How does Knowledge Association of Online Travel Reviews Affect Product Sales? Based on the Knowledge-based Theory and Social Network Theory

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How does Knowledge Association of Online Travel Reviews Affect Product Sales? Based on the Knowledge-based Theory and Social Network Theory

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Abstract: To better understand the impact mechanism of online travel reviews, this study aims to investigate how the knowledge association of online travel reviews influences the sales volume of online tourism products from the perspective of knowledge-based theory and social network theory. We crawled online reviews of 314 tourism products from the leading OTA of China and constructed knowledge networks of online travel reviews by using the semantic association of thematic words. Our results show that both knowledge association and knowledge heterogeneity have a U-shaped curvilinear relationship with sales volume. Moreover, knowledge heterogeneity partially mediates the relationship between knowledge association and sales volume. In addition, knowledge cohesion has a negative moderating effect on the relationship between knowledge association and knowledge heterogeneity. The findings of our study have important theoretical value and managerial implications for tourism e-commerce research.

Keywords: online travel reviews, semantic association, knowledge network, social network analysis

1. INTRODUCTION

Although online travel reviews have brought convenience to tourists and tourism enterprises, the redundant and complicated information contained in review texts makes buyers and sellers fall into the contradiction of “information loss” and “information overload”. Thus, scholars have focused on how to effectively mine the knowledge value of online travel reviews \cite{1}. Based on knowledge-based theory, online travel reviews are the embodiment of consumer knowledge, and the identification and combination of knowledge are also of great value. The smallest knowledge element of online travel reviews is the thematic word. Each thematic word is a knowledge node in the massive number of review texts, and a large number of thematic words is set to form knowledge. Knowledge extraction of online travel reviews depends on not only the literal meaning of thematic words but also the semantic association logic among thematic words. In the process of knowledge recognition and combination, knowledge network is constructed by the co-occurrence of semantic association between the thematic words. In the semantic association knowledge network of online travel reviews, consumers can obtain valuable information through the visibility of knowledge in the network, and further influence the purchase decision of tourism products.

The visibility of knowledge in the network will affect product sales, and this effect may often be nonlinear \cite{2}. Therefore, to reveal the effect of knowledge networks of online travel reviews on sales volume, this study integrates natural language processing technology, social network theory and knowledge-based theory to explore the following three questions: (1) From the perspective of knowledge nodes, what is the mechanism of the impact of knowledge association on the sales volume of online tourism products? (2) From the perspective of knowledge content, what is the relationship between knowledge heterogeneity and knowledge association, and how does it affect sales volume? (3) From the perspective of knowledge units, what role does knowledge cohesion play in the relationship that knowledge association affects the sales volume of online tourism products through knowledge heterogeneity.

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2. METHODS

As our data source, we choose Tuniu (https://www.tuniu.com), which is a leading OTA platform in China [3]. In the choice of cities, we select 163 cities as tourism destinations; they were all included in the “Charm city with Chinese characteristics 200” list in the 2016-2018 period. And a pre-test was conducted to determine the appropriate review threshold, which was at last set to no less than 416. From July 5 to July 30, 2019, we set up a crawler to obtain the online travel reviews of 370 products at all time points. After data cleaning, we obtained 314 samples of online tourism products.

In this paper, we construct the knowledge network of online travel reviews by using the method of Chinese word segmentation processing and semantic association analysis proposed by Hou et al. (2019). For each listing, first, we extract the thematic words by using the Jieba toolkit and TextRank algorithm. Second, Python and the Natural Language Toolkit (NLTK) are used to calculate the frequency of thematic words and to extract bigram phrases. Then, the knowledge network is constructed through the co-occurrence of thematic words. Finally, we calculate the eigenvector centralization, modularity index and E-I index of the knowledge networks by using the social network analysis software Gephi and Ucinet to test and verify the research model.

3. CONCLUSIONS

Based on social network theory, knowledge-based theory, natural language processing and other multidisciplinary theories and methods, this paper extracts core thematic words from online travel review texts and constructs knowledge networks of online travel reviews through the semantic association analysis of thematic words. The main conclusions are as follows: First, the core thematic words in online travel reviews are the embodiment of consumer knowledge, and the network constructed by knowledge association is the carrier of the acquisition and integration of knowledge resources. Second, this study proves the existence of a U-shaped relationship between knowledge association and sales volume; that is, compared with low-level and high-level knowledge association, sales volume can be low at a medium level of knowledge association. Third, the empirical test results support the U-shaped relationship between knowledge heterogeneity and sales volume and the mediating effect of knowledge heterogeneity between knowledge association and sales volume. Finally, the results support the negative moderating effect of knowledge cohesion between knowledge association and knowledge heterogeneity.

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