

# ***Online Product Review and Supply Chain Decision Making: A Research Review and Outlook***

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**Abstract:** With the development of modern network technology and the rise of online shopping, online product reviews can not only provide consumers with product information, but also have an impact on the decisions of all members in the supply chain. The paper first sorts out the classification and definition of online product reviews, then organizes and analyzes the relevant literature of online product reviews on product quality, pricing, demand, channel selection strategy, and finally discusses the future research direction and development trend.

## **1. Introduction**

With the continuous development and popularization of Internet technology and the rise of e-commerce industry, more and more consumers begin to do online shopping, that is, to buy the products and services they need through online sales channels. In the traditional process of offline physical store shopping, consumers can make corresponding purchase decisions by observing the actual situation of products or experiencing the actual services. However, in the online virtual shopping environment, consumers cannot experience the process of offline physical store shopping and identify the quality of goods. In order to reduce the degree of information asymmetry between enterprises and consumers, retailers or e-commerce platforms provide consumers with different sources and different forms of online product reviews, so that consumers can learn more information about products through these online reviews and help them make more reasonable and correct purchase decisions[1].

According to the generation of online product reviews, online product reviews are divided into three categories: the descriptive product reviews about product generated by the enterprise, consumer reviews that consumers share their own shopping experience after buying products and the third-party product reviews generated by professional critics about product evaluation[2]. Among these three categories, due to the low credibility of online product reviews generated by enterprises, more scholars put their research scope on consumer online product reviews and the third-party product reviews. Most studies about the influence of online reviews on the supply chain decision, the researchers did not clearly distinguish between comments generated by consumers or generated by critics. Moreover, because this study aims to explore the impact of online product reviews as a decision variable on supply chain decisions, the product reviews generated by critics and consumers, as long as they are published on retail platforms, are called online product reviews. Therefore, this paper will focus on the impact of online product reviews published on retail platforms on product

quality, pricing, demand, channel selection and other supply chain decisions, and discuss future research trends to provide reference for future expansion research.

## **2. Online Product Review: Connotation**

At present, there are many studies on online product reviews, but there are various definitions of online product reviews. Researchers will always divide the definition of online product reviews into different ranges by generating different generating subjects or different carrying subjects. Among the existing studies, the most studied online product reviews are online reviews[3] and the third-party product reviews[4].

The concept of "Online review" was first proposed by Chatterjee[5], and then some researchers defined and explained the concept specifically. The definition of Park and Tim is widely used, they think the Online Reviews are the information about the use and feeling of the product delivered to other consumers by potential consumers who have purchased the Internet, the information can be positive, neutral or negative and consumers can access their buying decisions in an easier way and at a lower cost[6].

The definition of the third-party reviews is also quite different, which is mainly reflected in whether the "third-party" of product reviews refers to the information generator or the platform carrying information. Foreign researchers believe that the generation subject of the third-party reviews must be generated by professional commentators, when Chakravarty et al. studied the interactive effect of critic comments and consumer online comments, they made a clear distinction between the definition of the two definitions. Research believes that critic comment is the third-party product reviews, the generation subject of the third-party product reviews is professional critic, while consumer online review is released by consumers[7]; Chen and Xie believe that the information generator of the third-party product reviews is the laboratory testing parties and experts, and it is published on the media, which is fundamentally different from the word-of-mouth reviews generated by consumers[8]. While domestic researchers believe that the third-party product reviews refer to third-party online platforms that are published independently of retail websites.

In the study of online product reviews and supply chain decision-making, researchers did not clearly distinguish whether the generating body of online product review was consumers or professional critics, but the bearer body of online product review in the study refers to the reviews on the retailer platform rather than the third-party platform independent of buyers and sellers. Previous studies limited the scope of online product reviews to all reviews published on the seller platform. Future studies on the impact of online product reviews on supply chain decisions can consider the third-party product reviews, and the reviews made by professional critics on consumer reviews can then affect the supply chain decisions; whether retailers or retail platforms choose to introduce reviews from the third-party websites to influence supply chain decisions and consumer purchasing decisions.

## **3. Reviews on the Impact of Online Product Reviews on Supply Chain Decisions**

Foreign scholars have made more studies on the influence of online product reviews in supply chain decision-making, the decision of product pricing and product demand may be affected, and in the channel selection decision, the online product review research is mainly focused on the competition supply chain and closed loop supply chain.

### **3.1. Product Quality Decision**

Online product reviews can provide consumers with information about product quality and affect

their purchasing decisions. Moreover, the information revealed by online product reviews can make up for the information difference between enterprises and consumers, and encourage enterprises in the supply chain to make adjustments to product quality decisions to meet consumer needs.

Zhao and Zhang believe that online product reviews can provide consumers with product quality information, but that the quality of the reviews declines over time. Suppliers, influenced by online product reviews, will have to offer higher prices for fewer customers and higher quality products[9]; Wang et al. built two-stage decision model, and thought that consumers expect to buy products according to quality in the first stage. In the second stage, consumers make purchase decisions according to the previous stage of consumer product reviews. The study found that the difference between the quality rating of the product and the actual quality of the product will affect the quality decisions of manufacturers and the pricing decisions of manufacturers and retailers, and affect the profits of both[10]; The research of Kim et al. is based on the context of competing service providers, this paper explores the factors that may affect the decision-making relationship between the third-party reviewers and service providers, and analyzes the product quality choices made by service providers under the influence of third-party comments[11]; Li and Wang studied consumer reviews as a quality signal, and examined the impact of corporate pricing strategies on reviews, the study found that sales reflect the accuracy of consumer review information and appropriateness to customer needs, and cutting prices in the early stage can attract more consumers and get more consumer reviews, so as to provide the later consumers with more high quality, good and high accuracy of product quality information[12]; Nam et al. have found that consumer reviews have an indirect impact on corporate quality decisions. Many enterprises exaggerate the value of products through product reviews, but this is not consistent with consumer demand, and will have a negative impact on enterprises. When product reviews match consumer needs, product reviews realize their value and help companies increase sales[13].

All of the above studies are based on authentic online product reviews, but in reality, there are false comments, they will not only have a negative impact on the consumer purchasing experience, but also have misleading information about the quality decisions of enterprises. Therefore, studying the credibility of reviews and detecting false reviews can help supply chain managers make correct quality decisions, which is also the future research direction.

### 3.2. Product Pricing Decisions

Online product reviews have a significant impact on consumer utility, so consumer utility theory is widely applied in pricing models in product pricing decisions. Guo et al. used a company with dual channel sources for product reviews and review truncation operations as an example to discuss the dynamic pricing problem of a company's two-stage monopoly. It is found that the optimal pricing is usually composed of price increases and decreases related to the threshold structure of consumers' adoption of product reviews. The optimal price increases as consumers' adoption of online product reviews increases[14]; Yang et al. studied the impact of online product reviews on the profits of manufacturers and retailers under centralized and decentralized channel structures. The study found that manufacturers' pricing decisions depend on the degree of information in online product reviews and the relationship between consumers' acceptance of online channels[15]; Crapis et al. believed that consumers can learn quality information from online reviews, and studied two Pricing: static price and single price change in the case of consumer quality preference[16].

The above literature mainly analyzes the impact of online product reviews on the pricing of a single product. Some scholars also consider how online product reviews affect pricing in a competitive environment. Kwark adopted a channel structure consisting of two competitive manufacturers and a common retailer to study the impact of online product reviews on pricing

decisions of two competitive manufacturers and online retailers[17].

The above research method on pricing decision-making is mainly to establish the Hotelling model through consumer utility theory, while some scholars also use empirical analysis to study the impact of online product reviews on the pricing decisions of manufacturers and retailers in the supply chain. Li et al. collected online book reviews and sales data from Amazon for testing, and found that there was a significant correlation between online product reviews and the optimal pricing[18]; Sun conducted empirical research using data from Amazon and BN, investigated the impact of consumer online product reviews on corporate sales, and explored the pricing decisions of retailers selling products online[19]; Zhao and Zhang built a dynamic programming model to determine the optimal pricing decision against the background of a customer intensive service system with online reviews[20]; The above literatures on online product reviews consider all reviews as a whole, but Zimmermann et al. divided the scoring differences of online product reviews into taste differences and quality differences. Based on this difference, he considers taste differences and quality differences as independent sources of consumer rating differences, and analyzes the impact of consumer comment ratings on product pricing[21].

In the literature on the impact of online product reviews on pricing, the research focuses mainly on single supply chains or competitive supply chains with multiple products. In future research, the particularity of the dual channel closed-loop supply chain can be considered to explore the price issue of online reviews for different recycling modes.

### 3.3. Product Requirement Decision

Cho et al. used data from the US automotive market from 2002 to 2013 to study how qualitative and quantitative reviews of online reviews interact and affect product demand. The results indicate that review emotions have a positive impact on product demand, but this positive impact gradually decreases. The impact of qualitative and quantitative reviews on demand indicates that the qualitative and quantitative components of product reviews are complementary; Yang et al. found that under a centralized channel structure, online product reviews can promote an increase in demand for online channels, but have a negative impact on demand for offline channels. While in a decentralized environment, online product reviews only affect the demand of online channels and do not have an impact on the demand of offline channels; Zimmermann et al. analyzed the impact of consumer review ratings on product demand based on the rating differences of two online product reviews: taste differences and quality differences. The research has found that demand increases as the total variance of consumer ratings increases. Another part of the research focuses on using online product reviews to predict product sales, Clemons et al. used beer manufacturers as an example to analyze consumers' online product reviews. It was found that the sales of beer will increase with the increase of review scores, and the top 1/4 rating is the most accurate in predicting sales; Dellarocas et al. added the factor of review quantity to the product sales prediction model and found that the prediction accuracy of the model was significantly improved.

Existing literature shows that there is relatively little research on the impact of online product reviews on manufacturers' product demand decisions in the supply chain. In the future, factors influencing online product reviews can be added to demand forecasting, and demand forecasting models can be improved to study how enterprises should make product demand predictions under the influence of feedback information from consumers' online reviews.

### 3.4. Channel Selection Decision

At present, research on the selection of supply chain channels mainly focuses on both online and offline channels. When manufacturers and retailers choose a single online, offline channel, or parallel

channels, further analysis is needed on the impact of online reviews to provide a basis for channel selection decisions. Some researchers believe that even offline retailers can benefit from online product reviews. Li et al. studied whether offline retailers should expand their online channels and adopt online review integration strategies in omnichannel retail. The research results show that offline retailers only adopt online review integration strategies when online product reviews are more informative in resale situations. Under the proxy pattern, even though the amount of information provided by online product reviews is lower than that provided by offline services, offline retailers will still choose to use online review integration strategy. The research also involves the third-party product reviews, and it shows that offline retailers have a strong willingness to integrate third-party product reviews.

In reality, more channel selection decisions are made in a competitive environment. Yang et al. studied the impact of online product reviews on manufacturers' online channel strategies based on the background of online and offline channel competition. The results indicate that when manufacturers introduce online sales channels, online product reviews may have adverse effects, but manufacturers can reduce this negative impact by adjusting wholesale prices; Guo et al. studied the value of online reviews in the context of channel competition and found that expanding sales channels can effectively improve the accuracy of online product reviews, thereby having a beneficial impact on both businesses and consumers; On the basis of Guo, Kim studied the impact of online product reviews on service providers' operational strategies and profits in the context of channel competition; Sun et al. developed a duopoly model in the context of two competing online retailers to study the impact of online product reviews on the strategy selection of online retailers' return strategies and channel competition.

In the closed-loop supply chain, some scholars have also conducted research on the impact of online reviews, but there is less research in this part, mainly focusing on the selection of recycling modes. Qiao and Su explored the interaction between manufacturer licensing strategies and distribution channels in the context of online product reviews in the field of remanufacturing, and found that the impact mechanism of online product reviews on manufacturer channel selection is influenced by the cost of product remanufacturing; Xiao et al. considered the competitive factors of product recycling channels on the basis of closed-loop supply chain and continued to study the impact of online product reviews on channel selection. The study found that when the effectiveness level of online product reviews is high, manufacturers should implement a trade in strategy in online channels.

In future research, the characteristics of online product reviews can be segmented and the impact of review content or influence on channel selection can be studied; There is still a significant expansion in the channel selection of competitive supply chains and closed-loop supply chains, considering the relationship between the intensity of competition between competitive supply chains and the value of online product reviews, as well as the impact of retailers' efforts in providing online product reviews on the selection of recycling models.

#### 4. Outlook

The article conducts an in-depth study of the relevant literature on the impact of online product reviews on supply chain decision-making. Based on existing literature, the impact of supply chain decision-making is divided into product quality, pricing, demand and channel selection. The article also summarizes and explores the impact of online product reviews on it. Based on the previous review and analysis, this article believes that further research can be conducted in the following areas in the future.



#### 4.1. Scope and Dimensions of Online Product Reviews

The previous text systematically summarized the definition of online products. There are differences in the ways in which domestic and foreign researchers define the definition. In future research, the differences and similarities in the impact of different online product reviews on supply chain decision-making can be considered. Similarly, the impact of different dimensions of online product reviews on pricing and consumer behavior decisions can also be considered.

#### 4.2. Multi-Channel Review Analysis

Existing research mostly focuses on product reviews provided by online retail platforms. In reality, consumers also post reviews on third-party review websites, social media, and other channels. Therefore, how to integrate multi-channel reviews and explore the mutual influence relationships between reviews from various channels is also an important research direction.

#### 4.3. Supply Chain Selection

In terms of supply chain categories, most current research mainly focuses on online and offline dual channel supply chains, and there are relatively complete literature exploring the impact of online product reviews on both online and offline sales channels. In future research, the competitive attributes of competitive supply chains can be considered, and the impact of online product reviews on multiple competing retailers can be studied. At the same time, closed-loop supply chain is also a focus of scholars' attention, and the research on online product reviews in recycling pricing and the selection of recycling modes is also worth in-depth consideration and research.

### 5. Conclusions

In this paper, the concept of online product review is first clarified. At present, the most studied online product review is online review and the third product review, while in the related research topics of supply chain decision, the research objects are mostly comments on the retail platform. Online product reviews can play an important role in supply chain decision-making, and will have an impact on product quality decision, product pricing decision, product demand decision, channel selection decision and consumer purchase behavior decision in the supply chain. In addition, in addition to existing research, this paper also summarizes future research directions, such as broadening the scope and dimension of online product review starting from the definition of online product review; studying the role of online product review in multi-channel supply chain decision.

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