

## **ELECTRONIC MARKETPLACES AS A FORM OF ORGANIZATION OF TRADE IN ENTERPRISES**

Dariusz Strzębicki

Warsaw University of Life Sciences – SGGW

**Abstract.** The aim of this article is to assess the impact of new information technologies, in particular electronic marketplaces on the conducted transactions and transaction costs incurred by enterprises. An important goal was also an attempt to evaluate the role of transaction cost economics in explaining the development of B2B electronic marketplaces. The dominant approach in the analysis of this problem in the article was the transaction costs economics. Electronic marketplaces are information systems, which reveal the effect of the electronic broker. However, the economic reality shows that electronic markets also allow the effect of electronic integration. Transaction cost theory is useful in explaining the impact of information technology on transactions between businesses but should also be complemented by the results of research and analysis of other scientific theories, such as resources based view.

**Key words:** information technologies, electronic marketplaces, transaction costs

### **INTRODUCTION**

Business-to-business (B2B) is an important part of the discipline of electronic commerce. It includes the use of computer networks and other information technology in order to carry out transactions and cooperation between enterprises. Increasingly common form of B2B e-commerce are electronic marketplaces that are such websites through which companies can trade commodity – money or to conduct cooperation in the supply chain. In the scientific literature the problem of the development of electronic marketplaces is considered, i.a. on the theory of transaction costs. Information technologies as a tool for information management are a natural area of interest for the transaction cost economics. Electronic marketplaces should be treated as information technologies

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Corresponding author: Dariusz Strzębicki, Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, Department of European Policy, Public Finance and Marketing, Nowoursynowska 166, 02-787 Warszawa, Poland, e-mail: [dariusz\\_strzebicki@sggw.pl](mailto:dariusz_strzebicki@sggw.pl)

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of an inter-organization nature. The approach based on transaction cost economics can be helpful in the study of the use of information technologies and the changes they entail in the functioning of companies. Thanks to information technology, production and trade enterprises have access to new forms of business, as well as new ways of cooperation and implementation of transactions with trading partners.

The aim of this article is to assess the impact of new information technologies, in particular electronic marketplaces, on transactions and transaction costs incurred by the company. The article also attempt to assess the role of transaction cost economics in explaining the use of information technology in business operations.

## RESEARCH METHODS AND SOURCES OF INFORMATION

The paper presents theoretical considerations on the impact of information technology on the transaction costs of enterprises. The article includes analysis of electronic marketplaces in light of transaction cost economics. The literature review in the field of B2B e-commerce has been conducted. It shows the dominant ideas found in the literature on electronic marketplaces. The main focus is on the functioning of commodity electronic B2B marketplaces. The structure of the paper consists of the following stages:

- discussion of the assumptions of transaction cost economics;
- characteristics of information technologies supporting B2B business transactions;
- presentation of theoretical concepts related to information technologies with special emphasis on electronic marketplaces;
- discussion of the analysis and an attempt to assess the suitability of transaction cost economics in explaining the phenomena of the use of electronic marketplaces in transactions between enterprises.

## ASSUMPTIONS OF TRANSACTION COST ECONOMICS

Transaction cost economics research focuses largely on the cost of organizing an exchange. It is believed that an enterprise tends to organize transactions within its own organization to reduce the costs of transactions with third parties, the so-called market transaction costs [Williamson 1998]. An example of a departure from the external market transactions by the company is vertical integration. Vertical integration and the free market are two forms that are located on the two opposite poles of the possible forms of organizing transactions and exchanges by a company [Carlton and Perlof 2005]. Between these two extreme forms there are many possible different forms of contracting, cooperation and strategic alliances.

Market transaction costs are the costs of transactions with other market participants. They arise as a result of having to search business partners, monitoring them, and enforcement of contractual arrangements. They can be divided into *ex ante* and *ex post* costs. The *ex ante* costs include: costs of design, negotiating, securing the contract. On the other hand, *ex post* costs include: monitoring, dispute resolution, negotiation costs. The *ex ante* and *ex post* costs often depend on each other. Lower incurred *ex ante* costs may result in higher incurred *ex post* costs and vice versa.

When an enterprise organizes transaction or exchange within its boundaries, transaction costs do not disappear because the market transaction costs are replaced by so-called costs of bureaucracy [Williamson 1998]. They have similar properties to the market transaction costs, because the organizing transactions within the company is often associated with the coordination and negotiation. In addition, the costs of monitoring trading partners are replaced by the costs of monitoring of the company's employees.

The main features of the transactions affecting the level of transaction costs in enterprises are [Williamson 1998]:

- specificity of assets – defined as investments made to support individual transactions;
- uncertainty – originating from the difficulty in predicting future market conditions and the behavior of trading partners;
- frequency – associated with the volume and repeatability of transactions between enterprises.

Transaction costs may be high for several reasons – uncertainty accompanying the formulation of contracts, the complexity of the contracts, the need to monitor contracts, the need to enforce contract [Sloman and Hinde 2007].

Important aspects of transaction costs are ownership and coordination. Ownership, in many cases, provides information advantage over transactions with third parties, and thus lower transaction costs. Coordination involves costs for the establishment and operation of information channels. The methods of coordination can be in many cases independent of the ownership, in terms of whether the transaction takes place within the company or outside with trading partners. For example, a company may use market prices in transactions between its own departments.

On the commodity perfect markets, coordination of decision usually takes place through the price and quantity. On the other hand, with transactions other than opened market, it is frequently necessary to coordinate through the integration of decision-making processes. Reduction of the costs of such coordination may require special investment, which in turn increases the risk of the transaction. Transaction risk may be due to, among others, the possible emergence of opportunistic behavior of business partners. Therefore, it be necessary to invest in more secure transactions, but these investments, in turn, increase costs.

According to transaction cost economics, in the economy one can observe balancing the economics of production (scale, scope, specialization) with transaction costs. Market transaction costs for companies constitute the limit of deepening economy of scale. Companies specializing in a particular area of activity reach a point where high market transaction costs are a barrier to further specialization [Bylund 2015].

## **ELECTRONIC MARKETPLACES AS MEETING POINTS OF BUYERS AND SELLERS IN THE CYBERSPACE**

Enterprises use a variety of information technologies for the implementation and support of inter-organizational processes with trading partners. These include the [Bocij et al. 2006]:

- network of connected computers and other electronic devices (including the Internet, intranet and extranet);

- software and website development tools which are e.g. Java and XML;
- electronic data interchange (EDI);
- operating information systems (in particular transaction processing systems TPS, office automation systems OAS, process control systems);
- management information systems and data warehousing systems;
- systems of various departments of the enterprise, such as e-procurement systems, customer relationship management (CRM), accounting systems;
- resource planning systems ERP.

The use of information technology in transactions takes many different forms and is widely known as an electronic business (e-business) [Woźniakowski and Jałowiecki 2013]. Information technologies are part of the inter-organizational systems that exceed the boundary of a single company. On the commodity markets, eg. in the agri-food sector most companies are developing in the first place information technology focused on cooperation with other companies (B2B), and only secondarily they use information technologies in relationships with individual consumers (B2C) [Pizło 2007]. Also the websites of companies in the industry are more focused on business partners than on consumers [Strzembicki 2014].

Electronic marketplaces are a kind of inter-organizational information systems (IOS) [Wang et al. 2006]. An electronic marketplace is the system, which connects information systems of many companies. IOS differ in the degree of integration of information between companies and the degree of transaction completion. In particular, these differences are noticeable among the electronic markets, which differ from one another in the degree of complexity, type and scope of services offered to companies and the scope of support for transaction [Grieger 2003].

In building inter-organizational information systems supporting B2B e-commerce, the increasing role is played by the technologies supporting the development of websites, such as Java and XML, and they reduce the importance of EDI in this regard [Williamson 2007]. As a result, it is more and more easier to create electronic connections between companies and electronic marketplaces using websites.

Electronic market can also be understood as a virtual meeting place for buyers and sellers, and transactions are made using electronic channels [Ganesh et al. 2004]. In contrast to traditional marketplaces, in electronic markets buyers and sellers are not physically present in these markets and can make transactions from any location with internet access. Goods are not physically present in the electronic marketplace which has to be compensated by an appropriate description of the goods in the electronic catalog. These markets can support all stages of the transaction beginning from the design stage and ending with delivery stage [Turban et al. 2006]. At the design stage electronic marketplaces can provide, e.g. supply planning, preparation of offer and description of goods. Information stage on electronic marketplaces is supported by enabling searching and comparing goods. Negotiation stage e-markets support by enabling electronic communications between the transaction parties, or providing the opportunity to participate in the process of dynamic pricing in the auction. Delivery stage is supported by offering transport services and online tracking of goods.

The organized commodity e-markets play the role of intermediary functioning mainly at the wholesale level. Therefore, they take over many functions of distribution channels

performed by traditional intermediaries, becoming for them competitors and may displace them from the market. However, the process of replacing the traditional middlemen with the new cyber intermediaries is not obvious, because the traditional intermediaries still perform important functions, which are difficult to be replaced with new media [Schmitz 2000]. Besides, the traditional intermediaries are seeking to strengthen their position in the distribution system of goods through the use of information technology.

### **THE IMPACT OF ELECTRONIC MARKETS ON ORGANIZING THE EXCHANGE AND THE TRANSACTION COSTS**

Transactions on the enterprise market are characterized by a great diversity. The way they are organized between businesses is often dependent on characteristics such as place of business in the supply chain, characteristics of the purchased goods, importance of the purchased product for the business, organization of raw material supply. Trading enterprises organize supply in a different way comparing to the production enterprises and usually have to deal with a greater number of suppliers. Processing companies usually give greater importance to the purchase of raw material serving production of the final product, comparing to the purchase of products supporting enterprise operation. What matters is also the quality policy and extent to which the quality and specific characteristics of the raw materials affect the quality and performance of the final product. The organization of an exchange may be also affected by the organization of supply. For example, just-in-time supply method usually requires greater coordination with suppliers.

Some goods are subject to frequent and regular exchange with the same known suppliers, but some are purchased less frequently, irregularly and from random unknown suppliers. In many markets and in many sectors of the economy, such as food sector, increasingly important are becoming relations of cooperation between business partners [Cheng and Carrillo 2012]. Important reasons for this phenomenon are the demand factors, among them the sophisticated consumer preferences and the associated less numerous and more difficult to serve market segments. However, some transactions made by the companies are conducted in the conditions in which the prevailing mechanism of coordination is price. Information technology can support different types of organizing transactions and exchange such as within the hierarchy, relations of cooperation, and market transactions. The information technology is seen as a factor having the potential to reduce transaction costs in each stage of a transaction.

Transaction costs are largely the result of a lack of information. Lack of information causes the decision making is accompanied by the risk and uncertainty. In enterprises there are many different kinds of risks associated with: the choice of inadequate vendor, failure to comply with terms of the contract, insufficient knowledge about the plans and intentions, incorrect predictions of demand, pursuit of the trading partner to use its position at the expense of the other party to the transaction, etc.

Information technologies tend to reduce the uncertainty in enterprises through [Leonard and Wilkinson 2014]:

- increasing the ease and efficiency of communication between employees of companies approaching it almost to the level of face to face communication;

- greater access to information and sophisticated data analysis tools and the ability to use the digitally stored expertise, e.g. due to a more perfect decision support systems in enterprises;
- the ability of firms to use the data, which would not be available without the use of information technology;
- fast access to data from all levels of the organization;
- information on decisions in the enterprise that can be stored in computer memory and be used in future decision making;
- data mining giving access to information that are difficult to discern;
- the use of portable computers, optical scanners and other electronic devices that make it possible to monitor processes inside and outside the company;
- common database used by the company's employees and business partners that contributes to reducing information asymmetry.

The range of applications of information technology shows that they have the potential to reduce costs associated with the collection, storage and communication of information, which are components of the cost of coordination. On the other hand, information technologies have the potential to reduce transaction risk by reducing the specificity of the transaction. It is believed that such features of information technology as intuitive interfaces, open standards, modularity and compatibility are very specific and do not increase investment sunk in specific relationships between enterprises [Clemons and Row 1992]. Information technologies can enable cost-effective monitoring of the counterparty, thus reducing the likelihood of opportunistic behavior [Cho and Tansuhaj 2011].

It is believed that there are two different effects of information technology having a significant impact on the operation of enterprises in the market [Malone et al. 1987]:

- the effect of the electronic broker – that relies on improving finding buyers and sellers and matching buy and sell offers;
- the effect of electronic integration – that relies on strengthening bilateral relations between the seller and the buyer.

The brokerage effect is revealed to a large degree on electronic marketplaces. In many scientific studies the development of electronic markets is being considered from the perspective of realization of the brokerage effect. An electronic marketplace is a kind of intermediary, broker, which allows to make business contacts and direct interaction between buyers and sellers. Electronic marketplaces are called “the new intermediaries” that perform market functions of matching buyers and sellers and discovering prices [Zwass 1996]. The result of the efficient implementation of these functions is greater price transparency in the market and decreased price level.

Researchers mention many potential benefits of participation in e-marketplaces for businesses which are among other things: reduction of the search costs, more information on products and less dependence on a small number of suppliers [Dai and Kauffman 2002]. It is believed that if the electronic marketplace is expected to reach a large number of buyers and sellers it should deal with the trade of goods, which are easy to standardize [White et al. 2002]. By standardizing, transactions can be conducted without viewing the goods and there is greater price transparency. For a good operation of electronic marketplaces, it is important that sold quantities of goods are large and the users are keen on taking part in the dynamic process of pricing [Kaplan and Sawhney 2000].

For the possibility of obtaining the brokerage effect on electronic marketplaces, commonly found limiting factor is the market information asymmetry resulting from the fact that certain aspects of the quality of products on the commodity markets are known only to the seller [Varian 2002]. This can lead to negative selection, the reluctance to use the electronic marketplace by buyers and as a consequence to market failure. In addition, in many cases, a large complex description of the products can make the implementation of the electronic marketplace within the industry very difficult. Specifications of many goods also includes knowledge that can be difficult to clearly articulate which may also hinder the development of electronic marketplaces [Hsiao 2007]. So one can believe that the major constraints that make full use of the brokerage on electronic marketplaces is the problem of information asymmetry and the issue of assessment of the quality of products sold in electronic marketplaces.

The second characteristic result of information technology application is the effect of electronic integration. This effect manifests itself in particular in the operation of complex information systems, e.g. ERP (enterprise resource planning). The electronic integration can take place within a company, but also outside a company through the electronic interconnection with trading partners.

Increasingly, also electronic marketplaces enable electronic integration effect. This is reflected among other things in the kind and number of services offered for their participants. Many electronic marketplaces provide technologies that support the integration and cooperation instead or in addition to the brokerage ability. Closer ties between participants in the electronic marketplace has a positive effect on the level of trust and cooperation, and consequently the reduction of transaction costs. Electronic marketplaces which are focused on integration enable cooperation, for example in the development of new products. Some electronic marketplaces function more as supporting processes of companies than as intermediaries of buying and selling [Christiansen and Markus 2003]. These markets act as supportig systems for procurement processes and provide services for the integration of processes between businesses, and support cooperation in supply chains [Philipps and Meeker 2000]. The participation of enterprises in these electronic marketplaces can often result in the need to make big changes in business processes of these participating companies.

It is also worth noting that electronic markets also have the possibility of creating a multilateral network connections between businesses [Pagani 2013]. Cooperation in networks effectively determines the competitiveness of enterprises [Siudek and Zawojcka 2014]. The result of electronic marketplaces operation may be the formation of vertically integrated network of loose connections. In such network companies work closely together using these electronic connections, while not being locked to each other can easily change business partners and if needed quickly establish a new relationship of close cooperation using brokerage effect, which in turn has a large impact on reducing market transaction costs.

The impact of information technologies on the conduct of exchange may also be considered from the perspective of resources based view (RBV). According to this approach, information technologies in enterprises are tools which allow to reap greater benefits from valuable assets of a company. This approach assumes that companies with a predominance of high-value assets (which have a high value within a narrow range exchange)

will seek to specialization, but companies with widely valuable assets (the value of which can affect a wide range of exchanges and commodities – corporate image, brand, relations with suppliers) will strive for vertical integration or diversification [Miller 2004].

In enterprises with narrowly valuable assets, technologies which reveal the brokerage, such as electronic marketplaces, may enable faster specialization because they allow the companies to reduce the market transaction costs [Chatterjee et al. 2006]. On the other hand in companies with widely valuable asset information technologies that provide electronic integration, e.g. ERP systems, are more likely to accelerate processes of vertical integration or diversification. Enterprises can therefore benefit from information technology usage to either specialization or vertical expansion and diversification.

## CONCLUSIONS

Information technologies facilitate and improve the exchange of information, goods, and conducting transactions between businesses. They make the communication within the company and outside with trading partners carried more efficiently. Information technologies have the potential to lower the costs of coordination and reduce risks of a transaction. They also contribute to lower ex ante and ex post market costs. Therefore, they can support various forms of organizing the exchanges, including two extreme forms, which are hierarchy and market. Thanks to the possibilities of information technology, companies can work closely together, but also find and change business partners efficiently.

The literature indicates two important effects of information technology, which reflect the extreme forms of the organization of the transaction according to transaction cost economics. The effect of the electronic broker increases the importance and universality of market transactions. In turn, the effect of electronic integration encourages enterprises to strengthen cooperation with a small number of trading partners, and even to organize transactions within their own company.

An electronic marketplace as a meeting place for business buyers and sellers in cyberspace is based on many types of information technologies that support the implementation of inter-organizational processes and various transaction stages. Electronic marketplaces represent inter-organizational information systems, which in a special way reveal the effect of the broker of information technology. Many e-marketplaces act as cyber intermediaries taking over the functions of traditional intermediaries and contributing to greater price transparency and expanding base of trading partners for businesses.

Economic reality shows that electronic marketplaces should be also analyzed in the context of electronic integration. Increasingly, electronic marketplaces enable integration of information systems between enterprises and closer cooperation. In some markets electronic integration effect is of paramount importance, and the effect of the electronic broker is less important.

The brokerage effect and electronic integration effect is a manifestation of the impact of information technology on the transaction costs incurred by an enterprise. However, each of these effects has a stronger impact on different types of transaction costs. The electronic brokerage effect has a relatively greater impact on reducing the search costs, and the electronic integration effect on reducing the monitoring costs. The co-existence

of these two effects in a single electronic marketplace causes that it becomes a network of cooperating companies that are not dependent on each other and can easily change partners if necessary. Thus, the electronic network of cooperation enables companies to reap the benefits of the transparent market, as well as close cooperation, while reducing transaction costs.

Economics of transaction costs is a very useful theoretical approach serving in the study of the effects of the use of information technology in transactions and cooperation between enterprises. However, the emergence of many new forms of electronic collaboration between businesses makes it useful to look on other scientific approaches that provide a fuller picture of the role of information technology in organizing exchange in enterprises. An example of the other scientific perspective is resources based view, which indicates that the role of information technology in an enterprise is to facilitate the organization of exchanges and transactions within or outside the enterprise, depending on its valuable resources.

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## **RYNKI ELEKTRONICZNE JAKO FORMA ORGANIZOWANIA WYMIANY HANDLOWEJ W PRZEDSIĘBIORSTWACH**

**Streszczenie.** Celem artykułu jest określenie oddziaływania nowych technologii informacyjnych, a w szczególności rynków elektronicznych, na zawierane transakcje oraz ponoszone koszty transakcyjne przez przedsiębiorstwa. Ważnym celem była również próba oceny roli ekonomii kosztów transakcyjnych rozwoju rynków elektronicznych B2B. Dominującym podejściem w analizie tego problemu w artykule jest ekonomia kosztów transakcyjnych. Rynki elektroniczne są systemami informacyjnymi, w których ujawnia się efekt brokera elektronicznego. Jednakże rzeczywistość gospodarcza pokazuje, że rynki

elektroniczne umożliwiają także integrację elektroniczną. Teoria kosztów transakcyjnych jest przydatna w wyjaśnianiu wpływu technologii informacyjnych na transakcje między przedsiębiorstwami, lecz powinna być również uzupełniana przez wyniki badań i analiz innych teorii i nurtów naukowych, jak np. podejścia bazującego na zasobach.

**Słowa kluczowe:** technologie informacyjne, rynki elektroniczne, koszty transakcyjne

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