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Paradox of Information Quality: Do Consumers Pay More for Premium Product Information on E-commerce Sites?

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ABSTRACT

The main goal of this study is to investigate the link between information quality and the customer's willingness to pay for it. We propose that the level of product homogeneity affects the consumer's purchase. This study hypothesizes that consumers tend to choose the lowest price when purchasing homogeneous products, regardless of the quality of information provided on the web site. In contrast, when purchasing heterogeneous products online, consumers do not necessarily choose the lowest price, but rather choose the higher-priced option that provides high quality information on the product. Before testing these hypotheses, we conducted a pilot study. The results of this pilot study show the feasibility of future studies.

Keywords

Homogeneity; Heterogeneity; Paradox of Information Quality

INTRODUCTION

Supposing that there are no prior perceptions of a given e-commerce site, what are the critical criteria influencing a consumer's purchase decision? Furthermore, if a consumer perceives an equivalent level of trust towards two different e-commerce sites, which site will he/she choose to buy products? Bakos (1997) deduced that the lower search and switching cost on the internet has had a significant impact on market equilibrium. This has resulted in lower prices, and consumers have become more sensitive to prices; that is, consumers obtain information on products from e-commerce sites that provide high-quality information, but the actual purchase tends to occur on a site that offers the lowest prices. This result occurs because consumers can easily compare different e-commerce sites and find the lowest price of a certain product (Smith et al., 2001).

This study casts doubt on this general belief, and proposes that the consumer's online purchase may be affected not only by the price, but also by the product information quality provided on the site and the product's attributes.

LITERATURE REVIEW

Although online consumers always want to acquire sufficient information for their shopping, they cannot, in most cases, because information asymmetry still exists online. This asymmetry is considered to be the consumers' perceived risk. Bauer (1967) noted that "consumer behavior involves risk in the sense that any action of a consumer will produce consequences which one cannot anticipate with anything approximating certainty and some of which are at likely to be unpleasant."

If the quality of a certain product is homogeneous and thereby easy to judge on the e-commerce site, this perceived risk will be relatively low. In contrast, if the product quality is heterogeneous and difficult to judge, the consumer's perceived risk must be high. De Figueiredo (2000) classified product properties into four different types based on the level of difficulty in judging the product's quality on the web (Figure 1).

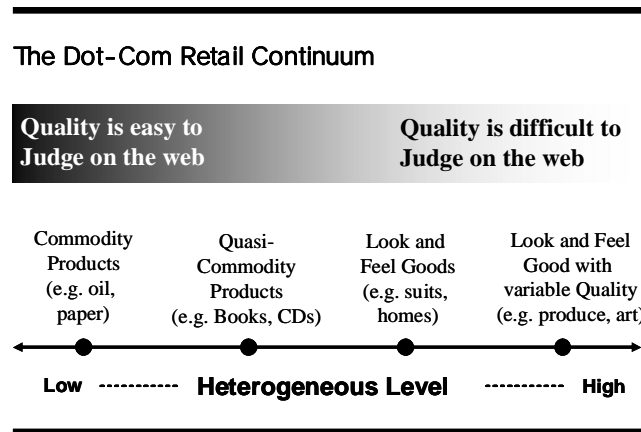


Figure 1. Heterogeneous Level of Products on the Web (Adapted from De Figueiredo, 2000)

As shown in Figure 1, products of low heterogeneity (homogeneous products/goods) include commodities such as oil and paper. Products of high heterogeneity (heterogeneous products/goods) include used cars, works of art, fresh agro-products, etc., which means that the perception of quality might differ from consumer to consumer and product to product. The complexity in describing products of high heterogeneity increases the difficulty for consumers to experience such products. Because only limited types of description are possible online, the uncertainty of quality or the difficulty of quality determination in this kind of market could be higher than in the traditional market (Malone et al., 1987). This uncertainty factor increases the consumers’ perceived risk so that they are reluctant to purchase such heterogeneous goods online. Sheth and Venkatesan (1968) suggested that high-quality information (premium information) could reduce this perceived risk in the traditional market.

In this study, premium information refers to any type of information intended to reduce the consumer’s perceived risk (e.g. manufacturer information, specific ingredients, expiration dates, customer reviews, sales counts, use direction, etc.) in contrast with basic information (e.g. price information, basic delivery information, etc.).

Although premium information reduces the perceived risk, after acquiring sufficient information for a certain product on a given site, the consumer will purchase it from a site that offers the same or similar product at the lowest price, not from those providing premium information, due to the very low switching and search costs on the internet. It will be a considerable and continuous loss for the site that provides premium information because the site needs to pay huge costs in providing and maintaining premium information, resulting in higher prices. Does higher information quality mean bigger losses? Does this problem always exist with all goods?

The current study posits that this problem regarding information quality and switching and search costs on the internet may be applied to homogeneous goods, but the paradox does not seem to apply to heterogeneous goods. If the consumer wants to buy a heterogeneous product and perceives some uncertainties or risks, the consumer will readily pay extra costs for premium product information as long as he/she feels the risk is alleviated sufficiently. That is, the problem of information quality will disappear, and the e-commerce site that provides premium information will be able to generate profit.

For example, consumers’ online buying behaviors will be different with respect to premium information on beef and as opposed to that of CDs. Suppose that a consumer wants to buy a pack of beef. He/she might find an e-commerce site that provides premium information on the product and be satisfied by the information quality of the site. Then he/she will be reluctant to switch vendors because of the uncertainty and risk of product heterogeneity. Said differently, the consumer cannot be sure whether the premium information provided on the site can be applied to the same or similar products of other sites that offer lower prices. It might be difficult to say that grade “A” beef of site Y is exactly same to that of site Z. In the same way, it also might be difficult to say that the premium information of the grade “A” beef of site Y is applied to the same quality of beef on site Z because beef is a heterogeneous commodity. In contrast, everyone might agree that the Beatles CD of site W is identical to that of site X, and that the premium information of the Beatles CD provided by site W is perfectly applicable to the same product of site X because the Beatles CD is a homogeneous product.

Research Model

The current study conducts an empirical investigation into the relationships between information quality and customer buying behavior, by initiating a new concept on the paradox of information quality. The conceptual research model of the current study is presented in Figure 2.

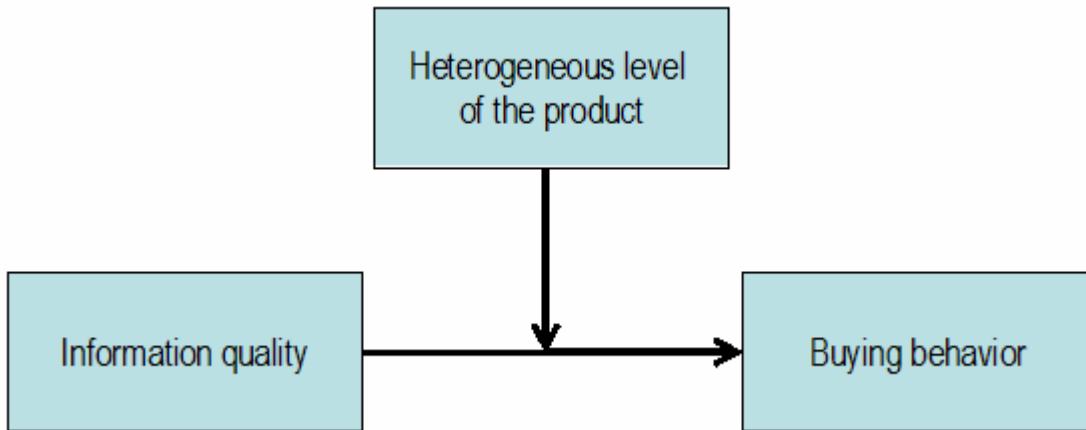


Figure 2. Conceptual Research Model of the Current Study

The current study proposes two hypotheses to accomplish the goal of this study.

H1: The consumer tends to choose the lowest price regardless of the information quality when he/she buys homogeneous products.

H2: The consumer is willing to pay more if the e-commerce site provides premium information on a heterogeneous product.

Let G_H denote homogeneous goods and G_T denote heterogeneous goods. An asterisk (G_H^* or G_T^*) indicates goods presented with premium information provided by the vendor. Then, suppose that $P(x)$ stands for the price of x , $I(x)$ for the information quality of x on the site, and $Q(x)$ for the quantity of x sold on the site. Therefore, the comparison in price between G_H^* and G_H can be represented as:

$$\frac{P(G_H^*)}{P(G_H)} \tag{1}$$

where $P(G_H^*) > P(G_H)$.

The current study assumes that the price of G_H^* or G_T^* is always higher than G_H or G_T , respectively, because of the value of premium information. In the same sense, comparison of the information quality of G_H^* and G_H can be represented as:

$$\frac{I(G_H^*)}{I(G_H)} \tag{2}$$

where $I(G_H^*) > I(G_H)$.

The ratio of (1) to (2) is represented as:

$$\frac{I(G_H^*)/I(G_H)}{P(G_H^*)/P(G_H)} \tag{3}$$

Formula (3) refers to the consumer’s perceived benefit from premium information on the purchased goods. If the value of (3) is less than 1, the consumer feels that he/she pays more than the quality of premium information provided by the site, which is over-priced. If the value of (3) is equal to 1, he/she feels that the cost is equivalent to the quality of premium information. If (3) is higher than 1, he/she feels that the cost is less than the quality of premium information, which is under-priced.

The ratio of the quantity of G_H^* sold to that of G_H sold on the e-commerce site is represented as:

$$\frac{Q(G_H^*)}{Q(G_H)} \tag{4}$$

Accordingly, H1 can be represented as:

$$r \left(\frac{I(G_H^*)/I(G_H)}{P(G_H^*)/P(G_H)} \times \frac{Q(G_H^*)}{Q(G_H)} \right) \approx 0 \text{ (N.S)} \tag{5}$$

When the consumer buys homogeneous goods, he/she will choose the lowest priced goods regardless of information quality. Therefore, the correlation between (3) and (4) must be around zero as shown in formula (5). In other words, there will be no significant correlation between (3) and (4).

In the same way, H2 can be represented as:

$$r \left(\frac{I(G_T^*)/I(G_T)}{P(G_T^*)/P(G_T)} * \frac{Q(G_T^*)}{Q(G_T)} \right) > 0 \tag{6}$$

When the consumer buys heterogeneous goods, he/she will readily pay more for premium information to reduce the perceived risk discussed earlier. As the consumer’s perceived benefit from the information increases from a value of zero to greater than one, the consumer feels that the perceived risk becomes reduced and the price reasonable. Then, he/she will buy the option with premium information rather than the cheaper option for the same or similar product, but with only basic information. Accordingly, as presented in formula (6), there must be a positive correlation between the consumer’s perceived benefit from premium information and $Q(G_T^*)/Q(G_T)$. In other words, more goods provided with premium information will be sold as long as the consumer believes that he/she profits more from the premium information and the price is acceptable. Figure 3 conceptualizes differences between consumer’s buying behaviors towards G_H^* and G_T^* .

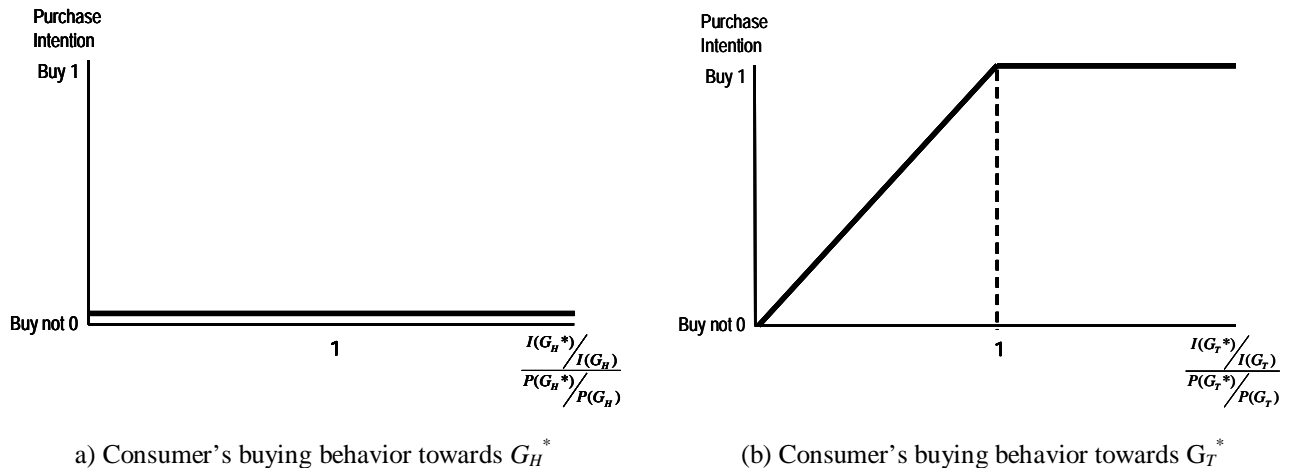


Figure 3. Differences between Consumer's Buying Behavior towards G_H^* and G_T^*

The horizontal axis indicates the consumers' perceived benefit from premium information for G_H^* or G_T^* . The vertical axis represents the consumers' purchase intention. In the case of G_H^* , the consumer will not buy G_H^* if the price is greater than G_H . Rather, he/she will always buy the most inexpensive one, G_H , regardless of information quality. On the other hand, in case of G_T^* , at the beginning, the consumer would not buy G_T^* because he/she feels they should not pay more than their benefit from premium information. However, as the consumer perceives benefit increases, his/her intention to buy G_T^* will increase to "1" on the horizontal axis. The purchase will continue until the consumer believes that the premium information is useful and the price of the goods is acceptable.

PILOT STUDY

This pilot study was conducted to evaluate the feasibility of a future primary study that will use real transaction data. Two different experiments were conducted under controlled environments. A small e-commerce site in Korea was constructed for the pilot study, its layout being exactly the same as a leading e-commerce site. As an example of heterogeneous goods, fresh food (abalone), was selected, while a CD (The Beatles-Yellow Submarine) was selected as a homogeneous product for this pilot study. Figure 4 illustrates the conceptual experiment design.

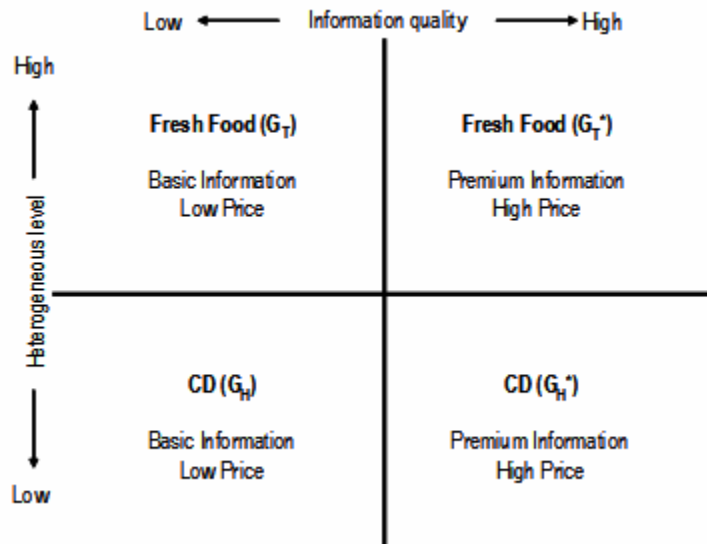


Figure 4. Conceptual Experiment Design for the Pilot Study

The experimental group (n=60) was divided in two. Each group was asked to perform a task involving the virtual purchase of a pack of abalone or the Beatles CD from the experimental web site. They were asked to assume that they were shopping for a gift for their family, and to stop the shopping process right before the system asks them to confirm the payment.

This study manipulated the web site so that when the participants browsed for the target product, they could find only three items. The three items were virtually the same product but their information quality and prices were manipulated (See Table 1). Basic information on the fresh product was limited to a basic product image, price, quantity and weight, delivery information, etc. that were commonly applied to all three items. Premium information includes origin, packing form, cultivation processes, preparing directions, recipes, detailed images, etc. that were differently applied to two items in addition to the basic information. The same manipulation methods were applied to the CD. Premium information of the CD included track information, album description, artist information, detailed images, purchase recommendations related to the CD, etc. Price variances between items were set as 20% (\$80.00 to \$96.00, or \$11.00 to \$13.30), which is in the boundary suggested by Baye et al. (2004).

Furthermore, since the main goal of the experiment is to demonstrate the consumer's willingness to pay for premium information, possible exogenous factors that might affect consumer buying behavior were controlled before conducting the afore mentioned experiments. To eliminate the effect of trust and loyalty towards the e-commerce site, the current study conducted the experiments on the same site. The brand name was also controlled. The results are shown in Table 1 and Figure 5.

Product Type	Item	(1) $I(x)$	(2) $P(x)$	(3) $Q(x)$	(4) $[I(G_{HX})/I(G_{HI})]/[P(G_{HX})/P(G_{HI})]$ or $[I(G_{TX})/I(G_{TI})]/[P(G_{TX})/P(G_{TI})]$	(5) $Q(G_{HX})/Q(G_{HI})$ or $Q(G_{TX})/Q(G_{TI})$
Homogeneous (The Beatles CD)	G_{H1}	8	11.00	23	1.00	1.00
	G_{H2}	14	13.30	1	1.45	0.04
	G_{H3}	18	13.30	5	1.86	0.22
Heterogeneous (a pack of abalone)	G_{T1}	7	80.00	8	1.00	1.00
	G_{T2}	12	96.00	10	1.43	1.25
	G_{T3}	22	96.00	13	2.62	1.63

Table 1. The Results of Pilot Study

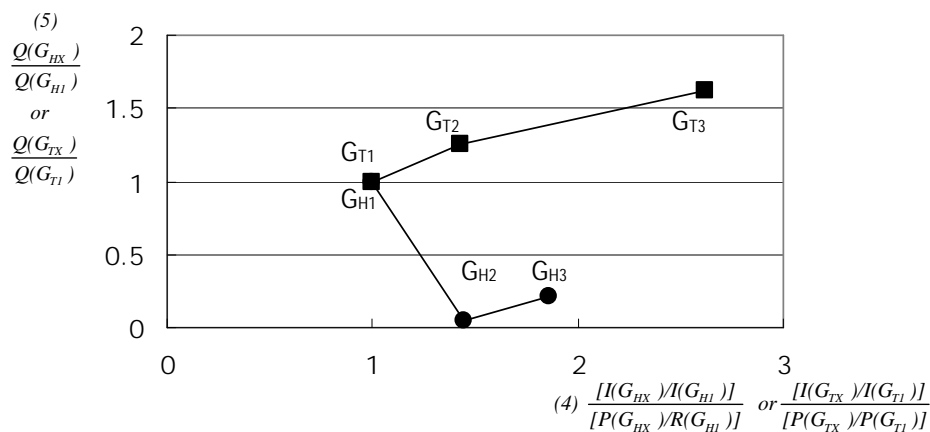


Figure 5. Results of the Pilot Study

Table 1 and Figure 5 compare the results of the pilot experiment. Each notation in Table 1 and Figure 5 refers to the definition discussed earlier. As shown in Table 1 and Figure 5, in the case of homogeneous goods, most transactions occur with the lowest-priced product, G_{HI} . In contrast, in the case of heterogeneous goods, as the consumer's perceived benefit from premium information – (4) on Table 1 –increases, the value of (5) also increases. The later is likely to show a positive correlation between (4) and (5) as shown in Figure 5. The results of this pilot study show that there are clear differences of online buying behavior between the two purchasing groups.

FUTURE PLANS AND DISCUSSION

A future study will involve the collection of a large amount of real transaction data from a leading e-commerce company in Korea. The present study proposed the possible existence of the paradox of information quality, and confirmed its existence. The goal of the future study is to clearly interpret the paradox by demonstrating the link between price and online buying behavior, including the moderating effects of product heterogeneity. Finally, this study will be used as a guide for building online pricing strategies and handling costs for providing product information.

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