6, the results of the full model are significant, with $F = 18.930$ and $P < 0.001$; the$\triangle R^2$ of 6.6%. The results indicate that source credibility significantly moderates the two dimensions of information quality's effects on the readers' perception of recommendation credibility: for recommendation persuasiveness, the significant negative coefficient at $P < 0.001$ level, indicates that the moderating effect is in the opposite direction from our hypothesis, thus H1 is rejected. For recommendation completeness, significant positive coefficient at $P < 0.001$ level, supports H2.

With the same method, we tested the moderating effect of source credibility on the causal relationship between recommendation credibility and recommendation adoption. As shown in Table 7, the result is significant, with $F = 7.159$ and $P < 0.01$; the$\triangle R^2$ of 1.8%. The result indicates that this moderating effect is in the opposite direction from our hypothesis, thus H3 is rejected. Fig. 2 shows all the hypotheses tests results.

Table 5
Main effects test.

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Beta	Beta		
RPE	0.656	0.066	0.656	9.985	0.000
RCP	0.053	0.066	0.053	0.804	0.422

$F = 88.978$, $R^2 = 0.471$, Dependent variable: Review credibility (RCRD)

Table 6
Moderating effects test 1.

MODEL	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Beta	Beta		
RPE*SCRD	−0.283	0.047	−0.442	−6.041	0.000
RCP*SCRD	0.217	0.055	0.262	3.912	0.000

$F = 18.930$, $\triangle R^2 = 0.066$, Dependent variable: Review credibility (RCRD)

In order to test the unexpected result that source credibility negatively moderates the causal relationship between recommendation persuasiveness and recommendation credibility, we performed a post-hoc analysis using the simple slopes test recommended by Cohen and Cohen [6] and Aiken and West [1]. This method is designed to interpret the interaction effects of two continuous predictor variables. In this manner, one could interpret the significance level of the causal relationships between the independent variable and the dependent variable under high or low levels of the moderator. To illustrate and test the significant interactions, separate regression lines were computed, plotted, and tested with one standard deviation below the mean of the moderator and one standard deviation above it. As shown in Table 8 and Fig. 3, under the high source credibility condition, readers' perception of the recommendation credibility is stable regardless of recommendation persuasiveness. However, under the low source credibility condition, readers perceive a recommendation as more credible with the increase of recommendation persuasiveness. Thus, the impact of source credibility was the exact opposite of our hypothesis H1.

The simple slopes test was also used for exploring the unexpected result of source credibility's negatively moderating effect on the causal relationship between recommendation credibility and recommendation adoption. As shown in Table 9 and Fig. 4, the slope is steeper when source credibility is low, compared with the one when source credibility is high.

6. Discussion and conclusion

6.1. Discussion of the results

Our research is relevant for both researchers and practitioners, because our findings uncover new insights in both realms. Drawing upon ELM, this study developed a new research model to examine how source credibility moderates two dimensions of information quality's effects on readers' perception of recommendation credibility, as well as how it moderates the effect of recommendation credibility on recommendation adoption.

First, we analyze the main effects of the research model, which shows that the structural model explains 47.1% of the variance explained by the two dimensions of information quality. Similarly, the perceived recommendation credibility explains 47.8% of the variance of recommendation adoption. We find that the two dimensions of information quality have different effects on online recommendation

Table 7
Moderating effects test 2.

MODEL	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Beta	Beta		
RCRD*SCRD	−0.204	0.076	−0.350	−2.676	0.008

$F = 7.159$, $\triangle R^2 = 0.018$, Dependent variable: Recommendation Adoption (RADOP)

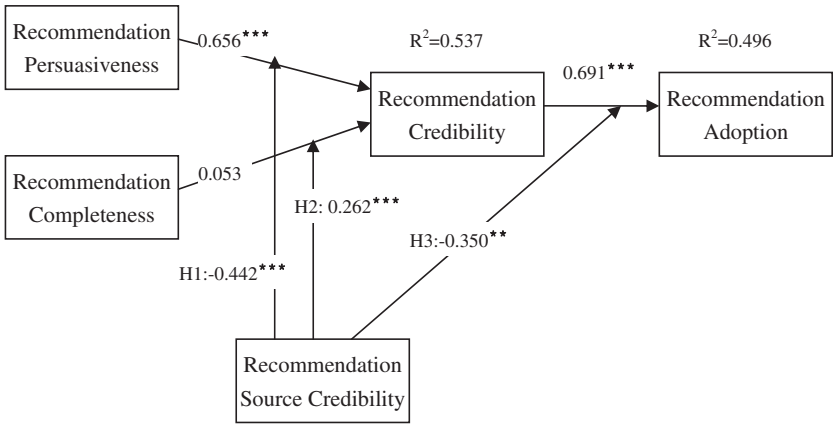

Fig. 2. Results of the research model. Note: **p < 0.01; ***p < 0.001.

readers' perception of credibility. Recommendation persuasiveness can significantly affect recommendation readers' perception of credibility, whereas recommendation completeness has no direct influence on recommendation reader's credibility perception. These results empirically suggest that these information content factors warrant additional study. When reading online recommendations, different attributes of the information quality lead to different effect on recommendation readers' credibility perception.

Second, we find that source credibility negatively moderates the causal relationship between recommendation persuasiveness and recommendation credibility, which is opposite to H1. From Fig. 3 and Table 8, we posit that the reason for such a negative moderation effect might be due to source credibility's direct effect on recommendation credibility: high source credibility can directly enhance the readers' recommendation credibility perception, thus, recommendation persuasiveness' effect is attenuated. Only when source credibility is low, can the effect of recommendation persuasiveness be fully exhibited. This result indicates that the effect of recommendation persuasiveness and source credibility on recommendation credibility is substitutive and not additive; that is to say, high source credibility cannot further enhance recommendation persuasiveness' positive effect on recommendation credibility.

Furthermore, we find that source credibility positively moderates the recommendation completeness effect on recommendation credibility. That is, recommendation completeness could be a conditionally influential factor affecting online recommendation readers' perception of credibility since high source credibility significantly enhances its effect. Specifically, readers will perceive recommendations from a highly credible source with comprehensive information as more credible, which is consistent with our hypothesis H2.

Finally, we find that recommendation credibility and source credibility have an interactive effect on recommendation adoption, but the effect direction is opposite to our hypothesis H3. From Fig. 4 and Table 9, we think that the reason for this negative interaction might be due to source credibility's direct effect on recommendation adoption: high source credibility can directly enhance the readers' adoption intention to some extent, even if they perceive the recommendation is not so credible; but it cannot further enhance readers' adoption intention when the recommendation is very credible. In this way, the effect of recommendation credibility is attenuated. However, low source credibility does not weaken the positive effect of recommendation credibility on recommendation adoption if readers perceived that the recommendation is credible. Thus, the slope is steeper when source credibility is low, compared with the slope when source credibility is high. This result indicates that the effect of recommendation credibility and source credibility on recommendation adoption is not additive.

In order to further understand the moderating effect of source credibility on the causal relationship between recommendation persuasiveness and recommendation credibility, we interviewed twenty questionnaire participants, and asked them to evaluate recommendation credibility under four conditions (2×2 matrix: recommendation persuasiveness high vs. low, and source credibility high vs. low condition). We confirmed our finding and our explanation from most of the interviewees. Representative comments include,

> "Commonly, I will utilize two ways to evaluate the credibility of the recommendation: the information persuasiveness and the source credibility, that is to say, I will believe the recommendations

Table 8
The internal mechanism of SCRD's moderating effect 1.

	Low RPE	High RPE
Low SCRD	4.19	5.54
High SCRD	5.63	5.73

Dependent variable: Recommendation credibility (RCRD)

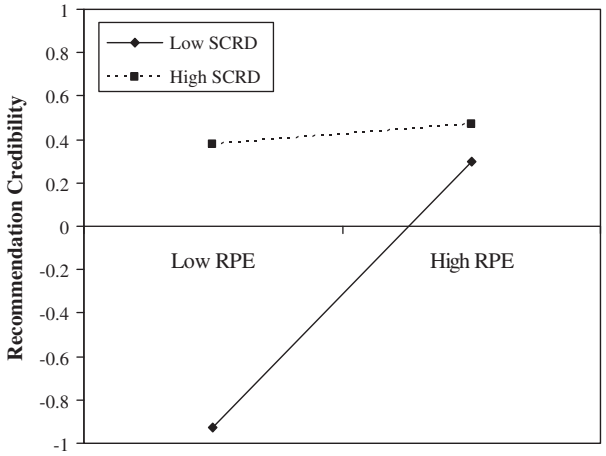

Fig. 3. The internal mechanism of SCRD's moderating effect 1. Note: the scale of the recommendation credibility is the standardized value.

Table 9
The internal mechanism of SCRD's moderating effect 2.

	Low RCRD	High RCRD
Low SCRD	4.21	5.74
High SCRD	5.16	5.79

Dependent variable: Recommendation adoption (RADOP)

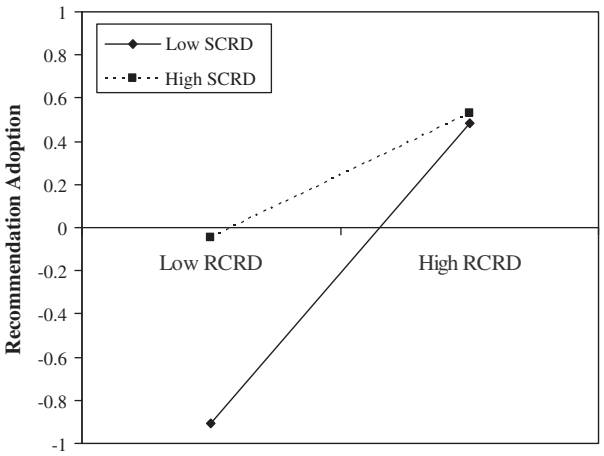

Fig. 4. The internal mechanism of SCRD's moderating effect 2. Note: the scale of the recommendation adoption is the standardized value.

if it contains persuasive arguments, I will also incline to believe recommendations if I perceive the information sources are credible; for the recommendation completeness, it is not so important for me because I do not know its authenticity, but, I guess the information from highly credible source seems to be more credible."

We also asked the participants how they adopt the recommendation under the four conditions (2×2 matrix: recommendation credibility high vs. low, and source credibility high vs. low condition), some participants gave the following explanation:

"If I think the recommendation is credible, I will adopt its viewpoint, no matter who tells me, but if I perceive it is not so credible, sometimes I will browse the profile of the composer. If he/she is a famous and credible person, I may still consider accepting it."

6.2. Implications for research

This research makes some significant theoretical contributions. First, this study explored the two dimensions of information quality's effects on readers' perception of recommendation credibility. The results indicate that only one dimension of information quality can significantly affect recommendation credibility.

Second, we systematically explore source credibility's moderating effects in the research model. We discover that source credibility significantly moderates the causal relationship between the two dimensions of information quality and the readers' perception of recommendation credibility, with different moderating directions. This new finding indicates that source credibility has different moderating effects on these two factors. We also find that source credibility has negative moderating effect on the causal relationship between recommendation credibility and recommendation adoption. In general, this study empirically confirmed that source credibility has significant moderating effects with various variables in ELM.

6.3. Implications for practice

This research also contributes to the practitioners of online consumer discussion forums. Since the persuasiveness of recommendations could significantly affect the readers' credibility perception, while completeness has no significant main effect, generally, recommendation composers may need to focus more on their persuasiveness than on their completeness. However, highly credible composers may need to carefully consider the completeness of their recommendations since in their case, high credibility strengthens the impact of completeness on the readers' perception of credibility.

From the perspective of an online discussion forum administrator, our findings give some guidance for managing discussion and recommendation forums. We believe the developers of the online consumer discussion forums should create an algorithm that adjusts the format of the recommendations based on the findings of this research: for instance, identifying and then ranking the identical-target recommendations based on their persuasiveness, may help readers find influential recommendations more quickly. Furthermore, this research finds that source credibility has strong moderating effects with various variables, which indicates that recommendation readers evaluate the recommendation in different ways in these different conditions. Thus, we suggest that developers establish separate web pages to display high/low credible composers' recommendation; developers should also design a robust ranking system that allows readers to filter identical-target recommendations based on both persuasiveness and source credibility, or based on both completeness and source credibility. The actions will help readers to more easily pick out effective recommendations on their site.

6.4. Limitations of the study

Finally, we acknowledge some limitations of this study. First, there is a possibility of response bias. Although we randomly invited Koubei members from all experience levels (i.e., from a few days to over five years of experience on Koubei), active members might be more likely and willing to participate. Second, the sample was limited to one online consumer discussion forum in China, so readers need to be cautious not to over-generalize the findings. Nevertheless, we predict that the results should be applicable to other online consumer forums similar to Koubei. Third, this theoretical model can only be applied to simple recommendations that require minimal cognitive effort to evaluate, such as those concerning a restaurant, hotel or clothing shop. Further research may relax this constraint and retest our research model when information readers process more complex recommendations. Finally, this research only tested source credibility's moderating effect on the two dimensions of information quality. Therefore, we suggest other researchers to add more factors deriving from both central and peripheral route to further explore source credibility's moderating role, especially in some countries whose cultures differ from Chinese collectivism.

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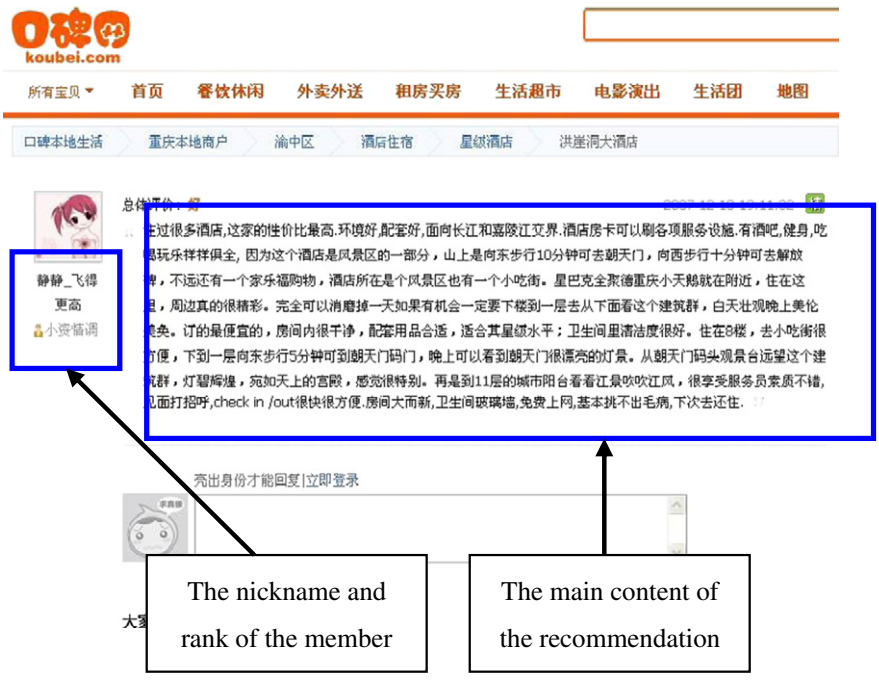
Appendix A. Koubei's main page

Appendix B. Typical Koubei recommendation page



Appendix C. Measurement items

RPE	Item 1	The recommendation arguments are convincing	Adapted from [33]
	Item 2	The recommendation arguments are strong	
	Item 3	The recommendation arguments are persuasive	
	Item 4	The recommendation arguments are good	
	Item 5	The recommendation information effectively supports its arguments	
	Item 6	The recommendation arguments are reasonable	
RCP	Item 1	This recommendation provides complete description	Adapted from [15,32]
	Item 2	This recommendation provides all necessary topics	
	Item 3	This recommendation provides sufficient information for readers	
	Item 4	This recommendation provides relatively comprehensive information	
SCRD	Item 1	Based on the rating system of the recommendation provider, this provider is reputable	Adapted from [34]
	Item 2	Based on the rating system of the recommendation provider, this provider is highly rated by the forum members	
	Item 3	Based on the rating system of the recommendation provider, this provider is good	
	Item 4	Based on the rating system of the recommendation provider, this provider is trustworthy	
	Item 5	Based on the rating system of the recommendation provider, this provider is reliable	
RCRD	Item 1	This recommendation is believable	Adapted from [25]
	Item 2	This recommendation is factual	
	Item 3	This recommendation is credible	
	Item 4	This recommendation is trustworthy	
RADOP	Item 1	To what extent has the content of the recommendation motivated you to make purchase decision?	Adapted from [28]
	Item 2	How closely did you follow the recommendation to make your purchase decision?	
	Item 3	To what extent do you agree with the information provided by the recommendation?	

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Dr. Chuan Luo is an Associate Professor at Southwestern University of Finance and Economics, China. His research interests include on-line reputation systems and electronic commerce. His publications have appeared in *International Journal of Electronic Commerce* and various conference proceedings such as International Conference on Information Systems.

Dr. Xin (Robert) Luo is an Associate Professor of Management Information Systems and Information Assurance in the Anderson School of Management at the University of New Mexico, USA. He earned his Ph.D. in Information Systems from Mississippi State University. His research interests include information assurance, e-commerce/m-commerce, and cross-cultural management. His research has been published in journals including *Journal of the Association for Information Systems, European Journal of Information Systems, Communications of the ACM, Decision Support Systems, Journal of Strategic Information Systems, Communication of the Association for Information Systems, and Journal of Organizational and End User Computing,* etc.

Dr. Laurie Schatzberg is a Professor Emeritus at The University of New Mexico in Albuquerque, New Mexico, USA. Her research interests include object-oriented IS design, cases & strategy in IS. Her publications have appeared in *Journal of Informatics and Education Research, Informatics Systems Education Journal, International Journal of Operations and Production Management*.

Dr. Choon Ling Sia is a Professor at the City University of Hong Kong, China. His research interests include electronic commerce, knowledge management, and virtual work. His publications have appeared in *MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Journal of the American Society for Information Science and Technology, Journal of International Business Studies, ACM Transactions on Computer-Human Interactions, IEEE Transactions on Engineering Management, IEEE Transactions on Systems,* and *Man and Cybernetics*.