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Doctoral School of Management and Business Administration

**VERTICAL COORDINATION AND CONTRACTUAL
RELATIONS IN THE GRAIN CHAIN**

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1. INTRODUCTION

1.1. Relevance of the topic

Vertical coordination has been one of the most important topics of Hungarian and international literature since the beginnings of intensification of agricultural production. The examination of the contractual relations and vertical integration has an increased relevance among Hungarian and foreign authors and researchers.

A general phenomenon, that most of the agricultural enterprises are operated only in few stages of their given supply chain, or they take part in one specific stage of different supply chains, and there are no attempts for building a whole supply chain at enterprise level.

Grain – or cereal – sector is one of the most important sectors of Hungarian agriculture, because its products are the most widely used raw materials of food production and other food industries. Therefore, it is very important to examine the operation of this sector, the vertical relations between the players of the sector. Most of the participants have long time traditions in the grain production and they have been players of the grain chain for many years, therefore their role in the chain are well built and the relations has been established formerly. Although, the changes of the macro and microeconomic conditions in the recent years may raise questions about re-thinking and reconsidering of former contractual relations.

1.2. Objectives of the research

The aim of my research – and the topic of the dissertation – was to analyze and explore the institutional background of the grain chain, based on the theory of transaction costs and the economic background of contractual relationship. The dissertation focuses on the vertical coordination of the grain sector, focusing on the contractual relations between the players of the grain chain.

In my research, I intended to explore those factors that may determine the formation – or the lack – of different contractual relations and, in addition, I wished to analyze how the vertical coordination could improve and stabilize the relations between the participants of the grain chain. A basic objective of my research was to explore the different conditions of the contracts, to describe the main features of these contracts and to identify the main motivating forces in choosing between the different forms of contractual structures.

As the grain chain is a very complex supply chain, in my dissertation I could not deal with all the players of the chain and its institutional background. The topic of my dissertation is restricted only for the comprehensive analysis of the grain sector's institutional background and its relations, through a theoretical and an empirical research.

1.3. Hypotheses of the research

The main hypothesis of my questionnaire survey was that the underdeveloped or not properly operated market institutions, which will result the increase of transaction costs, might

deteriorate the efficient operation of the grain chain. The establishing or developing vertical coordination could improve or stabilize the relations between the players of the grain chain.

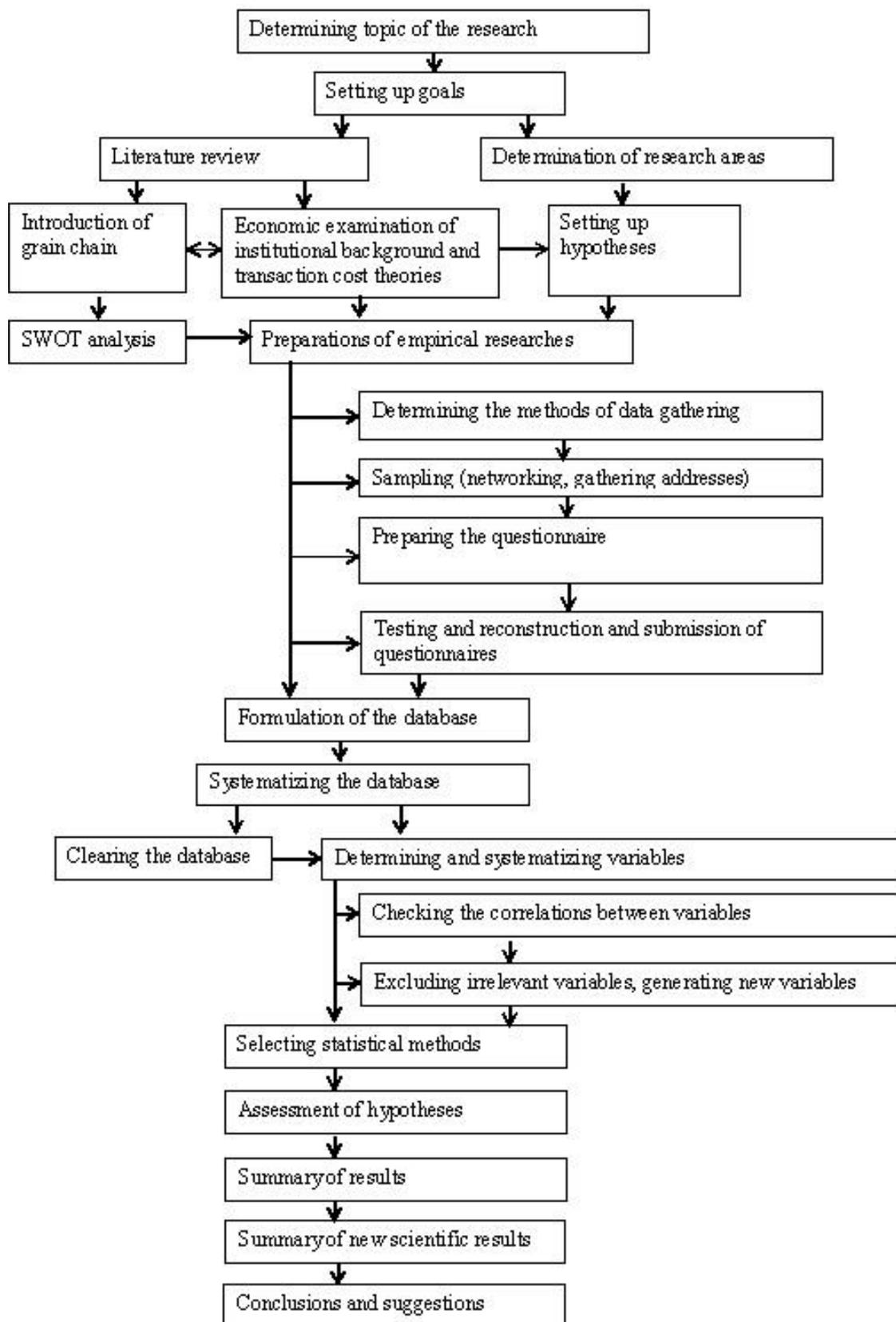
My research areas are connected to the different elements of the institutional background of the grain chain. Therefore, different hypotheses were formulated for the different marketing institutions, namely spot markets, concentrated markets and hybrid institutions, such as cooperatives, contractual systems, and finally for vertical integration and supplementary institutions.

The main questions of my research were the following:

1. What are the main driving forces of choosing spot markets, what are the problems of trading at spot markets?
2. What are the reasons of the aversion with concentrated markets and what are the main features of exchange markets?
3. What are the main forces which determine the formulation of contractual relations? What are the most important features and conditions of these contracts? How common are the formulation of cooperatives in Hungary?
4. How common is to build vertical integration in Hungary? How vertical integration could improve the relations between the players of the grain sector?
5. What is the role of the different supplementary institutions in the institutional background of the grain chain? What are the main features of these institutions?

According to the abovementioned objectives, I formulated my hypotheses and I set out my research plan, by which the research work could be accomplished. The process model of my research is illustrated in flow chart form by Figure 1.

Figure 1: The process model (flow chart) reflecting the structure of the research work



Source: own compilation

2. MATERIAL AND METHOD

According to the relevant international and domestic literature sources, I summarized the main principles and features of institutional economics and transactional costs. In the next step, I introduced the relations between the participants of the grain chain.

The first part of my dissertation describes the theoretical background of my researches. This chapter exceeds the general literature review, because in addition to the description of the different vertical levels of the grain chain and summarizing the most important features, problems and market processes of the sector I summarized the main findings in the form of a SWOT analysis, for the whole grain sector. In the SWOT analysis, I described the strengths, weaknesses, opportunities and the threats of the grain chain, moreover I summarized those most important actions, by which the threats and weaknesses could be avoided and the strengths and opportunities could be utilized in the future.

The second part of the literature review describes the behaviour and attitudes of the participants of the grain chain, their relations, cooperation, the possible risks, transaction costs, their contracts and the possible contractual incompliances.

For conducting an empirical survey, I compiled a questionnaire to gather the relevant information about the different players of the grain chain. The main parts and features of this questionnaire, the hypotheses and the research methods are introduced in the 'Material and method' chapter.

The materials and methods used for obtaining my research objectives were as follows.

Materials:

- data of the Hungarian Central Statistical Office,
- data of the Research Institute of Agricultural Studies,
- statistical data, tables,
- questionnaire surveys.

Methods:

- literature review,
- document analysis,
- descriptive statistical methods,
- stochastic interdependence analysis,
- cross-table analysis
- variance analysis,
- association analysis,
- correlation analysis.

2.1. Hypotheses of the research

In the first step of my researches, the following hypotheses were formulated to be a base for the empirical research:

Hypothesis 1 (H1): Spot markets

The use of spot markets – which characteristics are different in case of different operating activities – are determined by the following problems: conflicts between buyers and sellers, lack of information about prices and demand, lack of social capital, changing business contacts.

Hypothesis 2 (H2): Concentrated market

The players of the stock exchange are mostly large processing companies. The low level of attendance to the concentrated markets are resulted by the high barriers of entry, the high quality requirements, the lack of capital and the lack of knowledge about the operation of the stock exchange.

Hypothesis 3 (H3): Hybrid institutions

H3a: Contractual relations

Contractual relations – despite the existing problems – are the most widely used forms of vertical integration in the grain chain. In case of contracts, the most important features are the length of the contracting period, the activities, the details and the form of the contract, the conditions of the contract, the bargaining power of the parties, the existence or the lack of guarantee and the possible debates on the contract.

H3b: Institutions of storage and warehouses

The different storage institutions (private and state-owned warehouses) play a determinant role in the grain sector. The capacity of storage facilities has increased significantly in the past years, which caused differences between the players of the grain sector.

H3c: Cooperatives, organizations

The role of cooperatives and other organizations in vertical integration is very small in Hungary; these forms of integration are not widely known either.

Hypothesis 4 (H4): Vertical integration

Vertical integration is performed at only 2-3 levels in Hungary. The level of integration is an important influencing factor of cooperation, which may determine the level of bargaining power, the features of contracts, the willingness for guarantees and it also influences the choice between the different distribution channels.

Hypothesis 5 (H5): Supplementary institutions, logistics networks

Logistics networks and relations are also determining factors of the grain chain. The problems may derive from the lack of capacity and the poor infrastructure. For these reasons, it is highly recommended to set out the main features of distribution and logistics operations in the contracts.

2.2. The aims and construction of the questionnaires, its variables and the features of the sample

The basic goal of my questionnaire was to explore and examine the contractual relations between the players of the grain chain, based on the principles of transaction costs and economics of contracting, and to make an empirical analysis of the different influencing factors of the different organizational structures. The research focused on those influencing factors, which may basically determine the building or the lack of contractual relations, and a key target was to explore how could the contractual relations improve or stabilize the relations between producers and the processing industry.

The main question groups were the following: how, under which conditions are the contracts built, what are the main differences in types of contracts, what are the driving forces of selecting the different types of structures.

The questionnaire was made in electronic form by using the Google Docs. The most of the questionnaires were sent by this way, but in a smaller part of the sample, I used paper-based questionnaires by request.

Introduction of the main features of the sample and willingness to answer

The questionnaire was sent in the first half of 2013.

The selected multitude of the research was the participants of the grain sector, where I put emphasis on the grain producers and primary processing industry.

The following associations, organizations, databases and registers were used for finding availabilities of the participants of the sector: mill register, public database of grain producers, different county-level institutions of the Ministry of Agriculture and Rural Development. I also could submit my questionnaire to different associations and institutions of the grain sector: the Grain Producers' Organization, the National Association of Hungarian Farmers' Societies, the National Federation of Agricultural Co-operators and Producers, the Hungarian Grain and Feed Association, the AGRYA, and the Hungarian Seed Association. These organizations helped my research by submitting my questionnaires towards their members.

The sampling was random, although a priority was given to addresses with electronic availability, but I attempted to enlarge the sample in order to get a wider insight to the different stages and activities of the grain chain.

More than 1000 questionnaires were sent to the different players of the supply chain, but the electronic version could be se-sent freely, so the number of questionnaires might be larger. The number of filled questionnaires, which were taken into further analyses, was 99.

2.3. Methods for evaluation of the questionnaires

After gathering the questionnaires, I processed and cleared the database. Due to the use of an electronic questionnaire form, the answers were directly could be placed into the database. The columns of the database were formed by the questions; the rows of the database were formed by the answers.

After getting the questionnaires, I made the encoding, and then the database was checked, corrected and cleared. In the course of the encoding process, I put emphasis on forming clear and more simple codes, to make the further steps – processing by statistical programmes – easier.

Those questionnaires, which showed many missing answers – some of them may derived from technical problems – I deleted from the database. In some cases, where related questions were asked, the missing data could be replaced by the answers of other questions.

During the checking of the context of the answers, I filtered the non-relevant or contradictory answers.

Wrong answers were derived from misunderstanding of units, but these answers could be corrected in most cases. The contradictory answers were due to the inconsistency of the respondents, therefore these answers should be assessed differently. About 10-15% of the questionnaires needed corrections to me made during the data processing stage.

The methodology of the research is based on mathematical-statistical methods in the topic of probability calculations. Due to the limited length I introduce only the most important methods I used, which are essential in for understanding the results of the research.

Association calculation were used for the analysis of risk taking and guarantee-taking attitudes of the players of the sector, and for the analysis of the different integration levels. I used this method also for summarizing the correlations between the integration level and contractual relations, as well as for exploring the correlations between the age and experiences of the top management and their knowledge about stock exchange trading.

I used variance analysis for exploring the correlations between the activities of the different participants and the use of spot markets, or the detailed description of the delivery in the contracts. I also used the variance analysis for analysing the connections between the exchange trading and written contracting methods and the use of different distribution channels and the role of the organizations in the grain chain.

I conducted correlation analysis for exploring the coherences of the factors of contractual relations, the correlations between the time period of contracts and the activities performed, or for exploring the problems of keeping the different standard given by the contracts, in case of different distribution channels.

3. RESULTS

3.1. Assessment of hypotheses

The summarized version of the main hypotheses of my research are the following:

After the political and economic transition in the 1990s, some of the problems of the grain sector (e.g. wheat exports, transport, the relations between the players of the sector, idle capacities, etc.) have remained unchanged. The efficiency of the grain sector is deteriorated by the underdeveloped or not properly operated market institutions, which will increase the transaction costs. The establishing or developing vertical coordination could improve or stabilize the relations between the players of the grain chain.

Summary of the research results

The first research area (**H1**) was set up for the examination of the spot markets, to explore the driving forces of choosing this structure and its possible problems.

The results of the literature review – namely, that the use of spot markets by the small-scale wheat producers is typical because of their uncertain yields and lower quality – could not be verified by my results. The second part of my hypothesis about the problems of sales at the spot market could be verified by my own research results.

In the course of the examination of the first part of H1 hypothesis, I concluded that although small-scale farmers sell their crops at the spot markets in a higher proportion, but this does not refer to the raw material producers. Among the examined companies, those companies use this market channel type, which deal with secondary processing (at an average of 70% of their sales) or trading. Primary processing companies use this distribution channel at a lesser extent at an average of 29% of their sales.

By the analysis of the second part of H1 hypothesis, I concluded that the use of spot markets is determined by several problems.

There are many conflicts between the sellers and the buyers, the lack of information is quite general, and the business relations and social network of the business partners is rather poor. The lack of trading and price information may lead to high price risk, the lack of relations between the two parties may lead to serious conflicts, and the lack of long-term relations may stop the advantaged deriving from business connections.

The respondents highlighted the following problems as most significant at the spot market channel: exchange rate risks, quality problems, lack of resources, unpredictable trading, lack of time, fluctuation of prices, and dependence on hired labour, irrational operation, and lack of storage capacities.

Because of the following reasons, the respondents do not use the spot markets: they are waiting for better prices; they are suspicious about this system, lack of money, low demand level, unfavoured circumstances, lack of storage and drier facilities etc.

The lack of price and demand information was indicated as a medium strong or strong problem at the spot markets. The large share of the respondents has not considered the conflicts between the two parties as a significant problem. According to my survey, nearly one third of the respondents could not feel the lack of social capital as a significant problem.

According to the question about the changing of business partners only 13% of the respondents work with fixed business partners, and only an insignificant number of respondents indicated that they change their business partners every year. According to the results of my survey, most of the business connections are lasting for only a few years in the grain sector.

A medium strong significance was detected by my analysis between the operation activities and the use of spot markets as a distribution channel. The problems were perceived by the raw material producers and the input (i.e. primary) producers more significantly, than in the other groups, while representatives of secondary processing detected these problems during their activities at the less extent. Changing business partners is more frequent in the group of raw material producers and traders than in the groups of processing industries.

The second field of research (**H2**) was formed for exploring the driving forces of the use of concentrated markets, as a distribution channel, and which are the main features and main reasons of the use of stock exchange.

My survey verified the findings of the reviewed literature sources, namely, the futures and option markets are very weak in Hungary, and activity of the producers at the commodity exchange is growing by the increase of their economic size and decrease of diversification level. The players of the commodity exchange are mainly large processing companies; the participation of grain producers is very low, because of the high barriers of entry, their lack of capital, quality requirements and the lack of knowledge about the exchange market as a marketing channel option.

According to the findings of my survey, the participants of the Budapest Stock Exchange are mainly large processing companies; the participation of grain producers is very low. A greater share of the respondents (79%) does not use the options of exchange trading. Nearly 40% of the respondents never use this marketing channel, 20% use this system but only for 20% of their activities. My survey justified that the role of exchange trade is growing by the increase of the economic size.

When examining the different operation activities I concluded that the traders use the stock exchange at the highest proportion of the sample (9%) the second important group is the group of primary processors (6%) and the raw material producers represent the smallest proportion (4%).

According to the answers of my questionnaire, the low level of using the channels of the Budapest Stock Exchange are the high barriers of entry, the high quality requirements and the lack of knowledge about exchange trade. As the respondents indicated, the lack of capital is its most important reason; the second is the lack of knowledge about exchange trade possibilities.

Those respondents, who does not use stock exchange, indicated these reasons as medium strong, for the raw material producers the greatest problem is the lack of capital, while primary processors did not consider the quality requirements as a limiting factor.

According to the opinion of some respondents, the Hungarian stock exchange is very limited, only 3-5 companies dominate the exchange market, it is not liquid, the prices are distorted, and the entry and the exit from the stock market is very inflexible.

I detected correlation between the experiences of the managers and the use of stock exchange as a marketing channel, that means the knowledge and the experiences has a positive impact on this relation. Similar results were found when examining the age groups; the use of stock

exchange trading was more significant at older age groups, which reflects the former results, i.e. the role of knowledge and experiences about the operation of stock exchange.

The third research area (**H3**) was set up for the examination of contractual relations, what are the main steps of their development, what problems may occur, what are the most important conditions of these contracts, (**H3a**). In addition, I wished to explore the main features of storage facilities in the grain sector (**H3b**), and I focused also on the significance of cooperatives as a partnership form in the examined sector (**H3c**).

The analysis of contractual relations (**H3a**) was a key area of my research. Most of the information I gathered through the literature review – for example that one of the most important problems of contractual relations is fluctuation, or this form of relationship is dominant in mill and feed industry and among large and small scale grain traders, or the lack of contractual discipline will increase the risks of the producers – were verified by my survey results.

I get the following results during the examination of H3 hypothesis:

In the greatest share of the examined sample the most important form of contractual relations were contracts in written form (60% of the respondents use written contracts in three-quarters of their contracts). Written contracts are mainly used by input producers and primary processing companies. Raw material producers and secondary processing companies use written contract at the less extent.

Most of the companies of my sample have recognized the advantages of contractual relations – i.e. risk and cost reducing role – by which companies may improve their efficiency, may produce higher quality products and the coordination between the different production levels may also be developed and improved.

My researches resulted that the activity of the different producers or companies and their role and situation in the grain chain as well as vertical coordination is among the most determinant factors in contractual relations. A great share (58%) of contractual relations is made for short term (mostly because of uncertain market trends and market conditions), that means a maximum of one year contract period. 67,74% of partners with one-year contract period and 90% of partners with long-term contracts use written form contracts.

One-year (seasonal) contracts are mainly used by raw material producers. The length of the contract period is mostly influenced by the activities of the partners. The period of the contract determine whether the partner use a written contract form or not. Written contract form is general in case of longer contract periods. The longer the contract period, the closer the cooperation is, that means, in case of written contract we can speak about a higher level of vertical integration. The place of producers and companies in the grain chain (i.e. the activities and the business relations) influences the length of contractual period, in case of closer relations and co-operation the length of contract period is longer as a result of stable relations and trust between the contracting parties.

In case of written contract, the fulfilment of the contract is satisfied at a higher level, which also verifies the reasonability of written form contracts. In my survey I also observed, that in the half of my sample, the price and the quantity of products are both given in these contracts, and this may decrease the risk of price change.

93% of the respondents declare the quality in their contracts, which will improve product quality. According to my results, the improvement of bargaining power is not significant in case of contracts, only one-fifth of the respondents are strong enough in their bargaining power, and one-tenth can never use their power in the course of the contracting process, although bargaining power is one of the most significant influencing factors of contracts and the price competition. The main characteristics of the contract will determine the bargaining

power of the parties. A common problem of sales that the contracts do not contain any guarantees for either the producer or the buyer, and the legal procedures of solving the problems in the contracts is very long and complicated process.

Only 40% of the enterprises sets guarantee in their contracts, while 30% of the companies never use guarantee during their contracting process. Half of the respondents (mainly in small sized companies) take the guarantee on their own, while the other half (large enterprises) shares the guarantee with their partners. Companies with longer traditions can take the risk on their own; nevertheless, they prefer sharing the risk with the partners. The following forms of guarantee were summarized by the respondents: absolute guarantee, advance payment, products, processed products, traceability, bio-quality products, mortgage, goods, area cultivated by the producer, hedging buyers, common sampling methods, bank guarantee, credit insurance, bill of exchange, own capital of the company.

Most of the debates are connected to quality and quantity problems, or in other cases they are related to logistic problems and deadlines. The reasons are mostly the problem of lack of capital financing problems and the fluctuations in supply and demand.

The respondents indicated the following deadline problems as most important: delay, too short deadlines, delayed payments, too long deadlines, time management problems, uncertain deadlines, circular debt, insolvency, difference between contracted and real deadline. Some of the respondents answered that they prefer prompt payments.

16% of the respondents have already met the legal procedures for forcing their contracts in legal way. Those respondents indicated contractual problems who were business partners of mills, processing companies, Producers' Organizations and the stock exchange.

By the results of my survey verified that the contract conditions are different in different distribution channels. In case of using open market forms the incidence of written forms was lower. According to the business partners of the wholesale traders the selling price was indicated as the most important element of the contracts, while in case of the partners of Producers' Organizations, the guarantee was the most important. In case of concentrated markets, the entire contract conditions were considered significant, i.e. the transportation and logistics conditions, quality, quantity and price. In case of partners of traders, the price was most significant, in the milling industry there were no significant correlations, while in case of suppliers' cooperatives, the price, the quantity and the details of transportation were considered as most significant according to the answers of the respondents.

In connection with the **H3b** hypothesis, the information of the different literature sources – i.e. the uncertainties in storage capacity, the small sized companies has deficiencies in storage and drying capacities – were verified, but the hypothesis concentrating on the successfulness of public warehouses were just partly verified.

Two-thirds (63,3%) of the sample have own storage or drying capacity and 24,7% use the opportunity of public warehouses. According to the different activity areas, the primary processing industry had the greatest share of own storage facilities (92%), the second largest group (75%) was input producers, while only half of the raw material producers had own storage facilities according to my survey. Only 19,5% of the raw material producers used the warehousing possibilities, while a large proportion of primary processing companies used warehouses (58%) although this group owned the most of the own storage capacities.

The micro-sized companies were in very disadvantageous situation in own storage and drying capacities, as more than 50% of them has no own facilities. The share of storage and drying capacities and the share of using public warehouses are increasing with growing of the

company's size: while 90% of the micro enterprises and 66% of small enterprises did not use this facility, more than 50% of medium sized enterprises use the system of public warehouses for storage.

According to my results connected to **(H3c)** hypothesis, the role of cooperatives in vertical integration is rather low in Hungary. 62% of the examined sample is not member of any cooperatives or other types of organization systems, 92% of the respondents have never took part in different suppliers' organizations and none of the respondents took part in marketing cooperatives.

According to different activities, two-thirds of raw material producers, secondary processing enterprises and traders have never been the member of cooperatives and other partnership. The participation of primary processing companies in cooperatives was more than 50%, while 75% of input producers indicated that they have membership in cooperatives.

According to company size, it can be stated that 74% of micro enterprises and 58% of small enterprises are not members of cooperatives, while in case of medium sized enterprises this proportion was high (70%).

The increase of the role of cooperatives in the sector could improve the technological and market efficiency of the enterprises, therefore their financial conditions, competitiveness and their independence could be improved, which would have very positive impacts on the whole grain chain. 85% of these enterprises did not use the services of Producers' Organizations, which are very important in the vegetable sector, and only 4% takes part in this system.

My fourth research area **(H4)** was set for the examination of domestic experiences of using and building vertical coordination. I also analysed the role and the possibilities of vertical coordination in the stabilization and the improvement of the relations between players of the grain sector.

The main findings of the literature review were verified by the results of my own survey: there are a few integration forms in the Hungarian grain chain, which are based on common ownership, but their role is not significant. The number of vertical integrations that is operated in more stages of the chain is very low. A common feature of the grain chain integrations is that they are covering only few stages of the chain, namely milling industry, pasta production, baking industry and wholesale trading, and the participation of the primary producers is rather low in these integration forms.

My own researches have demonstrated that the ownership integration processes may last through 2-3 stages of the grain chain, and the number of those who participates only through one or 1-2 stages is very large. It means that vertical integration is not significant in Hungary. According to my research results, there is a very small share of those enterprises and producers who are operated in more than one stages of the grain chain (secondary processing has represented 4%, primary and secondary processing and trade 3%, raw material production, primary processing and trade also 3%). There were no enterprises in my sample who could took part in every stages of the grain chain, that means none of the enterprises could reach the top level of vertical integration.

I verified that the place of the enterprises on the grain chain influences the closeness of their relations, and it has many positive impacts on the risk-taking attitudes and even on the fulfilment of the conditions of the contracts.

I also verified the correlations between the activities of the enterprises and their place in the grain chain and the preferred marketing channels. I also justified that the activities of the enterprises may determine the time length of their contracts (for example, in case of raw material producers prefer short-term and seasonal contracts).

I also detected the correlations between the size of the companies and their bargaining power, which means that those large companies who are at the higher level of vertical integration, have stronger bargaining power in their contracts, while in case of micro enterprises the bargaining power is very low.

Large companies have more influence on the sales price; they may play an important role in the determination while in logistics questions the role of smaller enterprises is stronger.

The correlations between the place in the grain sector and the use of different marketing channels were significant; it means that the place in the grain chain determines the selection and the use of different marketing channels. I also detected a strong correlation between the place in the grain chain and the conditions of the contracts. A significant and medium strong correlation was observed between the place in the grain chain and the risk-taking attitudes.

The fifth area of my research (**H5**) was set out for the assessment of the role of logistics institutions in the grain sectors institutional system and in addition, I wished to describe its main characteristics.

The registering of the different logistic processes between the different parties of the grain chain is very important. In the sample of the surveyed companies, 57% of the respondents determined the date and the detailed stages of transportation and it was more significant in case of input producers and secondary processing companies. The place of delivery was less important in 58% of the sample, particularly in case of raw material producers, input producers and primary processing companies. On the contrary, the place of delivery is an important factor of the contract at secondary processing companies and those with trading activities.

The detailed process of delivery was given in the contracts at 65% of the respondents, and it had less importance only at the raw material producers. The exact place of delivery was regarded as very important factor at 90% of the respondents; therefore it is given in detailed form in the contracts. The name of the supplier was considered as very important information by 80% of the respondents, therefore it is given by their contracts.

The delivery of goods is realized by both the buyers at the sellers (50-50% in the sample), and it is applied for the costs of delivery. When analysing this question according to the activities, it can be stated that in more than the half of raw material producers and 75% of the input producing companies the delivery is realized by the partners, but its costs are paid by the contractor. In processing branches and trade, the contraction parties share equally the transport process and its costs between the partners. Two-thirds of the primary processing companies charges the costs of delivery for the partners.

For the raw material producers, input producers and primary processing companies the place and the name of the supplier is the most important information, which is registered in their contracts. For secondary processors and traders all the information about transport and delivery is equally important, so they are registered in all the contracts.

In summary, according to the examined sample, in business contracts of the grain chain's players the place and date of delivery, and the details of delivery were the most important features of the business contracts. The date and place of delivery were only indicated as significant in the half of the contracts.

As a result of the assessment of my hypotheses it can be stated that the grain chain, as a leading sector of agriculture could improve its present situation and by using the different supports and investments, and by reorganizing the relations the weaknesses could be corrected and the threats might be avoided.

In order to reach these goals, the risk taking and risk handling attitudes of the participants of the grain chain should be increased, and the relations between the players of this sector should be improved. Keeping the disciplines of the different contracts is a key important factor of this process. This improvement process cannot be performed without improving vertical integration, for which the good examples and practice used in foreign countries may be applied.

3.2. New scientific results

The new and novel scientific results of my research work are the following:

1. By a system-based approach I conducted a complex literature review of Hungarian and foreign the grain chain
 - 1.1. I explored the **institutional background** of the grain sector, its main features and present situation; I described the most important market processes of the grain chain in accordance with the principles of new institutional economics and transaction costs.
 - 1.2. I summarized the **vertical relations** of the players of the grain chain in a complex, system-based approach; I summarized the problems rooted in the main features, the risks, the cooperation, the transaction costs and the contracts that characterize this sector.
 - 1.3. I elaborated a complex **SWOT analysis** of the grain chain, showing the possible strategic directions.
2. I summarized the market processes and the main directions of the **Hungarian grain chain** after the EU accession, by analysing statistical data, and I explored the players of the sector and their different background processes through a comprehensive literature review and analysing and assessing statistical data.
3. I conducted an empirical research based on a **questionnaire survey** concerning the whole grain chain, which was the first such type survey in Hungary. I analysed the practical use of the theoretical results given by the available literature sources, and I justified my hypotheses according to the results of my survey. I explored which are the most important organizational and **institutional structures** that are relevant and have high importance in the sector. I also explored the driving forces of these structures and the attitudes of the players of the grain sector towards the building of vertical integration.
 - 3.1. I verified that the use of **contractual relations** – mainly in written form – might lead to better performance, because the uncertain background (weather, uncertain trends, uncertain yields, different attitudes of the market players) might be stabilized by using them. There are huge differences between the different contracts, depending on the activities of the main players. A great part of the contracts is for short term, mainly in case of raw material producers. Long-term contracts mean a closer relation

between the partners, which may be considered as cooperation, in these cases the predictability and the trust is higher which helps the future cooperation as well. A common problem of contracts is the lack of guarantee and security elements.

- 3.2. Based on the theoretical studies, I described the **main features and the problems of spot market**, the conflicts between the sellers and the buyers, the lack of information on prices and demand, the lack of social capital, the problems in changing business partners. These problems are more relevant in small-sized enterprises or producers, because they use mostly the spot markets.
- 3.3. By the results of my survey, I verified that the use of **stock exchange**, as a concentrated market is very low in the Hungarian grain chain. The participants of the concentrated market are mostly the large processing companies; the entry of new producers into the stock exchange is relatively low, because of the high barriers of entry, the quality requirements and the lack of knowledge about the operation of the stock exchange.
- 3.4. According to the results of my survey, I introduced that there are huge differences in storage capacities between the different sized enterprises, and the small-sized farms have disadvantages in this aspect.
- 3.5. I also stated, that registering of the different features of **delivery** – i.e. the place and time of delivery, the stages of the delivery process and the responsible persons – play an important role in the different contracts between the players of the grain chain, mainly in case of raw material producers, input producers and primary processing companies.
- 3.6. I introduced that the forms of **vertical coordination** may be found in the Hungarian grain chain, but their role is not significant. There are a few integration forms in the Hungarian grain chain, which are based on common ownership, but their role is not significant. The number of vertical integrations that is operated in more stages of the chain is very low, and the ownership integration processes may last only through 2-3 stages of the grain chain. A higher level of vertical integration may improve and stabilize the relations between the players of the sector, as the closer connections may have positive effects on the risk-taking attitudes, the realization of contract conditions, and the bargaining power of the companies. According to my research results, **cooperatives** play a very small role in Hungary among the different forms of vertical cooperation.

Vertical integration plays an important role in improving the risk-taking and risk management attitudes, the relations between the players of the grain chain and in keeping the contractual disciplines.

4. CONCLUSIONS AND RECOMMENDATIONS

The empirical research areas of my research were connected to the different elements of the institutions of the grain chain. My hypotheses were formed for the spot markets, the concentrated markets, the hybrid institutions (particularly for contractual relations and cooperatives) and for the forms of vertical ownership integration and supplementary institutions.

Analysing my hypotheses and the chosen areas of my research, it can be stated that most of the hypotheses were verified, only a small part was rejected and some of them was partly verified.

Based on my research objectives and the results of my research I make the following conclusions and recommendations.

Most of the participants of the grain chain are operating at raw material production, as micro-enterprises, without employees and they have a very weak bargaining power. They represent more than the half of the enterprises of the grain chain, therefore an increased emphasis should be put on this group, their main characteristics and problems, in order to keep the balance and improve the operation of the whole grain chain.

In the examined enterprises the management generally has 6-10 years long management skills, they have mainly higher education certificate. In case of raw material production, the manager and the entrepreneur is generally one person, and (in 17% of the sample) their age is over 61 year.

In the past few years, the uncertainty of the yields has increased because of unfavoured weather conditions. It was caused by summer droughts (in 2007 and 2012), while in 2010 the extremely high precipitation caused huge problems which caused serious impacts on the raw material producers. The decrease of the producers' prices the efficiency of production should be improved or cost savings are needed. The increase of yield prices are much less than the increase of input prices. The efficient grain production may be realized through intensified production, technological development and the improvement of the knowledge and skills of the human resource. According to the economy of scale, only those farms could be profitable in grain production, which have more than 100 hectares of land, which cannot be reached by most of the raw material producing farms.

In the relationship of input production of the grain sector, mostly the contractual relations are dominant, mainly between the raw material producers and primary processing companies (in mill and feed industry) besides the spot market channels. By using contracts, the producers may decrease the price risks and improve their marketing possibilities. Most of the players recognized the importance of contractual relations, its risk avoiding and cost decreasing role, by which the efficiency and the quality of production may improve and it also may develop the coordination between the different production units.

The lack of contractual discipline may also raise the risks of the producers. This problem is considered as one of the greatest risks besides natural risks. The most important problems in contractual relations are the lack of guarantees, and the legal procedures of solving the problems in the contracts are very long and complicated process.

The most important problems are about quality and quantity debates, and the delays of delivery and fulfilment of the contracts. The main reasons of these problems are the lack of capital, financial problems and the uncertain supply and demand.

In Hungary, most of the contracts do not deal with the risks of price volatility and the different types of guarantee. The reconsidering of the contract conditions is also missing from the Hungarian system

The participation of raw material producers in cooperatives is rather low, although these organizations with the collaboration of their members may help the producers in different fields, such as marketing and technological development and may improve their efficiency, profitability and competitiveness. Cooperatives in Hungary have low capital and their access to financial sources is limited. The trust and cooperating attitude of the possible members is very low and the problem of black/grey economy is a real threat for them. The increasing of the bargaining power of the producers could generate very positive effects for the sector and the whole grain chain.

The role of cooperatives in vertical integration is important for strengthening the position of their members, i.e. the producers. Cooperatives offer not only economic but also social advantages for their members, which is well known in western countries and should be taken into consideration in Hungary as well. The different producers' groups and organizations may lead towards this process and could improve the bargaining power of the producers.

Those forms of integration are more favourable for the producers, where the integrator does not fix the production structure for long terms and the balance between the integrator and the integrated participants may be kept. Without solving certain problems (namely, inadequate quality of raw materials, isolation from the market), the risks of vertical integration may increase.

Those integration forms also may be found in the Hungarian grain chain, which are based on common ownership, but their role is not significant. The number of vertical integrations that is operated in more stages of the chain is very low, and the ownership integration processes may last only through 2-3 stages of the grain chain, mainly in milling industry, pasta production, baking industry and wholesale trading, while the participation of the primary producers is rather low in these integration forms.

The building up of vertical integrations is very heavy process in Hungary, because of the lack of adequate contracts. Finding new partners, building long-term cooperation, specific investments may raise the problem of additional transaction costs for all the players.

Based on the SWOT analysis of the grain sector and the abovementioned facts, it can be stated that the grain chain, as a leading sector of agriculture could improve its present situation and by using the different supports and investments, and by reorganizing the relations the weaknesses could be corrected and the threats might be avoided.

In order to reach these goals, one of the most important tasks is to improve the information level of the enterprises by which the lagging of small-sized enterprises and farms may be corrected. The optimal solutions could be to build relations based on medium- and long-term contracts.

In my opinion (for example for avoiding the unfavoured effects of weather the risk taking and risk handling attitudes of the participants of the grain chain should be increased, and the relations between the players of this sector should be improved. Keeping the disciplines of the different contracts is a key important factor of this process. This improvement process cannot

be performed without improving vertical integration, for which the good examples and practice used in foreign countries may be applied.

In the course of my research work, I explored such practical experiences, which help the cooperation and the work of the participants of the grain chain, and their future business connections and economic performance.

I suggest further researches in order to explore the future situation of the examined factors, the improvement of contractual relations, and the way of the players of the grain sector towards the new stages of vertical integration. An actual reason of the further research is that the financing period of the CAP ended in 2013, and it is worth to assess the present situation and the future prospects (for example the impacts of the new support system) of the grain sector according to the new regulations.

5. RELATED PUBLICATIONS

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1. **Majóczki-Katona Sz.**, Markó O. (2013): Improving Competitiveness of Agricultural Companies by Human Capital in Hungary. In: Cs. B. Illés, F. Bylok (eds.): *People, Knowledge and Modern Technologies in the Management of Contemporary Organizations – Theoretical and Practical Approaches*. Szent István Egyetemi Kiadó, Gödöllő, pp. 43-55. (ISBN 978 963 269 399 6)

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