

## **SOME REMARKS ON LOGISTICS INVESTMENTS AMONG POLISH FOOD PROCESSING AND AGRIBUSINESS COMPANIES**

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Paper reports partial results of survey conducted to explore logistics processes among Polish food processing and agribusiness companies. Data gathered from survey conducted in 2009 and 2010 were used. Investigated companies were divided into four categories: (1) up to 9 employees, (2) 10-49 employees, (3) 50-249 employees and (4) 250 employees and more. Survey was carried out to quantify three research areas: (1) Logistic investments scale among agribusiness companies; (2) Knowledge of solutions for logistics; (3) Plans to acquire new logistic solutions and existing logistic base modernization.

To the best of our knowledge, this research is the first trial that focuses on logistics processes in the Polish agri-business enterprises. This study provided real data about the organization, management and logistics costs in the food processing companies in Poland, covering all agri-business sectors and companies of all sizes.

Keywords: Agribusiness, Poland, Food processing, Logistics investments

### **1. Introduction**

Poland with its strong agricultural heritage is recognizable and leading producer of dairy, apples, potatoes, rye, rapeseed, hogs, and cattle in Europe. Nonetheless, agriculture sector is the least productive sector of the Polish economy, employing about 14% of the work force while contributing less than 4% to the gross domestic product (GDP) for 2010. Poland's agricultural sector remained

largely in private hands during the last decades before the transformation in 1989. Most former big state farms are now privately owned and represent the largest production enterprises. On the other hand, based on the Central Statistical Office data [3] there are about 1.25 million farmers who have other employment apart from the farm and produce food mostly for their own consumption. These farms are small, no larger than 10 hectares and are highly inefficient, mainly due to inefficient management practices [9]. There are about 326,000 farmers with plots over 20 hectares and only 25,000 with plots over 50 hectares. These last two categories of farmers produce about 90% of food which is then supplied to agribusiness sector for further processing. In Poland, food processing sector consists of about 30,000 of enterprises and most of them are micro companies (with less than 10 employees) and small companies (with less than 50 employees) called SME.

Referring to agribusiness we mean a generic term for the various businesses involved in food production. More specifically, Davis and Goldberg (1957) [4] defined agribusiness for the first time in 1957 as the system which integrates of all operations involved in the manufacture and distribution of farm supplies, production operations on the farm, and the storage, processing, and distribution of farm commodities and items made from them.

Undoubtedly, logistics issues are very important for agribusiness enterprises, mainly due to the fact that food products are very sensitive to the production and transportation conditions. As a result of inadequate production process, storage and transportation goods may lose their nutrition properties or even can get spoiled. Therefore, in agribusiness industry the logistic chain needs to be particularly well-defined in every aspect of its links including products, products delivery, food production and distribution [1]. This value chain concept assumes that any particular actions being part of the processes implemented by a company should lead to the creation of the value added for both customers and the company itself.

The paper reports partial results of the study on logistics investments and processes in Polish agricultural companies and it is a part of a broader research project on “Logistics processes and the functioning of food processing and agricultural companies in Poland”. In this research we focused mostly on investment issues and the main research questions were:

- (1) The level of ongoing investments among Polish agribusiness companies;
- (2) The knowledge of solutions for logistics;
- (3) The plans to purchase new solutions to support logistics in chosen areas.

The remainder of the article consists of literature overview and three sections. The second section presents the characteristics of the sample and experiment design. The third section presents the results of a survey among Polish agribusiness companies. Then, in the last section, we discussed the findings and summarized the research.

## 2. Literature review of similar problems

Logistics is an essential function in every organization. It is best viewed as a single, but it consists of series of linked activities. These range from procurement to initiate the flow of raw products into an organization, through to physical distribution to deliver final products to customers. Not only is logistics essential, but it is also expensive, so it is in the awkward position of being essential, expensive and spanning most of the organization's operations [13].

The way in which the logistics processes are organized affects costs, profits, relations with suppliers and customers, customer service, and indirectly every other aspect of company performance [13]. Therefore, it plays a significant role in the successes or failures of every organization. Undoubtedly, the role of logistics has changed and it became more important and responsible for the value-adding activities instead of cost-generating.

According to Haan et al. (2007)[6], based on the survey among Polish small and medium firms, the companies use different coordination mechanisms when they grow in size. Large firms apply more formal management techniques as well as more sophisticated information systems to deal with the increased business complexity. These results give empirical support to the conceptual growth models and provide the description of managerial environment for decision making in logistics. On the other hand, the authors discovered that logistics and supply chain management are not well developed in the majority of Polish SMEs since specialization of such functions is not too deep in these companies.

In the field of logistics the literature pays also some attention to the use of information systems and computers for logistics as the factors that create value indirectly. The problem is that SMEs lag seriously in the area of information technology which supports only their administrative tasks. However, Bridge and Peel (1999) [2] refer that use of computers will shift from operational tasks to decision making (financial modeling) in the area of logistics organization and supply chain management in SMEs.

In 2003, a survey among Polish SMEs was held by Kisperska-Moron [6] in which the coordination of the logistics function was analyzed. The results of this survey (based on 127 questionnaires) were used to analyze the managerial environment for logistics management. Those surveys showed that Polish manufacturers changed their attitudes towards customer service and its competitive advantage aspects. They were aware of growing customer requirements and adopted sets of standards to evaluate that service.

Taking into account the declared knowledge of the logistics concept a study by Dimitrov (2005) [5] among 64 manufacturing companies revealed that Bulgarian firms had the knowledge which was much higher than its implementation both in the organizational structures and in the applied managerial

practices. The investigated companies claimed also to have better knowledge of the supply chain management concept than logistics. We suppose that due to a similar level of economic development, the same economic transformation problems and location in Central and Eastern Europe these findings may also concern Polish companies.

The other research by Lehmusvaara and Huiskonen (1998) [10] held among process industry companies discovered the factors that can prevent companies from improving logistics operations. One of them was the lack of investments in control and physical systems including computer systems, equipment and working machines used in logistics. Even if the company had such systems it still did not solve the problem. The reasons were that the benefits of the systems were not realized by the users of the systems; the users were not able to operate with the systems; and finally the management did not require the employees to use these systems. Although this study was done more than 10 years ago, we expect that in case of Polish agribusiness companies these findings may be still valid.

### **3. Investments issues related to logistics**

During the last few decades, logistics developed from a supporting function to an important set of activities that create a great value added to companies. In order to create a value added every business needs investments. Investments, understood generally as company's expenses to increase its income in the future, however, are expensive. Investments require engaging own or borrowed capital. Therefore, in today's market conditions the choice of cost-effective concept of investing in particular processes is not an easy problem for the company.

#### The level of ongoing investments

In the survey we asked about company's level of ongoing investments taking into account the consumption of fixed capital which reflects the decline in the value of the fixed assets of enterprises due to normal wear, obsolescence and normal rate of accidental damage. We had four categories: (1a) companies, in which the value of investments exceeds the value of fixed capital consumption; (2a) companies, in which the value of investments is equal to the value of fixed capital consumption; (3a) companies, in which the value of investments is lower than the value of fixed capital consumption; (4a) companies, in which investments are not undertaken. There were also 9.5% companies, which couldn't be assigned to any category, because they did not answer the question about the scale of investment processes. Distribution of non-response was similar in the companies according their size. As a result we could assign 19.1% of companies to the 1a category, 30.8% to the 2a category, 28.8% to the 3a category, 11.8% to the 4a category, please see Table 1 for details.

**Table 1.** Distribution of answers to the question about the level of the investment processes in companies

Investments scale	Count	Percent
(1a) investments exceed the value of fixed capital consumption	97	19.1
(2a) investments are equal to the value of fixed capital consumption	156	30.8
(3a) investments do not cover the value of fixed capital consumption	146	28.8
(4a) investments are not undertaken	60	11.8
Not filled in	48	9.5

At first, we were interested in the scale of investments by branch of the companies. This is because the survey was run in hard times as economics of many European countries faced slowdowns. Therefore, we were aware of the fact that crisis could directly or indirectly affects the position of a particular company or the entire branch. A crisis in one industry can have severe adverse effects on companies from completely different branches.

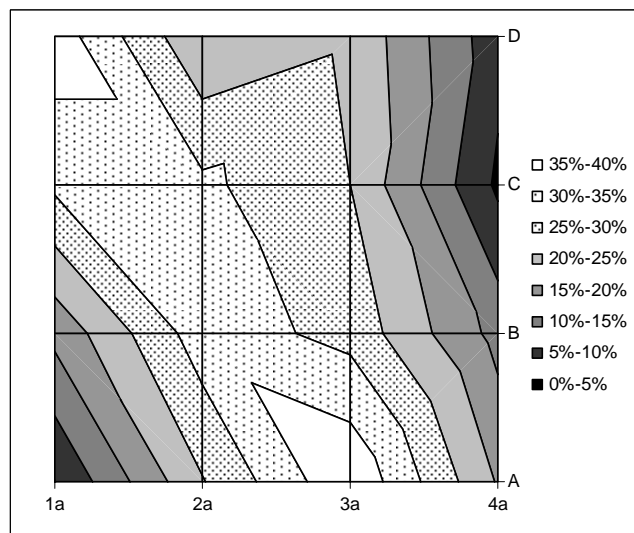
**Table 2.** Categorization of companies according to investments level and a branch

Branch	Investment	Count	Percent
Meat	low	57	49
Meat	high	59	51
Fruits and vegetables	low	12	36
Fruits and vegetables	high	21	64
Fats and oils	low	1	17
Fats and oils	high	5	83
Milk	low	5	21
Milk	high	19	79
Cereal and starch	low	20	54
Cereal and starch	high	17	46
Bakery	low	117	55
Bakery	high	95	45
Other grocery	low	19	42
Other grocery	high	26	58
Animal feed	low	9	69
Animal feed	high	4	31
Beverages	low	6	55
Beverages	high	5	45
Tobacco	low	1	100
Not filled in	-	9	100
Sum		507	

To analyze the companies' situation taking into account the investments we distinguished two groups of firms based on the scale of the investment processes. Companies that invested a lot, in which investments exceeded or were equal to the value of fixed capital consumption formed investment category "high". The other companies were assigned category "low", see Table 2 for details.

It turned out that the largest scale of investments took place in companies operating in fats and oils industry (83%), milk processing (79%), fruits and vegetables (64%) and other grocery (58%).

The next step was to analyze the relations between the size of a company and the investment scale. We used a surface chart with percentage shares calculated as the number of items that fall into the categories of companies according to their size (A-D) and answers assigned to a particular category (1a-4a) divided by the group count. The crossing of the categories presents percentage (as interval) of the companies which fall into the particular category.



**Figure 1.** The percentage share of investments (1a – 4a) taking into account the size of the company (A – D)

From Fig. 1 we can learn that the size of company is accompanied by the level of investment processes. Among large enterprises (D) there are between 35% and 40% of them, in which investments exceed the value of fixed capital consumption, see upper left corner of the figure with interval from 35% to 40%. In case of micro companies (A) we can find that investments do not cover the value of fixed capital for about 35%-40% of them. At the same time, between 15% and 20% of these companies declare that investments are not undertaken at all. Finally, only between

5% and 10% of micro firms admitted that investments exceed the value of fixed capital consumption.

The knowledge of solutions for logistics

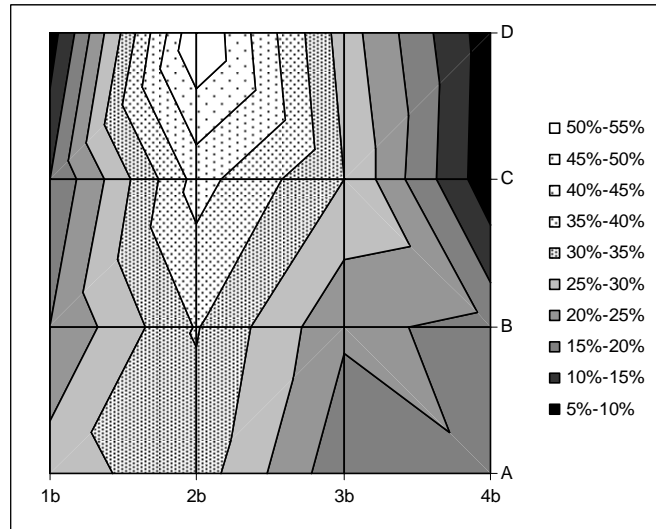
One of the conditions to obtain competitive superiority in a highly fragmented agribusiness market is to create a value added at every step of production process. Therefore, we believe that the logistics and supply chain management are the main components which are responsible for the excellence of whole company. It seems especially important for the food processing companies, which usually cooperate with many products providers and supplies its final products to many recipients. Nowadays, organization of logistics and supply chain management can be highly supported by wide range of IT systems (Thakur and Hurburgh, 2009). For instance, in small companies the use of information technology is limited to operational and administrative tasks while bigger companies use IT and available systems to support decision making and planning.

Introduction of information technology solutions to support logistics requires not only resources (money), but also a professional knowledge. Therefore, we asked companies in survey to choose their knowledge about logistic solutions offered by IT industry. There were four answers to choose: (1b) our knowledge is on sufficient level, (2b) our knowledge is usually sufficient (3b) sometimes we lack knowledge (4b) our knowledge is definitely too small. There were also 5.1% companies, which couldn't be assigned to any category, because they did not answer the question. Distribution of non-response was similar in the companies according their size. For details, please see Table 3.

**Table 3.** Distribution of answers to the question about the knowledge on solutions for logistics

The knowledge of solutions for logistics	Count	Percent
(1b) knowledge is on sufficient level	97	19.1
(2b) knowledge is usually sufficient	190	37.5
(3b) sometimes we lack knowledge	114	22.5
(4b) knowledge is definitely too small	80	15.8
Not filled in	26	5.1

To analyze the relations between the size of a company and the knowledge of solutions dedicated to logistics we used a surface chart with percentage shares calculated as the number of companies according to their size (A-D) and the number of answers assigned to a particular category (1b-4b) divided by the group count.



**Figure 2.** The percentage share of the knowledge of logistic solutions (1b – 4b) taking into account the size of the company (A – D).

In Figure 2 we can see that companies' evaluated their knowledge of logistic solutions as usually sufficient (category 2b). However, there is a relation between the company size and the percentage of answers in 2b category. Such progressive concentration of declaration round the 2b category, which grows up with the size of the company can be interpreted as a growth of declared level of knowledge of logistic solutions due to the growth of company size.

#### Plans regarding logistics

In the survey the respondents were also asked about their plans and intentions regarding the logistics in company. There were 10 categories to choose from (multiple choice): (1) Implementation of IT solutions; (2) Implementation of activity based costing system for logistics; (3) Investment in warehouses; (4) Investments in transportation means; (5) Outsourcing of warehouses; (6) Outsourcing of transport; (7) Investments in packaging equipment; (8) Centralization of logistics tasks by setting up the logistics department; (9) Participation in special courses, trainings and studies connected with logistics; (10) Other investments.

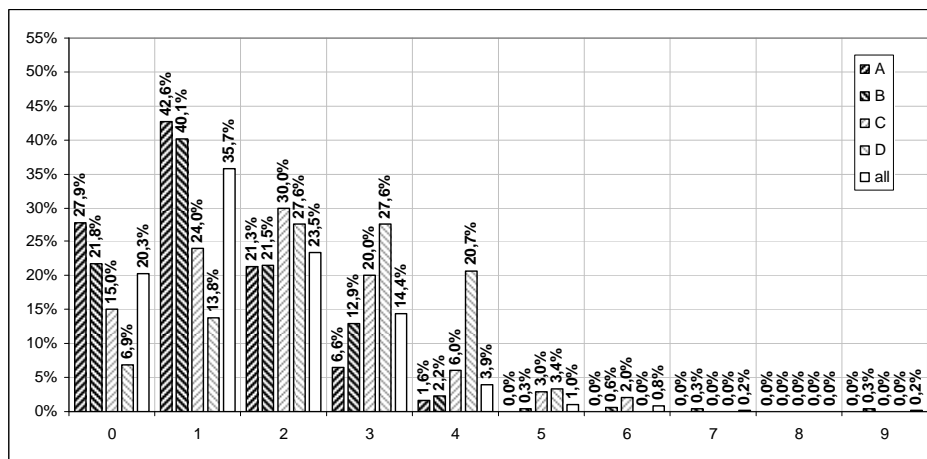
Not surprisingly, the results showed that the priority for the companies is to invest in transportation means (vehicles), regardless the company size. This finding is consistent with other research by LaLonde et al. (2007). They found, based on regular surveys that transportation is the most commonly included activity in logistics, and therefore it is the main factor that is subject to investment. In our



survey, we have found that more than a half of the companies (52.5%) are planning to invest in transportation means.

The other important issues for the companies are: investments in warehouses (26.4%), investments in packaging equipment (26.0%) and implementation of computer aided solutions and information technologies (20.5%). Noticeable is that with the size of the company the attitude to invest in particular area also is greater. For instance, only 1.6% of micro firms (A) declare investments in information technologies to support logistics. In case of small companies (B), 16.4% of them see the need to invest in information technologies. Continuing, 37% of medium firms (C) want to invest in IT solution, and finally, 48.3% of large companies (D) are interested in computer solutions.

We continued our analysis to find out how many different areas as a subject to invest were chosen by respondents. Fig. 3 presents the findings.



**Figure 3.** The percentage share of companies which declared plans and intentions to invest in logistics solutions in given areas (0 – 9). Where answer 0 means that the company is not willing to invest, 9 means that company plans to invest in nine different areas

*Source:* Authors' elaboration based on survey data

One-fifth of the companies (20.3%) declared having no plans or intentions regarding implementation of logistic solutions. These are micro and small companies that do not plan expenditures on logistics. Slightly more than one-third (35.7%) of the companies is going to invest in just one area. This is particularly true for micro and small companies in which 42% and 40.1% of them respectively, have chosen only one filed to invest.

Plans to implement solutions to support logistics in more than two areas appear more frequently among medium and large companies. In particular, 30% of

medium and 27.6% of large companies declare investments in two different fields. Taking into account investments in three areas of logistics we found that 20% of medium and 27.6% of large companies had such intentions. Finally, 20.7% of large enterprises considered to support four different aspects of logistics.

#### **4. Conclusions**

This paper has been aimed at presenting the state of Polish agribusiness companies concerning the investments related to logistics. The objective was to shed light on three issues: (1) The level of logistics investments among agribusiness companies; (2) The knowledge of the solutions for logistics; (3) The plans to acquire new solutions for logistics. Instead of proving specific research hypotheses' concerning the logistics issues we rather intended to present general picture of Polish agribusiness companies. Realization of the research objectives seems to be very important for a thorough diagnosis of logistics systems and to indicate possible directions of improvement on this field.

The major findings of our research in the area of logistics are as follows:

- 1) The results of investigations show that in agribusiness sector the scale of investments grow up together with the size of company. In case of large and middle companies there are majority of such firms, in which the scale of logistic investments is equal or exceed the value of fixed capital consumption.
- 2) Taking into account the branch of the companies we could find that some of them invest much more than others. It turned out that the biggest scale of investment processes (calculated as percentage of companies investing at least to cover the fixed capital consumption) took place in companies operating in fats and oils industry (83% of them invested), milk processing (79%), fruits and vegetables (64%) and other grocery (58%).
- 3) The declared knowledge of the logistics solutions is usually perceived as sufficient. In particular, there is a relation between the company size and the growing number of respondents indicating sufficient level of their knowledge.
- 4) When it comes to plans regarding the logistics a certain relation between the size of the company and the number of positive declarations was apparent. In eight out of ten categories of possible investments the percentage share of companies grew up together with the size of the company. Not surprisingly, the results showed also that the priority for the companies is to invest in transportation means (vehicles), regardless the company size. One-fourth of companies declared investments into warehouses as well as packaging equipment. One fifth of companies mentioned about the plans to implement computer solutions.

The overall results of the research suggest that most of the Polish agribusiness companies are aware of the fact that today's competitive market environment requires investment efforts. These efforts should lead to the creation of the value added for the customers and the company. Our studies indicate that the scale of investments, the knowledge of the solutions for logistics and finally the plans to acquire new solutions for logistics are the domain of large companies. This is due to the fact that many of small companies operate in a very traditional way [6], not attempting to create logistics solutions to reduce the costs and to help them operate more effectively. Our work confirmed also that logistics and supply chain management are not well developed in the majority of Polish agribusiness companies. This is not surprising for micro and small companies in which specialization of different functions (including logistics) is operated by one or two staff members.

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