

THE EFFECTIVENESS EVALUATING OF ONLINE SHOP BASED ON INFORMATIVITY OF THE PRODUCT PORTFOLIO

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Abstract

The nature of the Internet market allows us to develop information products that have experienced nature, disproportionately large effect on the scale of production and some publicity. Informativity in the article is the ability of goods contains different types of information: visual, auditory, olfactory, gustatory, and tactile. Depending on the types of contained information ideal online products (information goods), stimulating demand online products, and not stimulating demand online products are described.

The article presents a model for evaluating the effectiveness of Internet agent based on informativity of its product portfolio. The model is based on the analysis of the product portfolio, gross income and transaction costs of online shops selling advantage of one type of goods. A model of the ideal online store is shown. The basis for the analysis is financial results and information about the product portfolio of the largest online Russian retailers.

Results have shown that Internet agents that implement common advantage of ideal online products or stimulating demand products in the virtual market have a level of transaction costs lower than those online retailers that sell not stimulating demand products.

Scientific novelty of the model lies in the development of research on effectiveness of theoretical apparatus of forming the online seller product portfolio. The practical significance of the model is the ability to determine the level of optimality of the product portfolio of any virtual consumer market player. The obtained results allow for a deeper study of the optimization problems of transaction costs in the Internet market. The results can be applied to small and medium-sized enterprises with e-commerce for marketing strategy developing.

Key words: product informativity, online product, online shop product policy, transaction costs.

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Introduction

Contemporary approaches for evaluating information products were formulated two or three decades ago. Since that time, they have not basically changed. Information and technical progress has changed significantly, and, therefore, previous views on information products should be compared to the current reality.

In economy and law information products are referred to the type of products, the market value of which is formed by the information they contain. They may also include information services. Information products are often contrasted with tangible products such as food, clothing, or cars. Information products, in turn, may either have a material basis (disk, paper, flash drive, magnetic tape), or do without it (electronic versions of books, magazines, etc.).

Benjamin Bates insists that information may be presented either as a definite discrete unit or as a deliberate process. In the first case, the information appears as something that can be created, assigned, sold, bought, destroyed, etc. In the second case, the information is presented as a source of knowledge, including, according to Bates, information as the basis of all theories and concepts, including the theory of economic processes. Based on the definition of economic goods, Bates declares that the product can be tangible and intangible, transferable and non-transferable, free and with a positive value (Bates, 1990). It is also obvious that information can be transmitted, can have both some utility and cost.

On the other hand, every product has its informativity. Under the informativity the study refers to the ability of goods to comprise a plurality of different types of information (auditory, visual, tactile, and other types of information).

At the same time, Hal Varian argues that the information product is anything that can be converted into electronic form: books, films, recorded phone conversations. Varian considers information as an economic commodity product that has such properties as great effect on the size of production and publicity (Varian, 1998).

The group of researchers led by Grewal states that the decrease of the cost of information as a product and the creation of the technology needed for the acquisition, storage and transmission of this information are one of the most important influences of the internet on economic cooperation (Grewal, 2003).

James Boyle believes that information plays a dual role in the economy. On the one hand, perfect information is a key element of explaining the effective functioning hypotheses of the economy. In this case, it is presented as the most complete and available to the public.

On the other hand, real markets often need the information as a product. In this case, the information is intended to be limited, which has cost, and in some cases partial (Boyle, 1996).

The peculiarity of the well structured information transmission is an opportunity for the Internet market to make information more accessible to potential customers when compared to traditional methods of informing. Cook and Coupey have shown that increasing the availability of information through web technologies can increase the amount of knowledge about the product amongst clients. In this case, they are able to make better buying decisions. Subsequently, consumers are more satisfied with shopping they do (Coupey, 2001). Ballantine has investigated product information interactivity effect on consumers in terms of retail e-commerce. The scientists have proved that the amount of information associated with the product affects customer satisfaction (Ballantine, 2005). Jun and Chung also found a positive connection between information and customer satisfaction in the Internet market (Jun, 2006).

The research works by Chung and Sheen have showed that among five key factors (ease of purchase, product selection, information, price, individualization for consumer), it is information that influences the customer satisfaction most of all in a retail e-commerce (Chung, 2008).

To evaluate the information content of the product portfolio we offer using the theory of transaction costs (Williamson, 1981). A similar approach has been used in various other studies (Liang, 1998). Bakos shows the impact of information technology on the reduction of transaction costs arising from the subsequent exchanges on the definite electronic market (Bakos, 1991).

1 Method

1.1 Classification of products on the informativity basis

The informativity of products can be represented by the sum of the components by type of information, namely:

$$I_p = i_a + i_v + i_o + i_{ts} + i_{tc}, \quad (1)$$

where I_p – informativity of products;

i_a – auditory information content;

i_v – visual information content;

i_o – olfactory information content;

i_{ts} – taste information content;

i_{tc} – tactile information content.

The above formula can be used to identify ideal products on the basis of informativity according to Table 1.

Tab. 1: Ideal products on the informativity basis

Formula	Description	Examples of products
$I_p \approx i_a$ when $\{i_v, i_o, i_{ts}, i_{tc}\} \rightarrow 0$	Ideal sound (auditory) products	Musical compositions
$I_p \approx i_v$ when $\{i_a, i_o, i_{ts}, i_{tc}\} \rightarrow 0$	Ideal visual products	Cliparts, e-books
$I_p \approx i_o$ when $\{i_a, i_v, i_{ts}, i_{tc}\} \rightarrow 0$	Ideal olfactory products	Perfumes, eau de toilette
$I_p \approx i_{ts}$ when $\{i_a, i_v, i_o, i_{tc}\} \rightarrow 0$	Ideal taste products	Most food
$I_p \approx i_{tc}$ when $\{i_a, i_v, i_o, i_{ts}\} \rightarrow 0$	Ideal tactile products	Some products for the deaf

Depending on the combination of terms in the model (1) it is possible to describe all the categories of products in terms of information. For example, information of food can be presented by formula $I_p = i_v + i_o + i_{ts}$ ($\{i_a, i_{tc}\} \rightarrow 0$), because when purchasing a buyer always focuses on taste, smell, packaging or decoration.

The model (1) is necessary to figure out the most successful products for online sale. By means of modern Internet technology a seller can fully transmit either auditory or visual information. Unfortunately, modern technologies do not allow transferring the other three types of information. As we have mentioned earlier, this information can be partially transferred only with the help of text “digitizing”. Therefore, from the viewpoint of informativity the following classification can be given to all Internet products (Table 2).

Tab. 2: The classification of internet products by informativity

Ideal online products (information products)	Products containing either auditory or visual information, or a combination of both	Films, music, e-books, software, databases, and others.
Internet products, stimulating demand	Products containing olfactory, gustatory, or tactile information besides the audio	Home appliances, computer equipment and electronics, musical instruments, cars,

	and / or visual information	furniture and others.
Internet products, not stimulating demand	Products in which there is minimum content of the auditory or visual information, or there are no such types of information at all	Food, perfume, clothes and others.

This classification is the theoretical framework. It can be expanded with other classifications of products and services.

In accordance with the above, we can conclude that economic agents which are engaged in online business should focus on the exact products they sell.

1.2 A model of the ideal online shop

To solve the task of the optimal product portfolio of an online shop it is necessary to define the boundary conditions under which:

- Online shop gets maximum profit;
- Online shop aims at minimizing transaction costs.

There is a model of optimal transaction costs of production and consumption of information. It was introduced by Popov E. V. and Konovalov A. A. According to it, a firm does not need to seek complete freedom from transaction costs. The main goal of the firm is to have such a level of costs which allows all the institutions of production and consumption of information to function (Popov, 2008).

On the other hand, the classification of online products suggests that the more items are adapted for online sale, the lower transaction costs must be spent. In other words, it would look like this:

$$TC_{ip} < TC_{sd} < TC_{nd}, \quad (2)$$

Where

TC_{ip} – Transaction costs for the information product sale;

TC_{sd} – Transaction costs for online products sale, which stimulate demand;

TC_{nd} – Transaction costs for online products sale, which do not stimulate demand.

Based on the condition that a model considers the economic agent selling all three products on the Internet market, then the agent revenue can be expressed as the following:

$$\pi(Q, TC) = \pi(Q_{ip}, TC_{ip}) + \pi(Q_{sd}, TC_{sd}) + \pi(Q_{nd}, TC_{nd}), \quad (3)$$

where:

$$Q = Q_{IT} + Q_{CCT} + Q_{HCT} \text{—quantity of goods,} \quad (4)$$

$$TC = TC_{ip} + TC_{sd} + TC_{nd} \text{— transaction costs.} \quad (5)$$

In general, terms profits can be expressed as follows:

$$\pi(Q, TC) = R(Q, TC) - C(Q) - TC, \quad (6)$$

where π — net profit,

Q — output,

TC — transaction costs,

R — gross income,

C — product net cost,

This model has the following assumptions:

1. In our model income R depends not only on the size of output Q , but also on transaction costs. This means that the raise in transaction costs increases gross income.

2. The above expression is a budget constraint of our model. A firm may direct all received income on both the net profit increase and covering the costs.

3. Transaction costs will be assumed to be constant and independent of sales. Despite the fact that some types of transaction costs can depend on Q , we can presume that they are fixed costs in the short term period.

To maximize profits, let us write the expression as follows:

$$\max(\pi(Q, TC)) = R(Q, TC) - C(Q) - TC = 0, \quad (7)$$

Let us differentiate the expression according to parameter of transaction costs:

$$\frac{\partial \pi}{\partial TC} = \frac{\partial R}{\partial TC} - 1 = 0. \quad (8)$$

$$\frac{\partial R}{\partial TC} = 1. \quad (9)$$

If we combine the condition (9) with the condition (5), we get:

$$\frac{\partial R}{\partial (TC_{ip} + TC_{sd} + TC_{nd})} = 1. \quad (10)$$

The expression (10) is an optimality condition for a firm, operating in the Internet. Consequently, the ideal online shop must sell information products exclusively. If the

structure of the product portfolio is modified, while maintaining the number of units sold and the equal value of all goods, the profits will decline because of transaction costs rising.

Thus, to get maximum profit, an online seller should have the most profitable product portfolio. It is necessary to maximize the terms $\pi(Q_{ip}, TC_{ip}), \pi(Q_{sd}, TC_{sd})$ in equation (3). If two shops are in the same market internet-conditions, then the product portfolio will form a strategic competitive advantage for each of them.

Of course, the existence of economic agents that sell only not stimulating demand internet products are also present in the Internet market. The model of their development will be much slower and inefficient in comparison to agents having the ideal goods for stimulating demand for online products.

Now it is possible to figure out the main hypothesis to be tested based on theoretical calculations presented above:

H₀: The Internet Agent will have smaller transaction costs if it realizes more ideal Internet products stimulating demand.

2 Results and analysis

To test the H₀ hypothesis, we have collected data from the largest Russian online shops. We have gathered range of products sold in these shops, consolidated statements of income and losses in recent years, which included information on gross receipts and business expenses of firms.

Let us give an example from the four online shops: ozon.ru (67% - ideal online products (books, CD, DVD, etc.), 27% - online products stimulating demand (digital and home appliances, and others), 8% - the online products not stimulating demand (clothes and other), holodilnik.ru (household and digital products, 100% - online products stimulating demand), and bonprix.ru (clothing and footwear, 95% - online products not stimulating demand).

As a result of theoretical study, the author has investigated certain dependence (10). It states that a firm will be at the optimum level of transaction costs, if the ratio of gross income differentials and transaction costs will be equal to 1.

In addition, if we take into account the main hypothesis of this study, it can be assumed that the online shop, selling a lot of products that are the best from the informational viewpoint, will have smaller transaction costs.

In our case, ozon.ru is the best online shop in terms of information. The percentage of ideal online products in the shop product portfolio is 66.39%.

Using econometric methods we have got regression dependence of the gross revenue of R and the level of transaction costs TC. It is represented on Figure 1.

This dependence can be represented by the equation:

$$R = 2 \cdot 10^{-7} \cdot TC^2 + 0.7487 \cdot TC + 34923.$$

Differentiating this equation with TC variable we obtain:

$$\frac{\partial R}{\partial TC} = 4 \cdot 10^{-7} \cdot TC + 0.7487.$$

Substituting into this equation the value of the transaction costs of the online shop for every year, we get the following chart (see. Figure 2).

Fig. 1:The dependence of the gross revenue of R and transaction costs TC of online shop ozon.ru

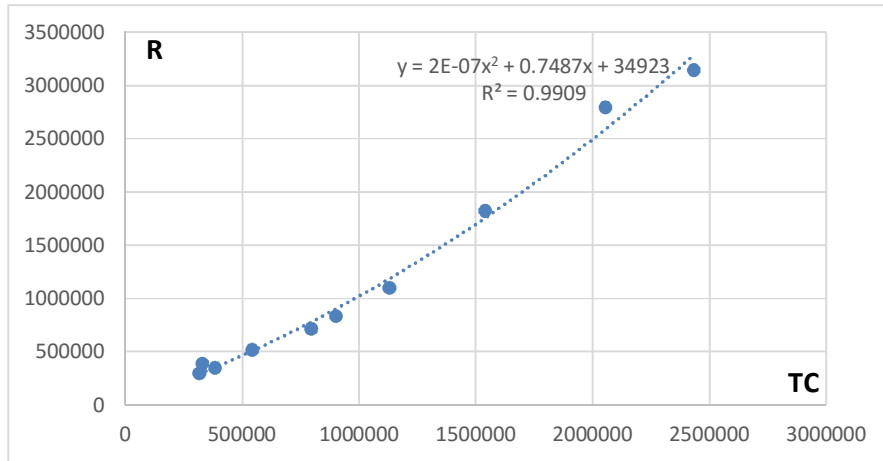
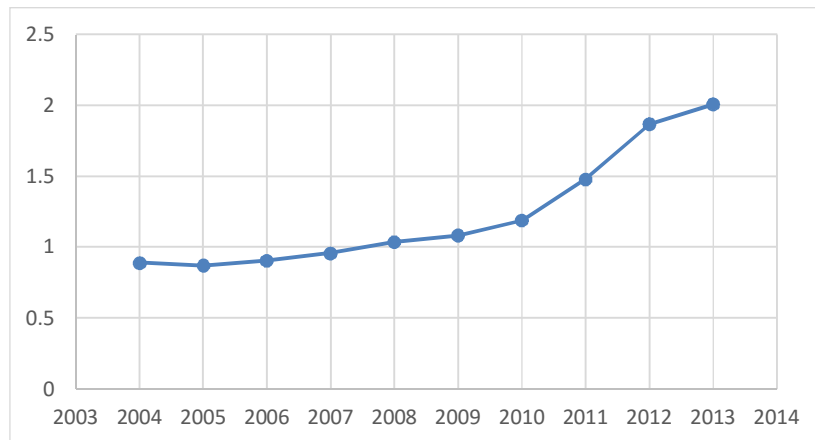


Fig. 2:The dynamics of the index $\frac{\partial R}{\partial TC}$ for the online shop ozon.ru (2004-2013)



This chart shows two key points. On the one hand, the constant growth shows a stable decrease in the level of transaction costs of ozon.ru. This can be considered a positive phenomenon. This fact partially confirms the H_0 hypothesis.

On the other hand, the value of the index $\frac{\partial R}{\partial TC}$ in 2013 came close to the mark of 2 points. This indicates a negative trend deviation level of transaction costs from the optimal value, which is equal to 1.

Likewise we analyze the financial performance of other internet shops. The results are shown in Figures 3-4.

Fig. 3: The dynamics of the index $\frac{\partial R}{\partial TC}$ for the online shop holodilnik.ru (2004-2013).

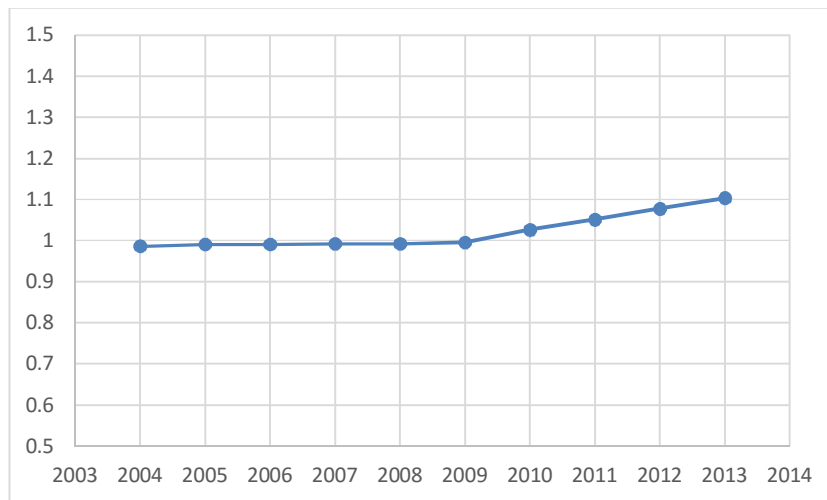


Fig. 4: The dynamics of the index $\frac{\partial R}{\partial TC}$ for the online shop bonprix.ru (2006-2013)

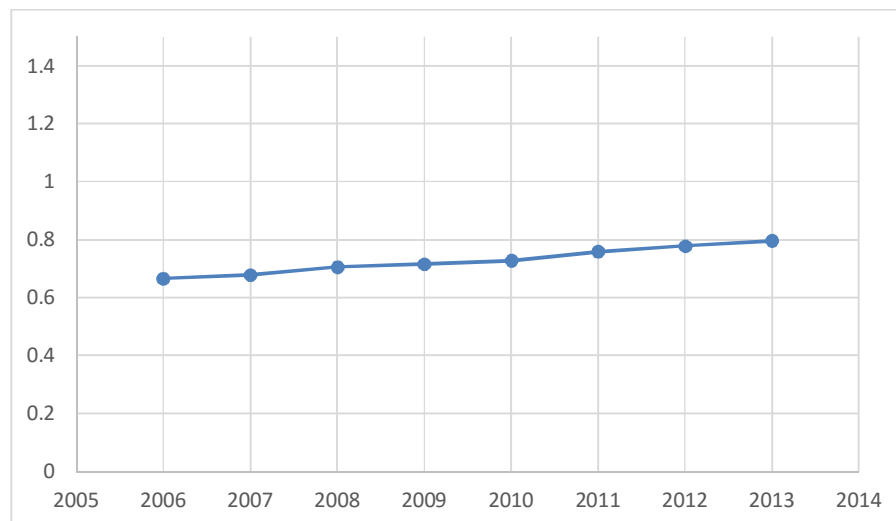


Figure 3 shows that the level of transaction costs of the online shop that sells only online products stimulating demand, is at an optimum level. Since 2009, the value of the transaction costs has moved away from the optimum level. It has a clear downward trend. A reason of costs decrease may be the stable operation of the online shop. Over time, this fact will definitely cause the trust of customers of this shop.

As we can see from Figure 4, the curve of $\frac{\partial R}{\partial TC}$ indicator for an online shop that sells products, which mainly do not stimulate demand during the reporting period, remains below 1. This indicates a high rate of transaction costs in the company.

Conclusion

Thus, the main conclusion of the study is as follows: H_0 hypothesis has been fully confirmed. Internet agents selling common internet products or products stimulating demand on virtual market, have the lower level of the transaction costs than those online retailers selling goods without stimulating demand. Namely, these are the products of the traditional market.

We can identify the following advantages of the described model. The scientific novelty of the model is in the development of a theoretical apparatus for the study of the efficiency of the formation of the product portfolio of an online seller. All established results allow carrying out more detailed investigation of problems of transaction costs optimization in the internet market.

The practical significance of the model is in the ability to determine the optimal level of product portfolio of any player of the virtual consumer market. This method could be used to monitor performance effectiveness and further optimization of the marketing strategy.

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