

Relationships between Trust, Product Prices, Price Discounts, and Price Premiums in the Online Open Marketplace

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Abstract. This paper proposed a novel method for calculating seller trust in the online open marketplace. Trust in the seller was calculated by using a questionnaire, examining, the feedback mechanism in Auction, (a leading online marketplace in Korea), and applying the analytical hierarchy process. Trust function proposed in this paper is one of the most important factors in an analysis of relationships between seller trust, price discount, and price

Keywords: Open Marketplace, Trust, Price Premium, Price Discount, Analytical Hierarchy Process

1 Introduction

The factors related to trust and prices are crucial to customers' online purchase decisions. In an open marketplace, a buyer selects one of many sellers offering different prices. Trust in the seller in online open marketplaces is an important determinant of customers' purchase decisions. This means that a higher level of trust in a seller(seller's reputation) provides an opportunity for the seller to propose a higher price(price premium) to the buyer(Resnick et al., 2006). Price premiums result from customers' willingness to pay an extra amount to reputable sellers to reduce transaction risk.

In this regard, there is a need for an examination of trust in the seller from the perspective of customers' purchase behavior in the context of the catalog model. One of the most important steps in an analysis of relationships between seller trust, price discount, and price premium is to identify and calculate the level of trust for each seller.

Thus, this study is proposed a novel method for calculating seller trust by using actual data from reputation systems provided in the online marketplace.

2 Trust Function in Seller

Many studies on feedback mechanisms as a method for building trust in online marketplaces have been conducted (Brown and Morgan 2006; Dellarocas 2003; Lee and Lee 2005; Resnick et al. 2006; Zhang 2006; Zhou et al. 2009). The reputation and feedback profiles for sellers in the online marketplace include a variety of data, ranging from grades to text comments. The most important thing is how to measure seller trust by using the reputation and feedback profiles given in the online marketplace. A simple method is to directly use feedback profiles instead of seller trust to analyze the relationship between seller trust and rewards or prices (Ba and Pavlou 2002; Lee et al. 2003; Pavlou and Dimoka 2006; Zhang 2006; Zhou et al. 2009). For an example, Ba and Pavlou (2002) directly used positive or negative ratings as proxies of seller trust. A drawback of the method results from the lack of ability to distinguish the level of trust in sellers because sellers get positive ratings for most transactions.

Another method to measure seller trust is to conduct the questionnaire that asks buyers to assess sellers for past transactions. For an example, Pavlou and Dimoka (2006) identified seller trust by finding buyers who had gotten a specific transaction with a specific seller and inviting them to participate in survey. This method requires a tedious and time-consuming effort. Buyers have to remember a specific transaction with a specific seller and assess the seller according to questionnaire items.

Our method generates a function to calculate a level of trust for each seller by allocating the actual data of each reputation or feedback profile. Auction (www.auction.co.kr), which is the largest and oldest open marketplace in Korea, was utilized as a sample for hypothesis testing. All sellers of Auction have feedback profiles, which include the seller grade, purchase satisfaction, and seller assessment/merchandise assessment. Hereafter, the information on such seller ratings is referred to as trust indices in seller. Seller grades are classified into seven symbols ranging from novice to VIP according to seller's trading history (refer to the questionnaire item 2 of Appendix). The purchase satisfaction with eight grades is allocated to sellers through buyers' feedback (refer to the questionnaire item 3 of Appendix). Seller assessment/merchandise assessment is classified into five grades ranging from highly unsatisfactory to highly satisfactory by aggregating buyers' feedback ratings (refer to the questionnaire item 4 of Appendix). When buyers make a purchase decision in Auction site, they refer to three trust indices in seller. In order to reflect buyer's perception for trust indices in seller, we used the survey method asking buyers to evaluate the relative importance of trust indices and to rearrange different scales of trust indices into three grades such as untrustworthy, trustworthy, and absolutely trustworthy.

The questionnaire was pretested with 52 buyers who had purchase experience in Auction site. The primary goal of the pretest was to check content validity and proper wording of the questionnaire. A total of 252 valid samples were collected from a questionnaire in which buyers of Auction were instructed to assess the importance of three trust indices in seller, and to classify the trust levels of each index into three grades. Table 1 shows the demographic characteristics of respondents. The percentages of gender, age, and purchase experience are similar to those of the distribution of buyers on the Auction site.

Table 1. Demographic characteristics of respondents

Items	Classification	Frequency (%)
Gender	male	134(53)
	female	118(47)
Age (years)	less than 19	45(18)
	20-29	68(27)
	30-39	49(20)
	40-49	51(20)
	over 50	39(15)
Number of purchase experience during the last six months in Auction site	1-2	107(42)
	3-4	70(28)
	5-6	25(10)
	7-8	15(6)
	9-10	15(6)
	over 11	20(8)

We calculated weights of three trust indices via the application of an analytical hierarchy process (AHP) to the sample data. AHP is utilized when determining the attribute weights by pair-wise comparisons of the attributes as criteria for decision making (Scholl et al. 2005). A series of responses may not be consistent. The degree of inconsistency can be measured by the consistency ratio (CR) to reduce it as much as possible (Saaty 1990). Responses with $CR \leq 0.1$ are generally sufficiently consistent (Saaty 1990; Scholl et al. 2005). A total of 79 samples, excepting 173 samples in which the CR exceeded 0.1, were utilized to calculate the weights of indices representing their relative importance. Respondents reported that purchase satisfaction was the most important index, as is shown in Table 2.

Table 2. Weights by types of feedback ratings for seller trust in Auction

Type of trust index	Weight	CR
Seller grade (w_1)	0.299	
Purchase satisfaction (w_2)	0.387	0.0000041344
Seller assessment/merchandise assessment	0.314	

The trust function in seller consists of the weight and the three indices.

$$T_i = \sum_{j=1}^3 w_j * x_{ij} \quad (1)$$

Where, $i = 1, \dots, n$, n: number of sellers, j refers to a type of trust indices.

In equation (1), T_i means the level of trust for the i th seller, x_{ij} means the value of the j th index for the i th seller, and w_j is provided in Table 2. Data collected from

questions 2, 3, and 4 of the questionnaire in Appendix were employed to calculate x_{ij} . The rating value of 6.0 for seller grade in Table 3 is a median of the data. If the grade of a specific seller (i) is VIP or diamond, we allocate 3 to x_{i1} . x_{i1} equals 2 for sapphire, x_{i1} equals 1 for gold or silver, and x_{i1} equals 1/2 for bronze and novice levels. This method provides standardized values for trust levels, ranging from 1/2 to 3 to each seller. For example, the trust level of a seller is 3 ($0.299*3 + 0.387*3 + 0.314*3$) when his indices are VIP for seller grade, 5 stars for purchase satisfaction, and a seller assessment of highly satisfactory.

Table 3. Median of trust level by indices

Type of trust index	(absolute trust) median	(somewhat trust) median	(never trust) median
Seller grade	6.0	5.0	2.0
Purchase satisfaction	8.0	6.0	3.0
Seller assessment/merchandise assessment	5.0	4.0	2.0

3 Conclusion

Our method of identifying trust in seller renders it standardized in one dimension, differentiates the level of trust in sellers, and enables the simplification of the research model analyzing relationships between trust, price and price premium.

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