

# A Study on Economic Value for Non-market Properties of e-Business

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## Abstract

This paper is a study on the model that measures economic values for the non-market properties of e-Business. For development of this model, first of all, we reviewed the properties of e-Business service, and looked around the relation between customer satisfaction and/or payment value and e-Business properties. In addition, we checked the method to measure economic values of these properties. This measurement method is the contingent valuation method which is a method of measuring the value of the environmental product. We modified it to adapt to the e-Business. Finally, in this paper, we proposed an economic value model which measures the value of willingness to pay(WTP) to our objectives. However, there could be some restrictions at the time when surveying empirically. Therefore, the succeeding study should be done in order to improve these restrictions some day.

*Key Word : Valuation, WTP, e-Business, CVM*

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## 1. INTRODUCTION

Since Internet was born, it has been diffused fast and has become a main strategic means and/or a strategic weapon of the enterprise. That is to say, it has created a new economy of electronic commerce(EC), and became a new method of creating and adding a new value of the enterprise.

U. S., which has played the leading role in EC from the early days, is already showing a great progress in this area. And other advanced countries in Europe and Japan are busy to join in this new economy of EC. Especially, in Japan, because a recent big bang of the monetary system is being gone on seriously, the conservative financial world has driven the EC. The Korean enterprises which set up homepage and/or opened the cyber shopping mall on Internet, has also carried out marketing and advertisement through Internet [1].

According to Forrester Research Inc., the size of the world market of EC is expected to reach US\$ 2.2 billion in the year 1998 and will be extended largely to US\$ 350 billion by the year [2]. However, this progress can be made when EC system meets all the requirements.

Therefore, the enterprise which is willing to conduct EC on Internet well, should improve services quality by means of continuous investment. Here, investment must be driven by evaluation means such as the cost-benefit analysis. Under these circumstances, this paper focuses on analyzing economic value of non-market properties) of EC. In the paper, we will limit the scope of our research to the electronic shopping mall within business-to-customer EC and analyze

the economic value that is related to the shopping mall service.

## 2. RESEARCH BACKGROUND

The economic value model that is used in this research is originally a model about the value measurement of environmental goods. Usually, environmental goods has the characteristics of which it cannot be dealt through the price mechanism of the market.

Therefore, it is not easy to measure the improvement level of the economic welfare caused by the improvement of the quality of water or the air quality and anti-pollution activities.

To overcome this problem, many researchers in this area have been making efforts. Consequently, several methods such as the benefit measuring method were developed. The contingent valuation method(CVM), one of them, is accepting its appropriateness and usefulness. CVM use technique that people set directly value on some environmental goods for giving value for the new environmental goods. In this case, questionnaire is used for gathering data like other methods. In the questionnaire, subject answers the amount he or she is willing to pay for the goods. First, this method set up hypothetical situation, and survey willingness to pay(WTP) of respondents under the situation by the questionnaire. Then, economic value of environmental goods is estimated by direct calculation and statistical analysis of data.

This analytic technique is usually used for estimating economic value of environment-goods, but recently it is being adapted to other fields[11]. In this research, will also research a

possibility of adaption for estimating economic value of the E(properties). CVM is the economic concept which is based on the 'Hicksian compensation surplus

The concept of the Hicksian compensation surplus is theorized on the process (estimating the benefit of increasing the safety of piped water through improvement of water quality[8]. The concept of the Hicksian compensation surplus could convert that how much part of one's income be equal to the incremental safety (piped water under the given utility level.

The function of Hicksian compensation surplus(CS) is expressed as equation of (1) : is the price vector of private goods,  $q$  is the quality of piped water,  $U$  is the utility level and  $Q$  is the quality of other environment. And compensation surplus(CS) of increasing the piped water's safety from the present level  $q^0$  to  $q^1$  is as follows.

$$CS = E(p^0, q^0, Q^0, U^0) - E(p^0, q^1, Q^0, U^0) \text{ -----}$$

----- (1)

The first expense function of the equation (1) is  $Y^0$  which is the respondent's present income, and given  $P^0, Q^0, q^1$  the second expense function is income level(  $Y^1$ ) which is to reach  $U^0$ . Here, the WTP(Willing to pay) is the gap between  $Y^0$  and  $Y^1$ . When using WTP as a measurement value of benefit, income compensation function considered as a WTP function which is expressed as function of (2).

$$WTP(q^1) = f(p^0, q^1, q^0, Y^0) \text{ -----} \quad (2)$$

The equation (2) is a basic structure of the value

function. The value function expresses the change of economic welfare that occur by the change of  $q^0$  by currency value.

Since the economic value analysis method can measure non-market properties, we will propose a model that adapt this method to value measurement of EC properties.

### 3. DESIGN OF RESEARCH MODEL

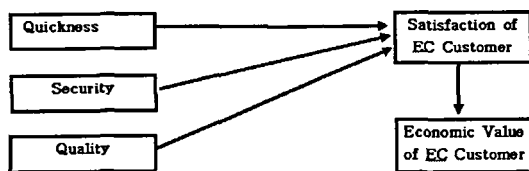
As previously mentioned, the properties of EC based on several strategic factors for the activation of EC are as followed. The first property is the competitive power of the price through the cutdown of costs. However, nobody regard the low price as the non-market property. The main source of price competitive power include the reduction of logistics cost by means of improvement of the logistics system. And improved logistics system can deliver the ordered product quickly by low cost. So, we can replace the low cost by quick delivery of the ordered product as the main source of price competitive power Therefore, in this study we would like to include quickness as the first non-market property. The second property is the reliability on the payment system. Most(about 90%) of Korean EC service enterprises are using both credit card and on-line receipt electronically as the payment mechanisms[5]. However, in the case of credit card, because Internet is not secure enough, individual's transaction information such as credit card number, personal identification number(PIN) and account number can be stolen. So this can act as a barrier to the activation of EC. In the case of on-line receipt, because it is impossible to trade immediately and it is not convenient for user to

pay for the purchase, this payment system can also hinder the activation of EC. Therefore the security of Internet is a necessary property as well as a very important factor.

The third property has to do with providing the high quality products. Since EC customers are buying goods or services without direct contact, very often the customer cancel orders for products. The reason why customers cancel orders is that the quality of product is low. To reduce this problem, the provider of EC service needs to get high quality products.

These properties are especially non-market properties which are not traded to the markets, so the market value are not given. Because of this, it is not easy to choose or decide on the priority of investment among properties and it might cause ineffective investment.

Therefore, we will suggest a model that can estimate the market value of non-market priorities. For the objective of this study, first we will analyze the relation between the properties of EC service and the satisfaction as well as the payment value<sup>1)</sup> of the electronic shopping mall customers(see Figure 1).



<Figure 1> Relation of Properties of EC, Satisfaction of EC Customer, and Economic Value

<Figure 1> shows the hypotheses that. properties of EC affects the EC customer satisfaction and the

EC customer's satisfaction effects the EC customer's economic value. On the these hypotheses, we suggest a econometrics model that estimate the economic value for non-market properties of EC (quickness, security, and quality). WTP of customers not only get affected by the their environmental and economic situations but also by the individual characteristics and/or preference, so this must reflected to the WTP function.

$$WTP(q^1) = f(p^0, q^1, q^0, Q^0, Y^0, T) \text{ ----- (3)}$$

In this equation (3),  $P^0$  is the price of private goods,  $q^1$  and  $q^0$  are the quality level of EC's properties(0 is the present quality level and 1 is the highest quality level),  $Y^0$  the income, and  $T$  is the vector toward the respondent's preference or characteristics. For example, when asking the WTP to the improvement of EC's security, we define  $q^0$  as the security level of present,  $q^1$  as the security level after improved. Also,  $P^0$ ,  $Q^0$ ,  $q^0$ , given equally to all the respondents.

Especially, in this research when considering the specific situation of EC, the concept WTP means the total amount(this is equal to sales of enterprises) that when perfect security is guaranteed, customers of EC are willing to pay for additional orders. This amount is estimated that multiply the ordering amount per time by the number of ordering time of each Internet shopping mall customer In this research, the econometrics mot which estimates the amount of WTP is as follows

$$WTP = a_0 + a_1ATT + a_2COS + a_3TRY + a_4NAC +$$

$$a_5AGE + a_6EDU + a_7YRS + a_8INC + U$$

WTP: The number of additional order and average amount per ordering time when perfect security is done.

ATT: The attitude of the respondent's about the security level of present EC.

COS: All costs spent for EC system usage

EFF: Efforts made for the security of EC

NAG: Subjective number of accidents occurring in 5 years related to security when the enterpriser is doing nothing to improve security

AGE: The age of respondents

EDU: The educational level of the respondents

YRS: The period(years) of using EC

INC: Average income per year

U: Error entry

Now, we can get WTP amount per person with the model, but this numerical value is not the average cost of payment on EC security per person. Therefore, we must compute a genuine WTP with this value. When security level of EC system is increased, customers will use electronic shopping mall more and more and enterprises will be get more profit than before. Because the cost for increasing security level will be justified by growed profit, a genuine WTP can compute from this additional profit arisen at the time when security level is increased.

Similarly, we can adapt the same method to other properties(that is, quickness and product quality) and estimate the amount of WTP. And finally we can decide on the priority among properties. Also, if the cost for improving the properties can compute, then we can check on the

appropriateness of EC investment through the benefit-cost analysis.

When analyzing the above equation, the perfect property must be clearly defined in order to let the respondent understand easily, and the accuracy of analysis should be upgraded. For example, in the case of EC security, the perfect security could be defined as "You'll never experience any accidents related to security for a lifetime." Also, when estimating the amount of WTP, it is necessary to set the range of the amount of payment. This can get accomplished specifies the maximum WTP in advance through preliminary survey.

#### 4. CONCLUSION

This research is a study on the model of the economic value measurement of EC properties that will take considerable parts in ail transactions. We limited the analysis range to the electronic shopping mall service within business-to-customer EC and we focused on the model to analyze the economic value of the non-market properties of the shopping mall service.

In this research, we classified the non-market properties by quickness, security, and product quality, presented a conceptual model that shows the relation between property factors, customer satisfaction and payment value. Then we presented the econometrics model for analyzing the economic value of security.

The study can contribute to decide the priority of investment among several EC properties and justify the cost for improving EC elements. However the study have some research limits such ad could deeply not analyze by the empirical verification. Future research agenda includes (1)

the practical survey of WTP of EC properties, and (2) the practical availability of the proposed model. Especially, many problems will occur in the process of the empirical analysis, so additional works should be done in the future.

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