



2nd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and
TOURISM, 30-31 October 2014, Prague, Czech Republic

The Development of Electronic Commerce in Agribusiness – The Polish Example

Dariusz Strzębicki^{a*}

^aPhD Assistant Professor, Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, ul. Nowoursynowska 166, 02-787
Warszawa, Poland

Abstract

The development of information technology and the Internet make it, they are increasingly being used in agribusiness. Electronic commerce has had a tangible impact on the way business is conducted and the structure of markets. The aim of the study is to assess the development of electronic commerce in agribusiness. The analysis was conducted on the example of Poland, which is a country with a specific structure of the agricultural market. It is shown that the development of electronic commerce in Polish agribusiness is at an early stage of development and at the same time is a process of evolutionary changes. The article also pointed to examples of current areas of application of e-commerce in Polish agribusiness and the potential future directions of its development.

© 2015 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Selection and/ peer-review under responsibility of Academic World Research and Education Center

Keywords: electronic commerce, electronic marketplaces, agribusiness, Poland

1. Introduction

Information technologies are increasingly being used in business. They have impact on relationships between consumers and enterprises and influence changes in the ways of doing business and in market structure. Information

* Dariusz Strzębicki. Tel.: +48 512545562
E-mail address: dariusz_strzebicki@sggw.pl

technologies enable many companies to achieve competitive advantage over their competitors by cutting costs, and entering new markets.

These changes also apply to agribusiness, which in many countries is an important sector of the economy. Agribusiness is also an important sector of Polish economy, a country that after the period of economic transition, in 2004 became a member of European Union.

An important part of information technologies used in enterprises is represented by electronic commerce. The aim of the paper is to assess the level of electronic commerce use in Polish agribusiness and possible directions of its future development. The analysis is based on qualitative content analysis of agribusiness websites and quantitative data of statistical institutions like Eurostat and Polish Main Statistical Office (GUS). Some examples of electronic commerce usage in the world and in Poland come from existing literature on the subject.

2. The development of electronic commerce as a complex and evolutionary phenomenon

Zwass (1998) defines electronic commerce as the sharing of business information, maintaining of business relationships and conducting business transactions by means of telecommunication media. The main types of electronic commerce transactions are Business-to-Business and Business-to-Consumer transactions. There are significant differences between these two types of transactions. B2B transactions are of larger volume and value, higher risks, less buyers, and different way of making purchasing decisions comparing to B2C transactions. B2B transactions are also prevailing in agribusiness as they are conducted between enterprises representing successive levels of agri-food chain.

With the bursting of Internet bubble in the late nineties of the XX century, practitioners and researchers began to look at e-commerce as an evolutionary phenomenon rather than revolutionary changes. It turned out that investing in e-business undertakings should be more cautious. However, it is commonly believed that the Internet has a great potential to improve the operations of companies and entire markets. The electronic flow of information makes the processes in enterprises run faster, without errors and automatically without human labor. Internet also helps companies to enter new markets.

The potential of electronic commerce is often considered from the perspective of transaction costs economics. Bakos (1991) distinguishes between two different ways of conducting B2B e-commerce which are the information links, which are mutual investments of the two companies in a solution of electronic communication between them, and the electronic marketplaces, which are represented by inter-organizational information systems that allow the exchange of information between many sellers and many buyers. It is believed that electronic marketplaces are more useful for the implementation of open market transactions, and are less useful for the operation of supply chains. However, electronic marketplaces, along with their development and expansion of services are becoming increasingly useful for supply chain (Christians and Markus 2003). What particularly distinguishes electronic marketplaces from the information links is the ease of comparison of suppliers and buyers, ease of changing suppliers and buyers, and enabling access to price information. With the development of information technology e-commerce should rather evolve from information links towards electronic marketplaces (Malone et al., 1987). Electronic marketplaces have the potential to reduce market transaction costs (e.g. costs of searching for suppliers and buyers, costs of negotiation, costs of contracting and contract enforcement), they reduce the information asymmetry between the transaction parties and contribute to efficient price discovery (Xiaoping et al., 2009). Therefore, their development may be beneficial for businesses and economies.

Adoption of information technology in enterprises is a complex issue and may depend on various factors. Thatcher et al. (2006) classified the factors of adoption of IT into two groups: intra-organizational factors (e.g. organizational readiness, size of the organization, top management support, consistency with the company's business strategy), and extra-organizational factors (e. g. industrial, governmental, cultural).

The importance and role of electronic commerce may be particularly evident in international markets because the Internet is a global medium and reduces the barriers of distance. However, the benefits of the electronic international trade may relate primarily to the companies from developed countries, as companies from developing countries barely overcome barriers and transaction costs associated with entering the markets, and electronic commerce only helps them to reduce search costs, which is insufficient to sell goods abroad (Pare, 2003).

Agribusiness is a sector in which the diffusion of e-commerce progresses relatively slowly. Leroux et al. (2001) pointed barriers to the development of B2B electronic marketplaces in agribusiness, which are: the complexity and diversity of agricultural products, traditionally important interpersonal face-to-face contacts in conducting transactions, consolidation of enterprises that reduces the need for coordination of fragmented markets by electronic commerce. Difficulties in the development of electronic agri-food markets are described by Fritz et al. 2004. In their studies, 85 electronic agri-food markets were identified existing in Europe and USA in the year 2000. They found that after two years continued operation only 25 of them. The rest of the electronic marketplaces have changed their business model or were closed.

In terms of the type of owner, electronic marketplaces can be divided into private-owned, consortia-owned, and public (third party owned). Each of these types has its unique ability to attract market participants. It is believed that factors contributing to the development of electronic public markets are homogeneous products with the characteristics of goods and fragmented markets that need electronic coordination (Kaplan and Sawhney 2000). Comparing with electronic public markets (third party-owned), private-owned and consortia-owned electronic marketplaces can more easily attract market participants, since large companies can induce their buyers or suppliers to participate in the electronic marketplace. However, as shown in the case studies of some electronic marketplaces, even consortia and private e-markets face many problems and barriers to their implementation in enterprises. In industries outside the agribusiness, White et al. (2007) analyzing adoption of 3 consortium-owned B2B e-marketplaces operating in the automotive, healthcare, and utilities sectors, listed such barriers to adoption as: high price pressure in the electronic marketplace, the difficulties in developing cooperation between companies in the electronic marketplace, the lack of adequate information systems in the enterprise that would allow using electronic marketplaces, too many electronic marketplaces, employees' sense of danger of weakening their position in companies, the difficulty of assessing the minimum level of integration that would be beneficial for the enterprises, the lack of pre-existence of a strong peer network in the sector.

In agribusiness, Brush and McIntosh (2010) studied electronic marketplace Live.ex created by Frontera cooperative to improve market transactions of livestock between farmers in New Zealand. In addition to the many benefits of the electronic marketplace perceived by farmers, they also pointed out some problems with its adoption such as: low computer skills of farmers, risk and lack of trust in Internet transactions, unattractive prices similar to those in the traditional market, lack of broadband in the Internet access, problems with product quality assessment, problems with timeliness of offers in the electronic marketplace, lack of transaction history, satisfaction with the existing cooperation with traditional livestock agent.

Electronic commerce has the potential of causing change in the institutional structure in many sectors. First of all, we can observe the processes of disintermediation which means the reduction of the role of traditional intermediaries, and reintermediation, that is taking new intermediary roles to either new intermediaries (cybermediaries) or traditional ones (Turban et al., 2006). Well developed and effective structures of agricultural markets of developed countries are less susceptible to the institutional changes caused by electronic commerce, comparing to developing countries with less effective market structures and fragmented market. Despite this, in the USA and Europe efficient electronic agricultural markets emerge. For example, an electronic egg market in the United States called Egg Clearing House and its European counterpart Ex-Trade, developed thanks to the Internet and are effective mechanisms for price discovery (Rask, 2006). In the USA, the traditional pig auctions are supported and partly replaced by electronic auctions (Roe and Wyszynski, 2011).

Public electronic marketplaces operating on an international scale developed particularly well in Asia. An example of the world's largest public e-market, covering many sectors (including agribusiness) is the Chinese Alibaba.com.

3. The development of electronic commerce in Polish agribusiness

In Poland, there are still significant differences in the use of the Internet in terms of place of residence and age. Slower Internet connections in rural areas are not a factor encouraging online shopping by consumers.

The development of electronic commerce in Poland can be compared with one of the most developed in this respect country in the EU which is Finland. According to Eurostat, in 2013 the percentage of individuals who

ordered goods or services for private use over the Internet in the last three months was 23% in Poland and 49% in Finland (Eurostat_a 2013).

Table 1 compares some aspects of electronic commerce use in the Polish and Finnish enterprises in 2013. All of the presented aspects are at a much higher level in Finland.

Table 1. Electronic commerce in Polish and Finnish enterprises in 2013.

Aspects of electronic commerce	Poland (% of enterprises)	Finland (% of enterprises)
Enterprises selling online (at least 1% of turnover)	9	16
Enterprises using Customer Relationship Management to capture, store and make available clients information to other business functions	21	40
Enterprises where the website provided online ordering or reservation or booking, e.g. shopping cart	15	17
Enterprises having received orders placed via EDI-type messages	3	8

Source: Eurostat_b 2013.

According to the data of the Polish Main Statistical Office (GUS 2013) online shopping conducted 11.2% of the food industry enterprises. However, most of the transactions did not exceed 5% of total purchases value. In 2013 online sales (over Website or EDI) were conducted in 10.7% of food industry enterprises. The main barriers to the sale of products through the Internet in the food industry enterprises were: unfit products for sale through the website (51% of responses), logistical difficulties (37%), difficulties with payment (24%), difficulties with security of information systems or data protection (20%), legal difficulties (15%), too high costs (31%).

In Poland there are about 1.5 million farms with area exceeding 1 ha. It is a very large number of agricultural producers for a country with 38 million inhabitants. The vast majority of farms are small farms. Most of the goods are sold directly to the food industry or to intermediaries. In some cases for example the big producers or producers' groups of fruit and vegetable sell products to supermarkets. An important place of supply for food industry enterprises, brokers, retailers and exporters are regional wholesale markets and local agricultural markets. Therefore, farmers often use these marketplaces to sell products such as corn, vegetables, animals.

On the Polish agricultural market there is a very large number of intermediaries. They buy agricultural products from farmers to sell them later at a profit. Many intermediaries are present in key Polish agricultural markets such as cereals market, pork market, and vegetable market.

In Poland, one can observe the processes of concentration and consolidation at the level of food processing and retail (Gołębiewski, 2010). It can be argued that the most powerful and with greatest bargaining power enterprises in the food chain in Poland are large retail chains and supermarkets, which can dictate terms of transaction to their suppliers. In turn, the food industry have high bargaining power in their dealings with intermediaries and farmers. Small farms do not have many alternatives to sell agricultural commodities and usually sell them locally. The Polish agricultural market is characterized by low level of contracting and vertical integration, and dominate informal agreements and open market transactions.

Large retail chains as the strongest actors in the food chain have the greatest potential for the development of e-commerce technology and they do it in different ways in both retail B2C sale transactions and B2B procurement transactions. Supermarkets such as Tesco, are advanced in the online retail of food products in large urban agglomerations in Poland. Retail Internet sales realized by traditional supermarkets is their response to the growing purchases made in the Internet by Polish consumers.

In B2B transactions supermarkets are developing electronic procurement by:

- Placing orders for products in the food industry enterprises using EDI systems.
- Electronic reverse auctions in which their suppliers compete by offering lower and lower prices.

- Consortia-owned electronic marketplaces created with other large retail companies and food processors. An example is the system for exchange of information on products called Global Data Synchronization Network (GDNS), which has a global reach and enables collaboration with suppliers internationally, and is also present in Poland (Muszyński, 2011).

The above-mentioned areas of e-commerce application by large retailers enable them to strengthen their market position. On the other hand, the high level of technological development of electronic commerce in supermarkets cause some of this solutions must be also used by their suppliers.

Also at the wholesale level, many organizations are trying to use e-commerce to strengthen their position in the food chain. Examples are dairy wholesalers in Poland that by allowing customers to place orders via the Internet, lowered operating costs and strengthened their position in the marketing channel (Malak-Rawlikowska et al., 2007).

Electronic commerce is also strengthening other wholesale institutions. Wholesale markets through e-commerce try to improve their services and attract as much enterprises as possible. For example, the Wielkopolski Wholesale Market (WGRO), which is one of the largest wholesale markets of food products in Poland has implemented an electronic system to improve the exchange of information between agricultural producers and buyers. Thanks to it, farmers can better plan the supply of products to the wholesale market (Szymanowski, 2008). Besides, most of the large regional wholesale markets in Poland publish on their websites the current prices.

Also, farmers may use electronic commerce in order to strengthen their position. Electronic commerce offers great opportunities for collaboration and joining forces by farmers. An example is the electronic consortia-owned marketplace of beef called Wołowina Sudecka. It was created by cattle ranchers, who thanks to this electronic marketplace and their own slaughterhouse sell to food industry enterprises and consumers avoiding intermediaries.

In the Internet there are many emerging Polish websites related to agribusiness, which have the characteristics of public electronic marketplaces. However, they have usually the form of simple electronic catalogs of sale offers and buying requests. Table 2 lists the addresses of those websites and their brief description.

Table 2. Electronic marketplaces of agricultural products

E-marketplace profile	Website address
Catalogs of sale offers and buying requests of agricultural goods and services	www.igrit.pl , www.gieldarolna.pl , www.iagro.pl , www.rolnicze24.pl , www.webbrokers.pl , eagra.pl , www.agrotrader.pl
Information portals related to agribusiness and containing catalogs of sale offers and buying requests	www.farmer.pl , http://produkcja.rolnicy.com , www.ppr.pl , http://sprzedamyka.pl , www.igow.pl , http://agrobiznes.money.pl , www.fresh-market.pl
Commodity exchanges, which on their websites contain information portals and catalogs of sale offers and buying requests	www.ewgt.com.pl , www.rolpetrol.com.pl

Electronic marketplaces listed in Table 2 already exist on the Internet for several years. However, according to the author's subjective assessment only few of them have the quality and potential to become in the future important electronic marketplaces in Poland. Particularly noteworthy are the three of them: Ewgt.com.pl, Ppr.pl and Igrit.pl. Each of them is characterized by significant growth since the start of its operation.

EWGT is Poland's only electronic marketplace for agricultural goods, which enables complete transaction, including payment for the goods in a secure way. Although it is run by the Warsaw Commodity Exchange, is not working according to the principles of commodity exchanges. Transactions can be conducted without the support of brokers. However, the description of the goods in offers is detailed and carried out according to a specific pattern. At the same time it limits the number of product categories covered by the electronic marketplace. New product categories are introduced gradually.

IGRIT is a typical electronic catalog of offers. Probably due to the strong emphasis on timeliness of offers it grew to the size of about 50,000 of offers, which is a large number comparing with other electronic marketplaces.

PPR is a popular in Poland agribusiness information portal. Its valuable content also attracts a lot of people who want to place buying and selling offers in its electronic catalog.

Table 2 contains the addresses of websites specializing in the agribusiness. However, farmers also place their offers in the general catalogs containing offers from various sectors of the economy such: Olx.pl, Oferteo.pl. The

table does not contain the addresses of electronic marketplaces for food industry enterprises. In Poland they are represented by such internet websites as Gielda Sożywca (<http://gieldaspozywca.pl>).

Polish agribusiness enterprises are also active in the international electronic marketplaces. They are at the forefront in terms of the number of sale offers placed in the Alibaba.com catalog. On 15 October 2014, one could find at Alibaba.com almost 4000 sale offers of agricultural products of Polish origin.

4. Conclusions

Although e-commerce has a great potential to provide many benefits for both consumers and businesses, its development in Poland is still at a lower level compared with the highly developed countries of the European Union. However, electronic commerce affects the operation of many enterprises and agricultural markets. In Poland, one can observe two main directions of development of B2B e-commerce in agribusiness. On the one hand, traditional enterprises of agri-food chain try to use e-commerce solutions to strengthen their market position and to better conduct existing functions. On the other hand, there are beginning to appear new cybermediaries who try to take advantage of the fragmented Polish agricultural market.

The most active in the first area are, large retail chains and supermarkets, which strengthen their position by drawing a lot of benefits of various electronic commerce tools. However, it is noticeable that, in this area also begin to be active wholesalers and agricultural producers. In the case of agricultural producers the consequence of these actions may be taking over functions of successive levels of the chain and bypassing intermediaries.

The new cybermediaries are represented by electronic public marketplaces. Most of them are simple catalogs of offers without services supporting transactions and cooperation between enterprises. Judging by the number of these websites and the number of offers, it can be concluded that there is a need for electronic public marketplaces in Polish agribusiness.

Electronic public, consortia-owned, private-owned marketplaces, and inter-organizational information links can replace traditional face-to-face transactions, but may also compete with each other. It is difficult to predict which of these electronic commerce solutions will in future play the most important role in Polish agribusiness.

References

- Bakos, Y., (1991). Information Links and Electronic Marketplaces: The Role of Interorganizational Information Systems in Vertical Markets. *Journal of Management Information Systems*, Vol. 8, Issue 2, September 1991, 31–52.
- Brush, G., McIntosh, D., (2010). Factors influencing e-marketplace adoption in agricultural micro-enterprises. *International Journal of Electronic Business*, 8 (4/5), 405-432.
- Chaffey, D., Mayer, R., Johnston, K., Ellis-Chadwick, F., (2000). Internet Marketing. *Pearson Education Limited, Harlow, Essex*, 5-10.
- Christiansen, E., Markus, L., (2003). Participation in Collaboration Electronic Marketplaces. *Proceedings of 36th Hawaii International Conference on System Science (HICSS'03), IEEE*, pp. 3-4.
- Eurostat (a), 2013. Individuals having ordered/bought goods or services for private use over the Internet in the last three months, Code: tin00067, <http://epp.eurostat.ec.europa.eu>.
- Eurostat (b), (2013). E-Commerce, customer relation management (CRM) and secure transactions, [isoc_bde15dec], <http://appsso.eurostat.ec.europa.eu>.
- Fritz, M., Hausen, T., Schiefer, G., (2004). Developments and Development Directions of Electronic Trade Platforms in US and European Agri-Food Markets: Impact on Sector Organization. *International Food and Agribusiness Review*, Vol. 7, No. 1, pp. 8.
- Gołębiewski, J., (2010). Efektywność systemów marketingowych w gospodarce żywnościowej. SGGW, Warsaw, pp.117-130.
- GUS, 2013, ICT - przedsiębiorstwa w 2013 roku, http://old.stat.gov.pl/gus/5840_wykorzystanie_ict_PLK_HTML.htm.
- Kaplan, S., Sawhney, M., (2000). E-Hubs: The new B2B Marketplaces. *Harvard Business Review*, Vol. 78, No. 3, 102-103.
- Leroux, M., Wortman, M., Mathias, E., (2001). Dominant factors impacting the development of business-to-business (B2B) e-commerce in agriculture. *International Food and Agribusiness Management Review*, Vol. 4, 206-211.
- Malak-Rawlikowska, A., Milczarek-Andrzejewska, D., Falkowski, J., (2007). Restrukturyzacja sektora mleczarskiego w Polsce – przyczyny i skutki. *Roczniki Nauk Rolniczych SERiA*, Vol. 94, No. 1, pp. 100.
- Malone, I., Yates, J., Benjamin, R., (1987). Electronic Markets and Electronic Hierarchies. *Communications of the ACM*, 30(6), 484-497.
- Muszyński, K., (2011). GDSN, czyli jak to się robi w Polsce. *Logistyka*, No. 4, pp. 65.
- Pare, D., (2003). Does This Site Deliver? B2B E-commerce Services for Developing Countries. *The Information Society*, Vol. 19, No. 2, pp. 132.

- Rask, M., (2006). The Internationalization Process of E-marketplace Ex-Trade. Aarhus School of Business, Aarhus, available at: <http://www.morten-rask.dk/2006b.pdf>, pp. 2-4.
- Roe, B., Wyszynski, T., (2011). Pigs in Cyberspace: A Natural Experiment Testing Differences between Online and Offline Club-Pig Auctions, Ohio State University, available at <http://ageconsearch.umn.edu>, pp. 2-7.
- Szymanowski, W., (2008). Zarządzanie łańcuchami dostaw żywności w Polsce. Difin, Warsaw, 198-199.
- Thatcher, S., Foster, W., Zhu, L., (2006). B2B e-commerce adoption decisions in Taiwan: The interaction of cultural and other institutional factors. *Electronic Commerce Research and Applications*, 5 (2006), 93-95.
- Turban, E., King, D., Viehland, D., Lee, J., (2006). *Electronic Commerce 2006. A Managerial Perspective*. Pearson Prentice Hall, Upper Saddle River, pp. 125-126.
- White, A., Daniel, E., Ward, J., Wilson, H., (2007). The adoption of consortium B2B e-marketplaces: An exploratory study. *Journal of Strategic Information Systems*, Vol. 16, 71-103.
- Xiaoping, Z., Chunxia, W., Dong, T., Xiaoshuan, Z., (2009). B2B E-Marketplace Adoption in Agriculture. *Journal of Software*, Vol. 4, No. 3, 233-234.
- Zwass, V., (1998). Structure and macro-level impacts of electronic commerce: from technological infrastructure to electronic marketplaces. In: K. Kendall (Ed.). *Emerging Information Technologies*, Sage, Thousand Oaks, CA.