CONSUMER DEMAND: E-COMMERCE OR TRADITIONAL TECHNOLOGIES

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Abstract

The application of e-commerce technologies is associated with more efficient purchasing system. The research combines both: the application of e-commerce technologies by consumers and economic efficiency of such application. The research is aimed to propose profile, which can be used to identify cases when it is worth enough to choose e-commerce technologies instead of traditional ones. The paper presents new cash-flow model, which can be applied to evaluate efficiency when e-commerce technologies are used by consumers.

The application of model shows that a consumer, which buying commodities on-line, receives economic benefit. The consumer's expenditure, when e-commerce technologies are used instead of traditional trade technologies, are usually lower due to the fact that it is not necessary for consumer to travel abroad and to waste time on the road; however, there is a growth of expenditure which appears as the result of implementation and maintenance of internet access and goods delivery.

Keywords: E-commerce, economic efficiency, consumer.
JEL Classification: L81, D10, D61.

Introduction

The focus on the application of e-commerce technologies by consumers is increasingly growing. The application of e-commerce technologies is opening up fundamentally new possibilities: consumer can visit website of trade centre and choose item from a wide range of stock. A range of goods in supermarket is limited to the items of 40–60 thousand whereas there are no technological limitations of having wider range of goods in on-line store. As well consumers can easily find, choose and even make a "purchase-sale" deal with a direct producer on-line. This encourages more and more consumers to buy goods directly.

In the study, the application of e-commerce technologies is associated with more efficient purchasing system.

The analysis of economic scientific literature on e-commerce, which is published by leading world publishers, shows that 27% of the authors analyse the application of e-commerce technologies by consumers. Most of these authors investigate consumers' behaviour and 9.1% of authors that analyse the application of e-commerce technologies by consumers also investigate costs and results, which are important for purchasers, which are seeking receive economic benefit. So, the results of such analyse show the importance of research, which combines both: the application of e-commerce technologies by consumers and the economic efficiency of such application. The paper presents the results of investigations in this context. Comparing e-commerce with mail orders, sales through representatives visiting consumers, telesales it is important to mention that e-commerce is the most popular purchasing channel because of less costly communication as well as access to a wider variety of goods. However, across different purchasing channels: e-commerce is the fastest developing purchasing channel: the growth rates each year are higher than 11% comparing with the performance of other channels, which growth rates each year are lower than 3%.

Compared to traditional stores, on-line stores may provide consumers cheaper alternatives, depending on the sector and commodities. A systematic survey of prices in both on-line and traditional stores shows that it is necessary to ascertain the magnitude of on-line price savings. However, these assumptions are generalised based on e-commerce development trends in national markets. Talking about prices in international markets, it is seen from the same survey that one third of European Union citizens consider purchasing commodities from another member state via internet because they are cheaper.

The study presented in the paper contains three different aspects. First, the application of e-commerce technologies, concerning consumer's purchases, is disclosed. The main issues of the European Union on-line purchasers related to buying in international markets are overviewed. As well the results of the study, which discloses how actively consumers are using e-commerce technologies, are presented. Second, in the paper the method of discounted cash flow was used for efficiency evaluation. The applied method is used by practitioners widely and suits for evaluating efficiency. The paper presents the new cash-flow model, which

can be applied to evaluate efficiency when e-commerce technologies are used by consumers. In model special focus should be given to consumer's investments and results, which are measured in time horizon as savings.

Third, in the paper the profile of cash flows is applied to case study looking up for practical evidence. In case study the costs of statistical consumer, which is located in Lithuania, are used. The statistical consumer uses e-commerce technologies for purchasing commodities in international markets.

The article is based on comparative, empirical analysis and economic analysis (which is conducted by using the discounted cash flow method). The scientific novelty of study – presented the comparison of consumer's expenditure, when e-commerce technologies are used instead of traditional trade technologies; formulated new cash-flow model, which can be applied to evaluate efficiency when e-commerce technologies are used by consumers.

Aspects related to the application of e-commerce technologies by consumers

The original idea of Samuelson (1938)'s revealed preference approach was to find conditions under which consumer behaviour 'reveals' full rationality in the form of utility maximisation (Manzini et al., 2009). Researchers are discussing benefits that on-line shops provide to consumers. The Internet promises to revolutionize the shopping and information-gathering choices available to consumers (McKnight et al. 2003). In general, it serves purchasers by providing them with an alternative that is more comfortable and less time consuming (Bergendahl, 2005).

Further, we discuss those characteristics that make on-line purchasing different from purchasing in traditional environment.

E-commerce can reduce the buyer costs due to lower: search costs, payment processing costs (Snieška et al., 2007), travelling and travelling time costs.

Consumer may want to purchase specific commodity, however, he doesn't know whether it exists, whether anyone sells it and what is the selling price. Before purchasing, consumer has to search for information (Snieška et al., 2007).

The travel time is expressed by costs that combine travel time and expenses. The time spent on the road is considered as costs with respect to consumer since he may not engage in any other activity during that time. The value of the time, which is saved, depends on the fact what consumer is able to create at that time.

Time use can be viewed from several perspectives: as the process of using or enjoying, or as the effort to acquire personal wealth (Gwozdz et al., 2010).

Willing to access on-line stores consumers have to invest to the internet access. Some authors suggest that existing theoretical models may explain the value which is created by investments into technologies (Andoh-Baidoo et al., 2010).

In addition, results of the survey show that consumers with an internet access at home spend twice more on cross-border purchases than consumers without internet connection at home (Commission of the European Communities, 2009). The place of commodities and the place of demands for commodities are at different locations (Bojnec et al., 2010), so the delivery costs are as a determinant. In some of such cases distance between different locations is significant to purchaser's choice due to delivery costs.

However, it is important for consumers to have higher economic benefit of purchase. This provides motivation for purchasers to buy; for example, a reasonable difference in prices comparing with the price, provided by traditional sellers, and costs, related to receiving purchase, including delivery costs and the costs for internet access, which together have to be lower than the difference in prices (between the final price of internet purchase and retail price at consumer country).

Buying is different in e-commerce; consumers may choose from a greater number of on-line stores and commodities. Different set of variables can be examined. Individual and family, man and woman decision making is different. Household collective decision is synergistic with individual and relational identities of family members; finally family has a shared vision about different options that would serve family identity needs (Epp et al., 2008).

Transactions in physical market are limited by territory. However, in the on-line environment, manufacturers without intermediaries can attract also those consumers, whose the choice of commodities is limited due to prices. The prices of commodities, which are sold in traditional stores and on-line stores, are different due to intense competition in both: physical and virtual environments (Snieška et al., 2007).

The research results of Lee et al (2011) show that the greater the perceived trust towards on-line stores is among potential consumers, the higher is the purchase intention (Lee et al. 2011). The results of Martin et al. (2011) research show that consumers from different countries perceive different risks and this affect in a different way to their repurchase intention. Perceived risk is not the same throughout the whole buying process and differs between an online and an offline context:

– In e-commerce the effect of perceived risk is lower during the "alternative evaluation" stage, yet higher during the "purchase decision" stage;
– While in traditional retailing, the effect increases during the "alternative evaluation" stage, and decreases during the "purchase decision" and "post-purchase behaviour" stages (Martin et al. 2011).

Some authors think that consumers would like to reduce the perceived risk rather than maximizing the benefit. According to Technology Acceptance Model (TAM) perceived benefit means gain and perceived risk means loss (Xiangbin et al., 2009). On the other hand, according to the theory of classic economics, consumers will follow the principle of maximization of total value derived from the available money.

Economics concept tells that, when making a purchase decision, a consumer attempts to get the greatest value possible from expenditure of least amount of money.

The main aspects, why consumers are satisfied with the on-line shopping, are the possibility to compare prices, the wider range of offers, the affordability of products and the choice of alternative on-line stores. However, they have the biggest worries about the trustworthiness of on-line stores and possibility to return commodities (Commission of the European Communities, 2009).

On the other hand, e-commerce has the potential to enable purchaser to obtain commodities, which are not available in consumer's own country (Commission of the European Communities, 2009). And this is the most important aspect for purchasing and for receiving personal wealth.

The application of e-commerce technologies by consumers

In general, 33% of European Union consumers are buying on-line. E-commerce sales in selected countries shows have up to 10% of total retail sales. The data is given in Table 1.

Table 1. On line sales comparing with total retail sales

Country	On-line sales (in billions)	Total retail sales (in billions)	From total retail sales
UK	£38.0	£400	9.50%
Germany	£29.7	£430	6.90%
France	£22.0	£449	4.90%
Benelux	£7.4	£211	3.50%
Italy	£7.3	£913	0.80%
Spain	£5.6	£560	1.00%
Denmark	£3.5	£57	6.10%
Sweden	£3.4	£1	4.80%
Switzerland	£3.4	£71	4.80%
Norway	£2.9	£46	6.30%
Finland	£2.3	£47	4.90%
Poland	£2.2	£110	2.00%
On average	£154.9	£3,295	4.70%

According to eMarketer (2009) the recent economic downturn has compounded national differences:

– Before the recession hit e-commerce was well established in France and Germany, as in UK;
– During recession hit shoppers (which are budget-conscious) turned to internet in ever-larger numbers to compare products and prices and pick up deals.

The most often European Union customers buy clothes, shoes and sport goods on the internet (41 % of all customers); furniture, toys and other house hold goods (35 % of all customers); electrical engineering goods (25 % customers); food (11 % customers). 85,9 % of customers, who buys leisure times and entertainment goods on the internet, have noticed that the quality of these goods when they are bought on the internet is better than when they are bought in traditional stores. The quality of delivery is improving: 76 %

of respondents didn't have any claims, 19 % of respondents are given back good, other respondents had claims because of the time of delivery.

In practice, the price of commodity presented at traditional stores at the consumer's country usually includes intermediate's mark-up. It is calculated that on average wholesale mark-up is equal to 17% and retail mark-up – to 33% (Statistics department of Lithuania, 2009). This means that on-line stores (especially) of manufacturers can offer different prices, which means price savings for consumer.

The application of e-commerce technologies also allows changing structure of household expenditure:

– to reduce travelling costs and costs for wasted time on the road (travel time - the time spent on trip, during which person can't be engage in any work activity),
– to increase costs for internet access,
– to increase costs for the purchase delivery.

Talking about perspectives of the application of e-commerce technologies by consumers, such can be mentioned:

– 9% of European Union citizens are traveling to another country to pursue the purchase of goods.
– According Statistics of Lithuania (2009) the average ticket price is equal to 173.5 Euros. In addition, it is estimated that journey takes one day.
– According to European Union statistical institutions, it is estimated that the journey for a natural person or entity employee which earns 563 Euros per month costs is 97 Euros per day (costs of travel time).
– In report "The Mystery Shopping evolution of cross-border e-commerce in the EU" is stated that the prices in on-line shop usually is 10% lower than the price for the same item reported in traditional stores.

In addition, consumers, who buy on the internet is interested in payment safety: that their information is safe and it is safe from the people who don't have permission. Some customers requires from on-line seller to apply extra technologies that guarantees safety (VeriSign 2009).

Finally, the main inputs to the model can be specified. Comparing e-commerce technologies with traditional trade technologies such have to be taken into the model: investments into internet access; net savings (price savings, travel costs and travel time costs).

For the calculation of travel costs must be considered:

– the average costs of travel to the store, located in another country;
– costs difference between the costs of travel to another country and travel expenses to the nearest post office or courier department.

Calculating travel time cost savings assessment:

– time, which is given to the trip to the store, located in another country, costs;
– time costs difference between the time costs of travel to another country and time costs to the nearest post office or courier department.

Final price difference – the difference between the price, which for item the buyer pays at supermarket, and the price, which buyer pays for item by purchasing it online (when taxes, delivery costs are included).

Cash-flow model, which can be applied to evaluate efficiency when e-commerce technologies are used by consumers

Evaluation of efficiency when information technologies are used continues to be a challenge (Sherer et al., 2003). Because of environmental differences and differences in the cost structure and benefits of alternative ways in which specific needs can be met, the answers could be different across consumers (Santos 2003).

Efficiency is an index allocated to measure the qualitative and quantitative results of economic practice and it is associated with resources, which are used to achieve the above mentioned results. Economic efficiency is of two sizes: economic effect and combination of resource usage (in other words, a relation between results and costs).

Efficiency can be evaluated by several ways: as a real efficiency and as an expected efficiency. In order to outline a real efficiency, indexes, indicating efficiency of e-commerce technologies in real time, are analysed. An expected efficiency is identified in such cases when it is necessary to evaluate the benefit of e-commerce technologies, which are intended to be applied instead of traditional trade technologies. In order to

outline an expected efficiency, historic data and predictions based on information which reflects consumer experience are used. One way to evaluate an expected efficiency is to evaluate investment (costs) and benefit (increase of savings). This is one of the key considerations during investment decision making process (Scheepers et al., 2008), as investments attempt to satisfy specific needs (Santos 2003).

Various methods to evaluate efficiency are used (Gatautis, 2009); same of them are based on costs-benefit or benefit-costs logic. In the paper the method of discounted cash flow method is used for efficiency evaluation. Cash flows are defined as the in-flows and out-flows of cash or cash equivalents, when these are created within a certain period of time (Mackevičius et al., 2006).

The advantage of cash-flow method. Calculating the present worth of investments, and savings, discounting is applied. Although the method seems simple the difficulties arise when trying to justify financially the size of the discount rate, which is used during calculations. The method is based on the fact that risk premium can be included into the discount rate.

The weakness of cash-flow method. In the process of discounting some factors such as inflation changes are not taken into account. These factors may also influence the money at the current value but during discounting process they are not evaluated.

The cash-flow method is used by practitioners widely and suits for evaluating efficiency. The paper presents the new cash-flow model, which can be applied to evaluate efficiency when e-commerce technologies are used by consumers, and is presented in Figure 1. The cash-flow model is universal. The model can be applied when historic (real) and generated (expected) data is analysed.

By using model it is possible to determine if initial or follow-up investments are covered by potential savings.

In the model various levels of economic evaluation are realised, the investments and the results reached by using e-commerce technologies are included. Presented model can be applied then investments are initial and continuous; such was foreseen during the formulation of model.
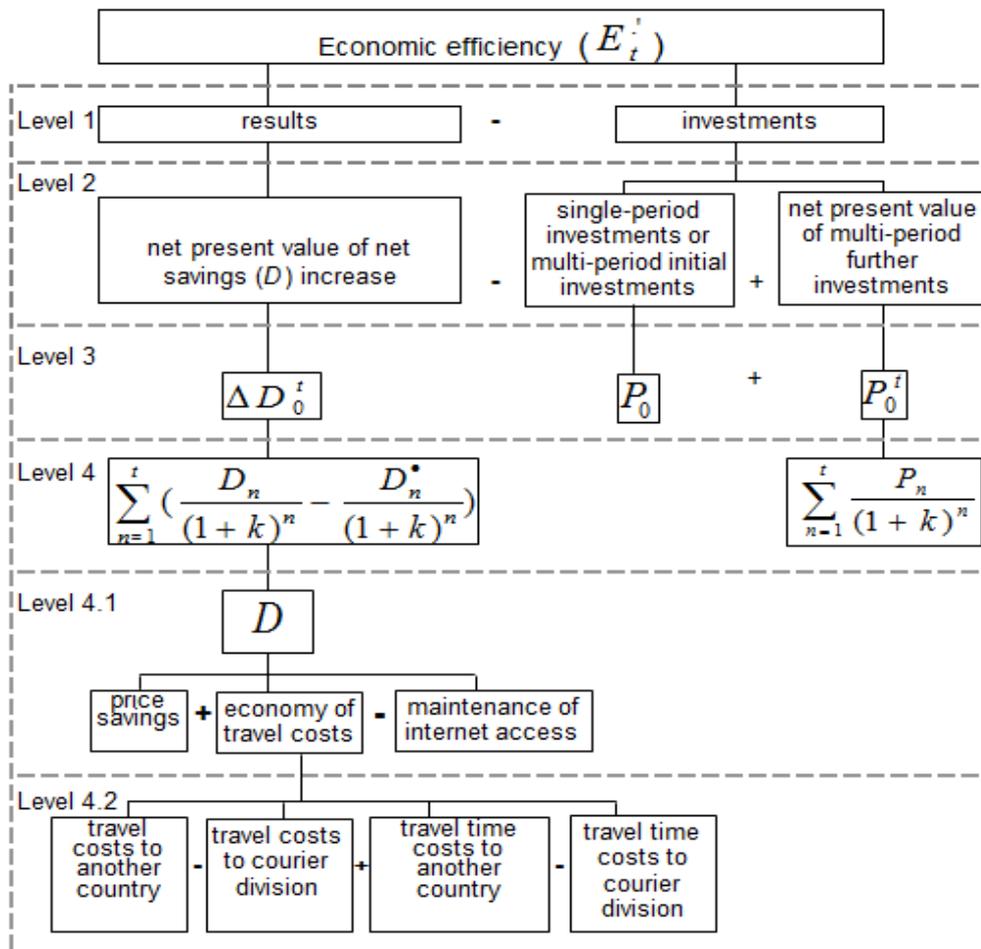

Figure 1. The model, which can be applied for efficiency evaluation when the buyer of goods uses e-commerce technologies for purchasing goods in international markets

In the section the means, for modelling goods purchasers' investments and results, have been offered. Herein, results before ($D_n^{\bullet}$) and after usage (D_n) of e-commerce technologies, the one-off and manifold nature of investments into e-commerce is highlighted. The investments of purchaser are seen as investments into internet access (P) with the aim to use e-commerce technologies for purchasing goods. Mathematical expression, which can be used for calculating efficiency, is presented bellow (1 formula):

$$E_t^{'} = -P_0^t + \Delta D_0^t \qquad (1)$$

here ΔD_0^t net savings resulted after the period t (when e-commerce technologies are used for purchasing goods), present value (calculated using the 2nd formula); P_0^t - investments into the internet access made during the period t, present value (2 formula), $E_t^{'}$ - economic efficiency after the period t.

The present worth of the indicated net investments (if they aren't one-off) is evaluated by formula displayed bellow (2):

$$\sum_{n=1}^{t} \frac{P_n}{(1+k)^n} \qquad (2)$$

here k is discount norm.

Investments into internet access are different from other type of IT investments (Kohli et al. 2003). The authors made presumption that cash flows which are generated by investments of consumer into internet access are positive.

The assessment of practical application of theoretical model

In the paper the profile of cash flows is applied to case study looking up for practical evidence. The data is given in Table 2. In case study the costs of statistical consumer, which is located in Lithuania, is used. For the calculation of investment into the Internet access the data of Statistics Department of Lithuania (2009) is used. According it the majority of the internet users (89%), for browsing the Internet are using computer. In addition, it is estimated that journeys to another country for purchasers are taken two times a year.

Table 2. Empirical assessments of cash-flow model

Inputs	Markings	Investing moment	After 1st year	After 2nd year	After 3rd year	Total
Price savings, Eur			23	23	23	
Economy of travel costs, Eur			395	395	395	
Travel costs to another country			347	347	347	
Travel costs till courier division			6	6	6	
Travel time costs to another country			56	56	56	
Travel time costs to courier division			2	2	2	
Maintenance of internet access			85	85	85	
Net savings ($n = 1,..., t$), Eur	D_n		333	333	333	
Investments, Eur	P_0	464				

net present value of net savings (when $D_n^{\bullet} = 0$)	ΔD_0^t		277	231	192	701
Initial investments, Eur	P_0	464				464
Economic efficiency (after 3 years), Eur	$E_t^{'}$					237

In the paper the authors have found out some trends associated with the application of e-commerce technologies: consumer's expenditure, when e-commerce technologies are used instead of traditional trade technologies, are usually lower due to the fact that it is not necessary to travel abroad and to waste time on the road; however, there is a growth of expenditure which appears as a result of implementation and maintenance of internet access and goods delivery.

The results of the study show that a purchaser receives economic benefit because of reduced travel expenses and wasted time on the road. In addition, for the activation of the application of e-commerce

technologies, it is appropriate to apply the model, which is presented in the paper and helps to evaluate efficiency when e-commerce technologies are used by consumers to purchase goods in international markets.

Undertaken empirical assessment has shown that formulated model can be applied to evaluate efficiency when e-commerce technologies are used by consumers. During empirical estimation, it has been established that a buyer receives benefit because of reduced travel expenses (approximately 82%) and wasted time on the road (approximately 13%).

Conclusions

Purchasing environment, talking about e-commerce technologies and traditional trade technologies, is different and the cost structure and benefits of alternative ways in which specific consumers' needs can be met, as well. Transactions in physical market are limited by territory. However, in the on-line environment, manufacturers without intermediaries can attract also those consumers, whose the choice of commodities is limited due to prices.

However, the usage of e-commerce technologies allows changing costs structure of household: to reduce travelling costs and costs for the time spent on the road, to increase costs for internet access and purchase delivery, but generally it helps to receive higher economic efficiency.

For the activation of the application of e-commerce technologies instead of traditional technologies, it is appropriate to apply the model which is presented in paper. In the model various levels of economic evaluation are released, the costs of implementation and the usage of internet access, in particular – investments and the results reached by the deployment of such technologies for purchasing have been analysed. The application of e-commerce technologies allows changing structure of household expenditure:

- to reduce travelling costs and costs for wasted time on the road (travel time - the time spent on trip, during which person can't be engage in any work activity),
- to increase costs for internet access,
- to increase costs for the purchase delivery.

A consumer receives economic benefit, if the consumer's expenditure, when e-commerce technologies are used instead of traditional trade technologies, are lower due to the fact that it is not necessary for consumer to travel abroad and to waste time on the road, when a growth of expenditure which appears as the result of implementation and maintenance of internet access and goods delivery.

The conducted empirical study of formulated model has shown that the offered model can be applied to evaluate efficiency when e-commerce technologies are used by consumers. During empirical estimation, it has been established that a buyer receives benefit because of reduced travel expenses (approximately 82%) and wasted time on the road (approximately 13%).

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