Evaluation of product uncertainty in online shopping

Fuyi Dong

College of Science, University of Auckland, Auckland, New Zealand

Abstract: This paper reviews the literature on product uncertainty in online shopping platforms. Online shopping, as a brand new way of shopping brought by the rise of Internet technology, has a lot of uncertainties. Product uncertainty, as an important factor in the uncertainty, affects the purchasing tendency of buyers. This paper reviews and summarizes the previous research literature, focusing on the following four aspects: to preliminarily understand what uncertainty is. Understand why product uncertainty should be reduced by understanding the impact of product uncertainty. The relationship between seller and product uncertainty is studied from seller's point of view so as to further reduce product uncertainty. Explore why more and more shopping platforms help other buyers evaluate product information by introducing reviews from buyers. Finally, we hope to help online shopping platforms and sellers develop in the future by studying and analyzing the uncertainty of these products.

1. Introduction

Shopping is a very common behavior in daily life. With the development of the Internet, online shopping has become a brand new shopping choice compared with the traditional purchase of products in physical stores. The introduction of Internet technology has greatly changed buyers' evaluation of products when they purchase (Christian M & Thomas H, 2016). When buyers purchase goods from unfamiliar sellers for the first time, their trust in online platforms and purchase intention are less than those in physical stores, which may be because the actual distance between buyers and sellers in online shopping is too far, leading to the inability to provide services in some practical experience (Peter R. D et al., 2016). The online market is different from the real market, where buyers can test the appearance, smell, texture and other elements of a product through different physical channels. However, in the online market, there is a lack of such direct interaction between buyers and goods, resulting in uncertainty of products, which is further aggravated by sellers' inability to perfectly describe the experience of all aspects of products (Angelika D et al., 2012).

We conducted an extensive review of the literature related to product uncertainty in online shopping. By understanding the concept of product uncertainty and its impact, we focused on the evaluation of different aspects of product uncertainty from both sellers and buyers in online shopping. In particular, the relationship between seller's uncertainty and product uncertainty, as well as the communication channels established between buyers and buyers through third-party platforms, can provide more information about products through evaluation of products after use, so as to help other buyers reduce product uncertainty. By quoting some examples of existing online shopping websites, this paper helps to discuss the problem of product uncertainty. And some practical examples of

proposed solutions are discussed.

Our paper will focus on the research and discussion of the following viewpoints:
• What is uncertainty?
• The impact of product uncertainty
• Seller and product uncertainty
• Buyer and product uncertainty

The purpose of this paper is to have a clearer understanding of all aspects of product uncertainty and provide more help to online shopping platforms and sellers through the study of these four aspects[1-3].

2. What is uncertainty?

Buyers need to face a lot of uncertainty when shopping on online shopping platforms. According to the research of Angelika D et al.(2012), uncertainty refers to the failure of buyers to predict transaction results due to asymmetric information between sellers and products in online markets. Seller's uncertainty and product's uncertainty are two major factors leading to information asymmetry.

Among them, the seller's uncertainty factor, because the seller conceals product defects and does not consider the possibility of future cooperation, makes it difficult for the buyer to evaluate the characteristics of the seller and whether it is opportunism. For product uncertainty, it may be because the seller may not be a professional, so he is not aware of some undetected real conditions and hidden defects of the product, which makes it difficult to fully evaluate the product and its future performance (Pavlou P & Dimoka A, 2008). At the same time, product uncertainty is related to product quality and product matching. The uncertainty of product quality is related to the quality promised by the seller or the hidden defects of the product (Pavlou et al., 2007). Or product defects cannot be accurately described on online trading platforms with sellers (Dimoka et al., 2012).

Finally, product uncertainty is divided into two aspects: description uncertainty and performance uncertainty. Among them, due to the limitations of online trading platform, buyers are unable to check the products themselves, and the uncertainty of description is aggravated by sellers' descriptions only. The characteristics of products need to be accurately expressed by sellers through the Internet. The defects that are difficult to detect are hidden risks of performance and may affect the future use of the product, which is called performance uncertainty. The uncertainty of product performance often comes from the buyer's inability to grasp the future performance and feelings of the product (Danny W et al., 2007).

To sum up, sellers' understanding of product features and their ability to accurately describe them to buyers are the key factors that most directly affect uncertainty. Therefore, description uncertainty and performance uncertainty are related, and these two uncertainties directly affect the buyers' key in evaluating product characteristics and predicting product performance in the future[4-5].

3. The impact of product uncertainty

When shopping online, buyers are affected by multiple aspects of product uncertainty all the time. When sellers do not reasonably control the uncertainty of their products, product uncertainty may lead to price premium (Angelika D et al., 2012). In the face of a product with high uncertainty, buyers are often unwilling to take too much risk. They will consider the potential risks and benefits more, so as to choose a lower price than the average in the price range, rather than paying a price premium for good products. The higher the uncertainty of the product, the buyer is likely to compensate for some of the unavailable information with a lower price, and describing uncertainty reduces the price premium. At the same time, buyers worry about the possible poor performance of the product in the future, so they will further lower the price to make up for the psychological expectation and further

reduce the price premium. However, when the uncertainty of the product is reduced, more buyers will be inclined to buy the product. Christian M & Thomas H(2016) conducted a simulation experiment on nearly 100 college students and graduate students, in which the ratio of male and female was nearly 1:1. The results showed that more than half of the participants gave negative feedback to the uncertainty of the product, and they were more inclined to avoid the uncertainty of the product. At the same time, about one-third of the participants did not have any feeling that they could accept the loss even if the product was priced within the acceptable range, so they did not have too much negative feedback on the uncertainty of the product. In addition to the influence of purchase intention, in terms of price, for products with low uncertainty, buyers are more willing to approach the estimated price of products, which is often higher than the price of products with high uncertainty. The reduced uncertainty of the product will enable buyers to assess the value of the product more correctly (Tripathi A et al., 2022).

Product information signals are one of the ways to help buyers reduce product uncertainty. Clear product information signals can help buyers reduce information search and processing costs. Buyers also need certain product signals from sellers. In order to reduce the uncertainty of products, it is necessary to find ways to use product information signals to reduce the uncertainty of the seller's description of the real situation of the product and the uncertainty of the product's performance in the future use (Angelika D et al., 2012).

Sellers use Internet technology to eliminate product uncertainty as much as possible, which will affect buyers' choice and purchase intention of their products, as well as their acceptance of product prices, thus increasing product revenues and profits. In an ideal situation, if the uncertainty of the product is completely eliminated, the buyer will consume the product in large quantities and even repeatedly purchase the product, and the seller will definitely profit from it. By reducing product uncertainty to increase the purchase volume of buyers, the high income can make up for the extra cost of eliminating product uncertainty in the early stage. It is a problem for sellers to find a balance that can maximize the income between these two points (Christian M & Thomas H, 2016).

Therefore, the increase of product uncertainty will adversely affect the price premium, resulting in some high-quality products obtaining low returns, while some defective products with low quality obtain relatively good returns. The reduction of product uncertainty may increase the cost, but at the same time, it can better improve buyers' desire to buy and reasonable evaluation of product price, so that sellers can gain more profits from it[6-8].

4. Seller and product uncertainty

It is mentioned in Section 2 that uncertainty is generally divided into two types, seller uncertainty and product uncertainty. This section will focus on the relationship between the two. There is asymmetry of product information in online market transactions, which comes from the seller's uncertainty of concealing real product information by some dishonest sellers, and the product uncertainty of missing real information due to sellers' ignorance of hidden product defects (Angelika D et al., 2012). It is very difficult for buyers to discern these two uncertainties in online shopping. Due to the limitations of the Internet, buyers are not able to experience the products themselves, so there are deviations in the judgment of the products. When evaluating product price, buyers will evaluate seller uncertainty and product uncertainty at the same time, so both of them have an impact on buyers (Kettinger S. N. B, 2013).

Angelika D et al. (2012) mentioned in the study that due to the difficulty of product evaluation by buyers, the uncertainty of products mainly comes from sellers for the following three reasons: First, the limitation of Internet information dissemination makes it impossible to give a detailed description of all aspects of products; Second, sellers do not fully understand the hidden defects of products;

Third, subjective concealment of the real quality of products. As a result, in online transactions, users are unable to fully grasp the real situation of the product and fail to evaluate its future performance.

In view of the above three problems, there are three solutions to the uncertainty of online product: the judgment of online product description; The moderating effect of seller uncertainty; Third Party Product Warranty (Danny W et al., 2007).

4.1 The judgment of online product description

As a kind of product information signal, product description can be roughly divided into three types: text description, visual description and multimedia description. Sellers need to provide detailed description information about the details and characteristics of the product on the website, so as to reduce the uncertainty of the product as much as possible, so that buyers can understand the details of the product through text description. By displaying pictures of products, sellers can show the image and details of products in a more vivid way, thus making up for the lack of understanding of products caused by physical isolation caused by online platforms. Pictures are a kind of visual sense, and buyers can recall the performance of similar products through pictures, so as to better evaluate products on online platforms, and help buyers further reduce product uncertainty. More vivid product information can significantly help buyers reduce product uncertainty (Danny W et al., 2007). For entertainment products, 3D technology can be used. Products displayed through interactive multimedia can give buyers more perception of products (Jun Y & Enping (Shirley) M, 2010). Although the use of pictures or multimedia tools to display products will increase the cost of sellers, buyers are more inclined to buy products with less product uncertainty, and these product description methods can help reduce product uncertainty.

4.2 The moderating effect of seller uncertainty

Under normal circumstances, sellers have absolute control over product information, while buyers can only get product-related information from sellers, which results in seller uncertainty having a strong influence on product uncertainty (Danny W et al., 2007). Seller's reputation influences whether buyers are willing to believe that the information provided by sellers is authentic and reliable (Angelika D et al., 2012). The seller's reputation also affects whether the buyer is willing to believe the seller's description of the product and will fulfill the promise (Michael L, 2017). A good reputation mechanism can effectively reduce seller's uncertainty, so that buyers can have a sense of trust in the authenticity of product information, and further evaluate the product according to the information. If the seller's reputation is poor, the buyer will perceive the seller's online description of the product as unjudgements. Therefore, seller's uncertainty determines the impact of online product description on product uncertainty, and sellers with poor reputation may increase product uncertainty.

Although not all sellers are dishonest, the information conveyed by sellers through the Internet is still limited (Angelika D et al., 2012). The seller is unable to accurately describe hidden defects or technical problems that the seller does not know about. The seller can't predict the future performance of the product perfectly either. Such a situation will lead to the concern of buyers, because they cannot judge the honesty level of sellers, and the uncertainty of products brought by uncertain sellers has become the biggest concern of buyers. Therefore, although seller uncertainty and product uncertainty are different, they will affect each other.

4.3 Third party product warranty

Third-party demand can help buyers understand the details of products not described by sellers, easing the restrictions of online markets (Angelika D et al., 2012). For some hidden defects of

products that the seller is not aware of, a third party can be applied to provide product warranty. Professional third parties can provide more detailed and realistic descriptions of products to help buyers evaluate the future performance of products and never reduce the uncertainty of products. Among them, the inspection and historical report can let the buyer know the real situation of the product effectively, including some existing defects, as well as possible defects caused by past experience. Warranty reduces performance uncertainty by promising to provide the product with a chance to correct possible future defects. At the same time, the guarantee provided by an impartial third party is more trustworthy, and the third party guarantee will be regarded by buyers as a manifestation of low product uncertainty[9-13].

5. Buyer and product uncertainty

Product uncertainty is related to product quality and product matching degree (Christian M & Thomas H, 2016). Product quality is primarily related to the seller, as discussed in the previous product section. The uncertainty of product matching lies in buyers' preference for product selection in the case of the same product quality, and sellers need to provide different buyers with products more in line with their preference. The quality of products can be evaluated based on objective standards, while the matching of products is related to subjective measures (Kwark et al., 2014). As the product matching degree is a subjective feeling of the buyer, there are more conditions and possibilities, so more real product usage feeling information is needed to help the buyer to make reference and evaluation of this information. Online evaluation system provides a channel for sellers or platforms to communicate with buyers (Jun Y & Enping (Shirley) M, 2010). Sellers can increase the usefulness of online reviews to provide a reference for buyers to evaluate product uncertainty (Jianan W, 2017). As a feedback system, the user rating system aims to reduce the uncertainty in the online transaction process, increase the seller's credibility and improve the efficiency of product transaction through the feedback after user experience of products (Steven T, 2016). Buyers are more and more inclined to leave comments after shopping on online platforms, and a large number of buyer comments become an information reference for other buyers to evaluate product information. Product information comments can also reduce the product return rate during online shopping (Danny W et al., 2015).

According to the experimental data analysis of Danny W et al. (2015), nearly 80% of buyers read reviews when shopping online in order to reduce the uncertainty of products or to look for ambiguous parts in product description that can be used to weigh. More than 40 percent of buyers believe the reviewer's expertise affects the credibility of the review. Nearly 22% of buyers are concerned about the possible future performance of the product. About 12% of buyers pay attention to reviews that describe the pros and cons of a product. Close to 10% mentioned comments that were too long and wanted them to be controlled. Therefore, it can be concluded that the factors affecting product evaluation can be divided into the following categories: diagnostic quality of product evaluation and credibility of product evaluation.

5.1 Diagnostic of product evaluation

The diagnostic nature of product evaluation is that buyers hope to reduce the missing or ambiguous parts of product information provided by sellers by referring to user evaluation. When buying products on online shopping platforms, buyers are more inclined to read reviews in order to reduce product uncertainty. In the process of reading reviews, buyers can get some information that sellers do not provide, and vague information points can also be reduced, which may negatively affect buyers' purchase decisions (Danny W et al., 2015). Comment value is the overall presentation, including both positive and negative feedback. Negative feedback is also a concern for buyers, and

sometimes even more effective. Buyers may question the usefulness of positive reviews because sellers may manipulate positive reviews. Therefore, the credibility of negative evaluations will increase, and more buyers will pay attention to the ratio between negative evaluations and positive evaluations as a reference, so as to evaluate and judge the uncertainty of products (Jianan W, 2017). At present many famous online shopping platform provides user evaluation system, for example, China's active users taobao is the month of nearly 800 million online shopping platform (Zhai J, 2019), the user to buy on taobao, after confirm the delivery of the products and the function of the platform will provide a product reviews, a user can in the product reviews published for the evaluation of the products. At the same time, users can upload pictures of their own products. Buyers may be skeptical about the use experience and picture representation of products in some advertisements posted by sellers (Danny W et al., 2007). Compared with the advertising pictures provided by the seller, which may contain false claims, the pictures posted in the buyer's review may be more realistic and serve as a reference for other buyers to reduce the uncertainty of the product.

5.2 Credibility of product evaluation

The credibility of a product is whether the content reviewed by users is fair and professional. Buyers will determine whether a product review is credible in terms of the professionalism of the review and the competence of the reviewer. When reviewers claim to be experts in a certain field and use their expertise to review a certain product, the evaluation has a certain authority, and such authority will increase buyers' trust in the product. Experts' comments are more influential, and such comments will be referred by more buyers to reduce the uncertainty of products (Danny W et al., 2015). For example, some sellers, especially those in the field of electronic machinery or technology, often invite experts in the field to review the products. At the same time, in the field of cosmetics, some medical experts to provide evaluation is easier to attract the attention of buyers. For online shopping platforms, when reviews come from independent third-party platforms with higher trust, buyers will rate the information as more reliable than the information from the seller. In China, there are many different third-party platforms that provide different product evaluations, such as Douban, which provides evaluation for entertainment products such as movies and TV dramas, and Xiaohongshu, which provides user evaluation and sharing for cosmetics and daily necessities[14-16].

6. Conclusion

In conclusion,Reviewing all the literatures about product uncertainty we read, we understand the uncertainty faced by buyers in online shopping. Most of these uncertainties come from the imperfect description of product information by sellers, and some defects in real products may be hidden, resulting in information asymmetry. The analysis of product uncertainty aims to reduce buyers' concerns as much as possible, increase buyers' control over product information and reduce product uncertainty (Danny W et al., 2007). Although, the best way to reduce the uncertainty of the product is to let buyers experience the product directly, such as free trial of the software, Demo version of the game, and part of the movie and TV series (Jun Y & Enping (Shirley) M, 2010). However, there are still other ways to reduce the uncertainty of products, even though these ways have certain risks, for example, user comments are too subjective and easy to be manipulated by sellers (Christian M & Thomas H, 2016). Sellers can still through the use of a variety of ways to reduce the uncertainty of the products as much as possible, to buyers for the product of the consumer consumption desire, even at the same time, in the future study, can also be discussed for the product after consumption, sellers can through the mechanism of refund or warranty guarantee, to further reduce the uncertainty of products in the future.

References

[1] Darke, P. R., Brady, M. K., Benedicktus, R. L., & Wilson, A. E. (2016). Feeling close from afar: The role of psychological distance in offsetting distrust in unfamiliar online retailers. Journal of Retailing, 92(3), p.287-299.

[2] Dimoka, Hong, & Pavlou. (2012). On product uncertainty in online markets: Theory and evidence. MIS Quarterly, 36(2), p.395.

[3] Hong, Y., & Pavlou, P. A. (2012). Product fit uncertainty in online markets: Nature, effects and antecedents. SSRN Electronic Journal.

[4] Kettinger, S. N. B.(2013). Adverse selection in online new-goods market: An analysis of product uncertainty and seller uncertainty. Proceedings of the Nineteenth Americas Conference on Information Systems, p.15-17.

[5] Liu, Z., & Park, S. (2015). What makes a useful online review? Implication for travel product websites. Tourism Management, 47, p.140-151.

[6] Luca, M. (2016). Designing online marketplaces: Trust and reputation mechanisms. National Bureau of Economic Research.

[7] Matt, C., & Hess, T. (2015). Product fit uncertainty and its effects on vendor choice: An experimental study. Electronic Markets, 26(1), p.83-93.

[8] Pavlou, P., & Dimoka, A. (2008). Understanding and mitigating product uncertainty in online auction marketplaces. SSRN Electronic Journal.

[9] Tadelis, S. (2016). Reputation and feedback systems in online platform markets. Annual Review of Economics, 8(1), p.321-340.

[10] Tripathi, A., Lee, Y. J., & Basu, A. (2022). Analyzing the impact of public buyer-seller engagement during online auctions. SSRN Electronic Journal.

[11] Wang, M., Lu, Q., & Ye, Q. (2016). The impact of differenttypes of online reviews on consumer purchasing decision--an empirical investigation with online marketplace data. PACIS 2016 Proceedings, p.300.

[12] Weathers, D., Sharma, S., & Wood, S. L. (2007). Effects of online communication practices on consumer perceptions of performance uncertainty for search and experience goods. Journal of Retailing, 83(4), p.393-401.

[13] Weathers, D., Swain, S. D., & Grover, V. (2015). Can online product reviews be more helpful? Examining characteristics of information content by product type. Decision Support Systems, 79, p.12-23.

[14] Wu, J. (2017). Review popularity and review helpfulness: A model for user review effectiveness. Decision Support Systems, 97, p.92-103.

[15] Yang, J., & Mai, E. (Shirley). (2010). Experiential goods with network externalities effects: An empirical study of online rating system. Journal of Business Research, 63(9-10), p.1050-1057.

[16] Zhai, J. (2020, February 13). More than 60% of the new annual active users on Taobao are from the sinking market.