

THESIS OF DOKTORAL (PhD) DISSERTATION

UNIVERSITY OF WEST-HUNGARY

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**PROSPECT FOR HUNGARIAN POULTRY MEAT
PRODUCTS**

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2004.

1. Preliminaries and objectives of research

The changes of the 1990s significantly transformed market circumstances, and poultry product producers and processors found themselves among completely new conditions. While before the change of regime the central regulation greatly influenced and limited the scope of food industry and poultry product producers as well, now, when the market regulates the food industry, they have to carry on a fierce fight for export markets. As the role of state decreased not only the public market mechanisms became more important, but – because it lead to some kind of imbalance – it seemed necessary for the state to intervene, but now in another manner.

In the meantime Hungary is joining the European Union and needs to meet numerous new requirements, such as market, biological, hygienic, environmental protective, etc.. On the one part these new challenges are useful because they help to be more successful on international markets, on the other part to some extent they can cause a greater defencelessness, which aggravates the situation of firms and makes it necessary to rethink their strategy.

Preparations for being able to hold out on export markets are made in different ways in case of firms which are completely or only partly or not at all owned by foreign companies. Moreover a completely different strategy is needed for small and middle-sized companies, for companies producing only for domestic market or both domestic and foreign market and for companies having a wide range of products, different product categories or concentrating only on some products.

The object of my research was to survey the competitiveness of domestic poultry product producing companies, their possible markets and the position and possibilities of the collective marketing used on the market. In my analysis I tried to signify the most important facts which basically influence the environmental circumstances of the sector and its position to be expected, and those basic qualities and competences which are to the sectors advantages over its competitors. I examined the influences of joining the European Union showing the possible advantages and disadvantages. I also examined the market positions, the strategies and the collective marketing activities of our competitors. I compared my result with the domestic practice.

The primary aim of my thesis was to investigate the circumstances of domestic poultry products, to show what preparations the sector made for the joining of the European Union, how the sector wants to take the linking advantages, whether the sector is competitive on the traditional export markets of Hungary, whether it is possible to gain new markets, and what steps the sector took to be able to keep up with its competitors.

In the first chapter I put great emphasis both on survey of the literature on competitiveness and market research and segmentation and on elaboration of the literature on collective marketing. Further I studied the topic adapting Porter's diamond-model to the sectors level.

2. Material and method

The amount and composite of poultry product export of Hungary greatly changed during the last decade. Besides the regular players of the international meat market, new players appeared, the group of considerable buyers also changed and the buyer's demands transformed, too. The hygienic, cost and marketing factors which greatly influence our chances on foreign markets were appreciated more.

The objective of my research was to help the future development of Hungarian poultry products by revealing their producing and processing and also the possibilities and positions of their export market sales.

My research – basically following Porter's diamond-model – includes the following areas:

- the position and cost analysis of raw material production, comparison of the results with those of the competitors
- the position and cost analysis of poultry proceeding, comparison of the results with those of the competitors
- the position of horizontal and vertical integration in the sector, comparison of the results with those of the competitors
- examination of the world's meat market, determination of the expected changes in poultry meat demand and supply
- survey of the tendencies and the world market of poultry products and
- examination and determination of the existing and possible markets of Hungarian poultry products
- cost analysis and examination of price-competitiveness in relation to the export, comparison of the results with those of the competitors

- the results to be expected of our joining the European Union and the possible effects of the changing regulations on the poultry meat export
- position of the organizations and applications of collective marketing, comparison of the results with those of the competitors

The method of the survey: Examination and analysis of the domestic and international statistics, customs tariff and special literature as well as processing the information obtained from the interviews with leading members of poultry enterprises, firms and organizations (Hungarian Poultry Product Council, processing industry and breeding) with “on desk” method.

The scientific research which forms the basis of my dissertation was done by the method of primary research based on my own collection of data and by secondary research based on previously existing stock of data.

The period of the survey: The dissertation is based on the data to be found between 1998 and 2003.

Security of data: I tried to get the data from different sources and compared them. In case of significant differences I consulted the well known authority of the given field. In case of smaller differences I averaged the two (or three) available data. When during the research new, more precise data came out I corrected my calculations.

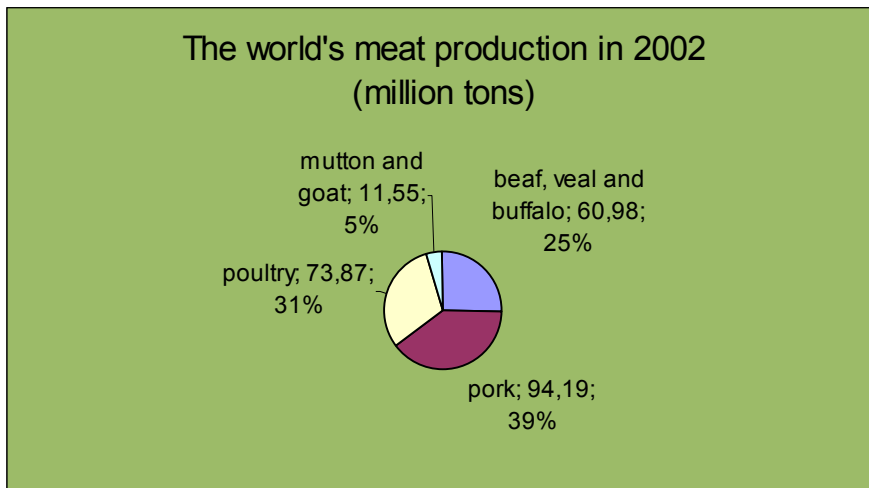
3. Results

3.1. Market positions of poultry products

3.1.1. Supply on meat market

To be able to illustrate the supply part, it is necessary to write not only about poultry meat production but about market position of the substitute products as well. In the domestic and international special literature the market of vegetable products is separated from the market of meat products. Vegetable products are not considered as competitors or substitute products, but as complementary products. According to this fact the chapter begins with the presentation of the world's meat production following the classification accepted in the statistics.

Figure 1



Source: FAO

The world's meat production is steadily rising: between 1997 and 2002 the world's production increased with 13,8 % and by the end of the examined period it reached 245 million tons. The Figure 1 shows the production volume of 2002. As it can be seen poultry is the second biggest share of meat with its 30 % quota.

The two third of production falls to North-America and Asia, but South-America is also present on the market with a significant and increasing production. The supply is always defined by the area's dominant market.

The supply of poultry products is influenced by the next determinants:

- the ability of poultry products and the demand (considering production rotation)
- costs of inputs (labour-power and feedstuff)
- technological development (breeding, raising, feeding and processing)
- biological security (illnesses, infections)
- suitable managing skills (on the level of producers and integrators)
- market position of the competing animal products

3.1.2. Demand for poultry meat

The poultry world market seemed to be overstocked at the turn of the millennium. The reason for that is that production showed a definite increase at the term of the millennium and even the fairly dynamic rise (5 % until 1998, later on an annual 3 %) in consumption wasn't able to compensate that increase.

The main reasons for growth:

- increasing consumption
- changes in regional consumers' preferences
- reducing trade restrictions

The biggest consumers are Asia, North America and Western-Europe. More precisely they are China, The United States and within Europe Great Britain, France and Germany.

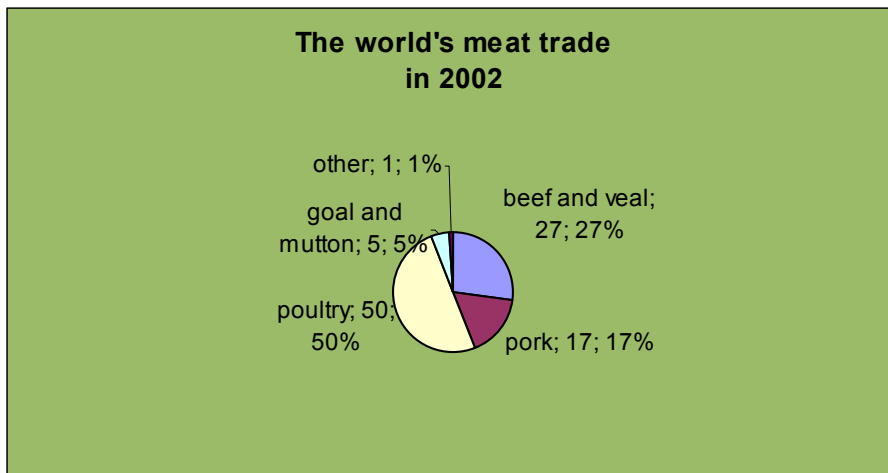
The demand for poultry products is influenced by the following determinants:

- economical and demographical determinants:
 - income
 - population
 - price
 - price of substitute products
- personal, cultural determinants:
 - attitudes, opinions
 - lifestyle
 - health considerations
 - environmental protection
- marketing determinants:
 - product placement
 - price
 - communication
 - retail trade
 - catering service

3.1.3. International trade of poultry meat

Poultry product trade constitutes the 50 % of world meat trade (Figure 2). The international trade of poultry products greatly become lively during the last ten years (with an annual 6 % on an average), and not calculating the trade within the European Union it gives about 11 % of the world's production. However in the future the pace of trade growth will slow down to an annual 3 % , but the rising tendency will probably continue.

Figure 2



Source: FAO

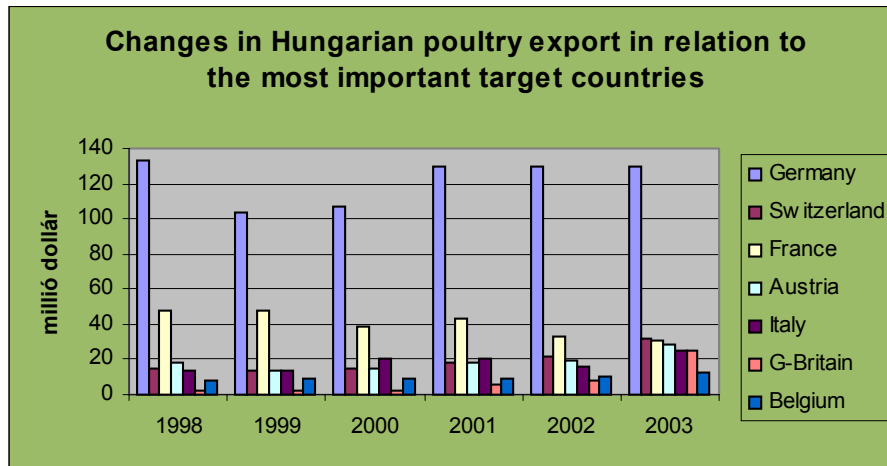
The biggest exporter of poultry market is the United States with its annual 3 million tonnes, which is delivered to Russia and China. The most dynamically developing exporter is Brazil which exported 631 thousand tons at the beginning of the examined period and 1,4 million tons in 2003 first of all to the Asian and European markets. China has also got a considerable export (annual 420-520 thousand tons) mainly to Japan. Further important exporters are the European Union and Thailand.

The biggest importers are Japan, Russia (in the 1990s it increased its import with 60 %) and China. The biggest deliverers to the Japanese market are China, Thailand and Brazil, while to Russia the United States is dominant and it covers the majority of the Chinese/Hong Kongese market as well.

3.1.4. Export conditions and markets of Hungarian poultry sector

Within the examined period the value of domestic poultry meat export was between 250-320 million USD. The product export was between 25-27 million USD. The export income was greatly influenced by the prices. Sometimes 20-30 % tolerance was realised.

During the examined period the product pattern of Hungarian poultry export underwent a significant change. The share of chicken export greatly decreased (12 %), turkey increased (3 %), goose maintained its position while duck greatly increased (5 %). Processed products realised a significant rise in income (5 %). Studying the export proportion of whole, boneless and sliced products by poultry species we get similar results in case of chicken products, while in case of turkey Hungary exports only – more than in 80 % – boneless products. Looking at goose the export of whole (36 %) and sliced but bony (57 %) products is important, and the export of boneless products is smaller. In duck export the proportion of sliced, processed products rose significantly.

Figure 3

Source: KSH, Kopint-Datorg

The most important export market of Hungary is the European Union (75 %). Three fourth of our product export, practically the whole goose export, the majority of liver and duck, 75 % of turkey and 70 % of chicken goes to the European Union. Out of the Fifteens Germany, France, Austria, Italy, Great Britain and Belgium are our most important buyers. Switzerland and Japan are also important buyers. Out of the Eastern European countries Romania, Russia, the Czech Republic, Slovakia and Ukraine buy smaller quantities accidentally. Our market share is 30 % in Austria, 29 % in Switzerland, 6,8 % in Germany and 4,5 % in France. Looking at the eastern countries it is 10 % in Ukraine and 0,5 in Russia.

3.1.5. Conditions to be expected of poultry products market

According to the most famous and well-known institutes dealing with agricultural predictions (FAO, FAPRI, USDA and OECD) in the 2003-2012 period producing and consumptions of poultry meat will

continue growing. The expected growth in production is 18 % in the USA, about 3million tons, and 8 % in the European Union, about 550 thousand tones. Production and consumption of the European Union – the Fifteens – will increase only with 4-5 %. In Hungary the increase in consumption can reach 18 %. Because the increase in production and the consumption geographically do not mach, intensive growth in trade can be expected mainly for Brazil and the USA.

3.2 Competitiveness and its determinants

3.2.1. Main characteristics of the world's poultry production

In my opinion the market attitude and competitive position of the leading countries in poultry world trade are influenced by three determinants:

- concentration, globalization
- enforcement of advantages in relation to the price, costs and productivity
- the existence, type and change of export subsidy in connection with international trade agreements

Strongly centralized production is a feature of big producers and exporters. The 5 biggest companies of the USA have got 54 % of the production, in Europe the 10 leader companies have got 33 %. Within the European Union in some countries (in Ireland, Denmark and Sweden) this index is 75-80 %, or it is typical to have a chain covering more countries. Besides market concentration it is also characteristic to have capacity concentration. In the European Union 10 producers

cover more than 50 % of the market. In Brazil the concentration falls behind the concentration of the USA, but it is considerable.

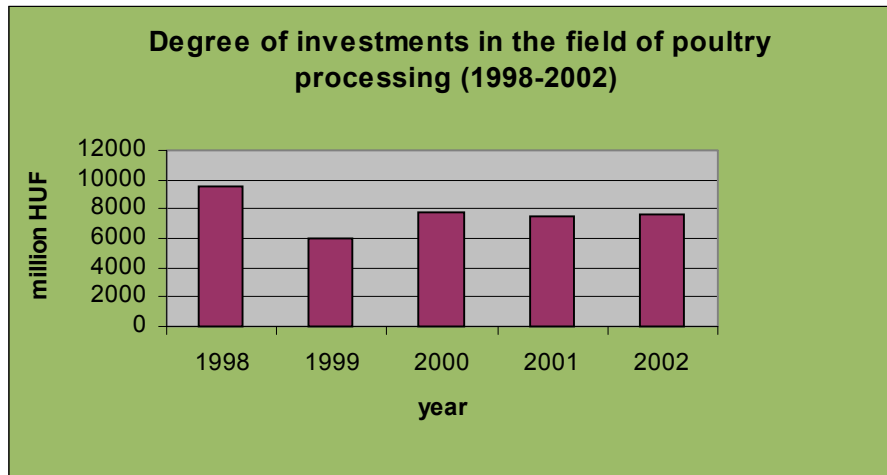
3.2.2. General features of Hungarian poultry sector

Poultry processing for export markets takes place in the biggest factories. There are only four really big factories – which are only of medium or small size in terms of the European Union – but besides these about 100 firms are engaged in poultry processing. In the sector the level of concentration does not fill the internationally expected requirements, and as the two leading companies are becoming weaker the decrease in concentration will continue. The average of the foreign capital is 36 %, which falls behind the average 55-60 % of the food industry. There is no specialization in case of bigger companies. There are only two-two slaughter-houses specialized in chicken and turkey slaughtering. All the others slaughter not only chicken but turkey and/or goose and duck as well. The smaller ones usually specialize in one species.

In case of vertical integration there is a significant lag. The integration is realised by species at different levels. In Hungary the integration is organized mainly by slaughter-houses according to the European trend. Only in case of water-poultry can we talk about a real, a European kind of organization.

The capital supply of the sector is low (33-35 %). Important investments were realized only in the processing industry.

Although the processing industry works with modern technology, they mostly use the inherited buildings. Unfortunately utilization is only 60 % due to the inefficient capacity concentration.

Figure 4

Source: KSH

3.3 Competitiveness

3.3.1 Natural competitiveness

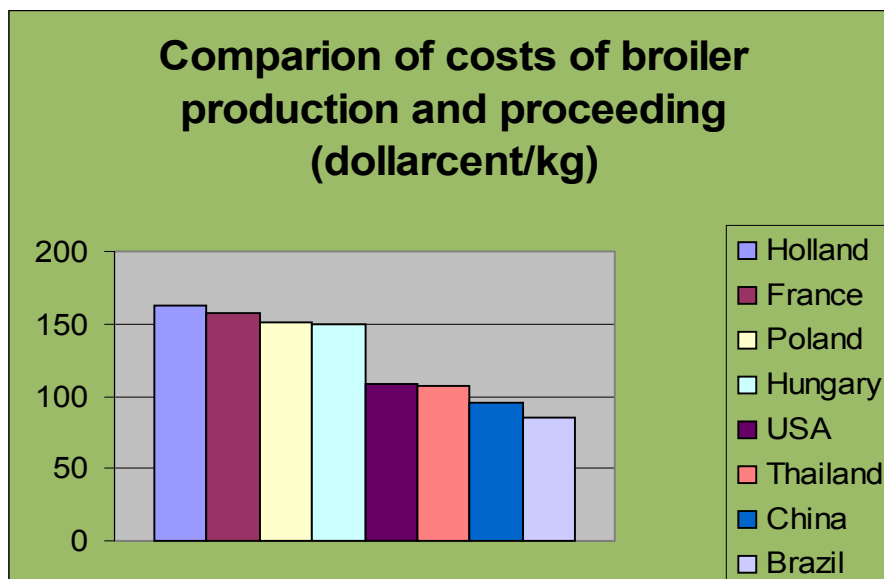
The output of poultry processing industry and the efficiency and quality of production are basically influenced by the price quality of raw material and the level of organization. According to expert opinions, considering the breeding stock of international integration origin, the genetic basis is good. Utilization of the fundamentals is only about 70 %. What is more, feed consumption and death is higher, slaughter weight is lower. The reason can be on the one hand the composition of feedstuff, on the other hand the technological lag caused by unrealized improvements. This structure results in low profitability and further postponements of improvements. Slaughter stuff production is very disintegrated, bigger than 50.000 establishments can be found in 34 % of agricultural organizations, while only in 0,5 % of individual farms.

From the point of view of different species generally we can conclude that considering the production of 1998 as a base the duck (+56,4 %) and turkey (33 %) production is outstanding. The position of goose (+11,1 %) is not so successful, but altogether it is not bad, while broiler (-2 %) has gone back.

3.3.2 Competitiveness and costs

In poultry industry, like in the sectors, one of the most important determinant in competitiveness is production cost, in which the favourable and unfavourable natural fundaments, the level of integration of organization, the cost of labour force, etc reveal themselves. In international comparison Hungarian broiler cramming and slaughter are weaker in case of big producers, but they produce at an acceptable level on the European market.

Figure 5



Source: AKII (2001)

Studying the influence of changes in costs in case of four export product groups the result is quite mixed. A significant rise in cost was caused by the rising prices of raw material. The efficiency was greatly influenced by the stopping of subvention, or the changes, mostly the decrease of subvention on the world markets. Altogether we can conclude, that mainly the sale of cut-up products was profitable, and in the prices of whole poultry – except duck – only a part of rise in cost could be enforced. Goose liver, bony chicken breast and goose breast were profitable.

In different firms the processing costs can be different in case of same products. One cause of the differences is the diverse use of capacities, resulting in specific cost differences, and the slaughter composition. The running of mixed processing firms results in higher specific costs than the running of specialized slaughter-houses, on the other hand the mixed feature can contribute to better utilization of capacities and distributing the current expenses. However the level of participation in integration is also a determinant.

3.3.3 Price competitiveness

Hungarian exporters are in a price following and accepting position apart from some duck and goose products. Our biggest partner is the European Union, but our highest prices are reached in Switzerland, and in case of goose liver in Japan.

Studying the internal and external suppliers to the European Union and the most important products to us our price competitiveness draws a mixed picture. Comparing to the internal suppliers of the EU we obtained a lower price in case of goose products, while in case of frozen turkey pieces and reprocessed products containing 57 % poultry meat

we were able to reach a higher price. Comparing to external suppliers we could reach a higher price in case of more than half of all the products, which is a good result.

3.3.4 Our comparative advantage

Our comparative advantage is outstanding (above 500) on the basis of the internationally accepted RCA-index, within the examined period it decreased 7 %, its tendency is constant.

3.4 The influence of foreign trade regulations

3.4.1 Subsidies

Those countries which have a leading part in poultry export are extremely varied if we look at whether they subsidize the export and to what extent. The agreement of GATT membership countries signed on 15th December 1993 changed the subsidy system to their very foundations.

The USA aids poultry export only to the consignments to the Near-East, Egypt and Singapore. Brazil gives no subsidy at all and what is more from the middle of the 1990s the Brazilian exporters have had to pay 6% export duty above the FOB price. The government of Thailand gives some export subventions but that is not too much, a little more than 1 % of the export price. However as a result of the WTO agreement, the competitive advantage of the USA, Brazil and Thailand is rising in the regions outside the European Union, which could felt even in the last third of the 1990s. In 1998 almost 60 % of the export of the European Union went to the market without any subsidies. The experts

of the European Union think that only 30-35 % of poultry export will be subsidized by 2005.

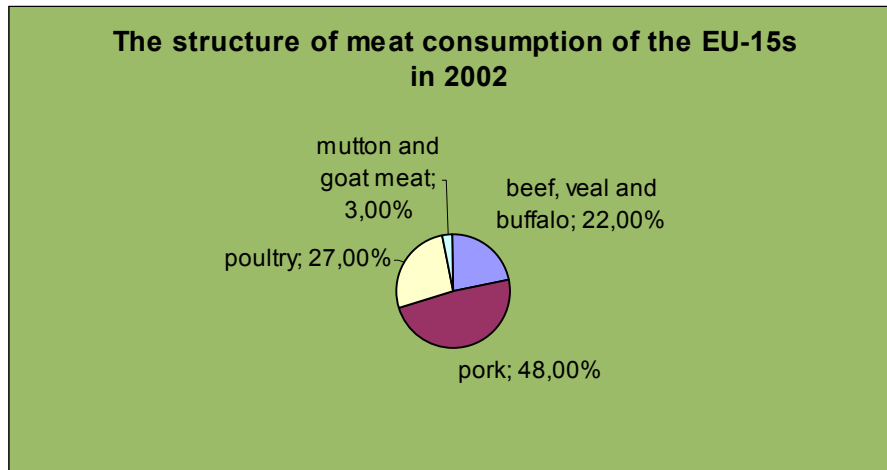
The double profit agreement with the European Union has been valid since 1st July 2001. After our joining the European Union the WTO agreement concerning outer markets will be incorporated into the common subsidy quota of the European Union, so we will be able to export to other outer markets under modified economic circumstances. Export subsidy covers only a quite narrow range of poultry products, in fact it is given only to frozen chicken products.

3.4.2 Duty protection and the effects of its changes on competitiveness

An insignificant amount of our poultry meat export went into the countries joining the European Union together with us. Basically we export turkey and duck products and reprocessed products into this group of countries. The customs tariff rate is high, so its abolition can have a positive effect on our export, it can open new markets. In case of third group of countries we also have to follow the European Union's agreement. 19 % of our export goes into these countries now. The changes have a negative effect mainly on our export to Romania, Croatia and Bulgaria.

3.4.3 The European regulation system

The structure of meat consumption in the European Union (Figure 6) is slightly different from the world's proportions. In Europe people eat relatively more pork and less poultry; however the proportion of the poultry is still 27 %. Poultry meat for sale is produced first by the broiler sector, secondly the turkey sector.

Figure 6

Source: Ofival 2003

The European Union treats poultry sector as a so called light market regulation sector. The base of the agricultural policy lying underneath is that when the grain market is controlled well, the competition relations of stock-breeding (pig and poultry raising) based on the grain market can be left to the players of the sector, to the market itself.

According to this policy light market regulation means the use of three means:

- collecting information, price monitoring system (every week the European Union Committee publishes the prices of the “A” level 65 % chicken on the so called representative markets)
- regulations of poultry trade (packing, the labels on it, other useful information , etc)
- trade regulations (export repayment, customs information)

3.5 Collective marketing, marketing strategy

3.5.1 Marketing activity of the competitors

Collective marketing of the USA works with very well built up organizations, effective financing and well established system of means all over the world. The basis of their export strategy is to take the maximum advantage of the differences between the climate structure of the domestic market and the biggest importers.

In the target countries Americans have established joint ventures to keep on the continuous market presence. They have carefully built up their export enhancement system covering the whole world. This network is supervised by the Foreign Agricultural Service (FAS), and a lot of regional non-profit organizations are its members. Each member depends on the development of the sector and the growing export results. Besides its US offices it runs independent USAPEEC branches in Mexico, Singapore, Japan, Hong Kong, China and Germany. The Council effectively helps its members. Its services are for example buyers guide, exhibitions, trade leads and passing on MAP programmes to the members.

MAP names 3 main subsidy categories. The first of them is taking part in trading exhibitions, the second one is marketing actions at selling places, and the third one is market research activity. Candidates can apply for the subsidies every year. The basis of judgement is that the application should be in agreement with the MAP's main intentions and fundamental principles (such as cost sharing, strategy planning, export targets and activity).

In Thailand's agriculture the leader is poultry sector, so they have worked out their export marketing strategy in accordance with this

fact. This strategy stands on several legs. At the beginning of the '90's they decided to expand the export of oven-ready products. To be able to keep on their export capability they even used currency devaluation, they established a common export organization which coordinated 80% of the export, and they also had strict quality control and diversified the market. Thailand's product development programmes totally depend on the requirements of the target markets.

Thai government helps with administrative measures to keep on the competitive and growing export. Broiler exporters get refund from their import duty of feeding stuff. The state banned the import of those antibiotics the use of which is internationally unacceptable. The veterinary directions are very strict, they require meat control before and after slaughter, that is why problems caused by remaining drugs have disappeared.

The export strategy of Brazil is quite similar to Thailand's. Its most important elements are market diversification and fulfilment of the rising climes for oven-ready products. They focus on entering alternative markets. They also do their best to get to know and satisfy the special requirements of the selected markets according to the directions of the export organizations of the sector.

Export enhancement and establishment of market organizations are helped by the government in Brazil, too. The Department of Trade Development (DPC) of the Foreign Office (MRE) is in charge of the export enhancement programmes, and employs 117 trade assistants in the embassies. This department (DPC/MRE) supplies studies on the sector, data of market research and statistics.

SEBRAE is the most important marketing organization of the country, which was established with the help of the government, and

which is financed by that 3 % which is deducted from the sector's incomes. As a result of their work more than 26.500 members took part in export in 2000. SEBRAE runs educational and financial courses for its members, helps them to exhibit successfully and does standardised market research for the smaller enterprises which want to export.

The export enhancement programmes of the sector are organised by the Association of Brazilian Poultry Exporters (ABEF). Trade organizations which represent the sector also looked after business federation duties and lobbied for the sector, however nowadays their most important activities are opening new markets and marketing.

The EU hasn't worked out a unified marketing strategy. Member states arrange their marketing policy themselves by their marketing organizations. Naturally they can apply for subsidy of the agricultural funds to finance marketing activity.

In the EU export and domestic marketing strategy are nearly the same. Determinant elements of the product and brand strategy are the growing production and selling of high quality, oven-ready and comfort products and also the augmentation of the rate of labelled, name-brand articles. The other important strategy aim is the vertical and horizontal concentration of the capital. On the market of oven-ready products which need a very complex processing these big, integrated companies are able to save a significant amount of costs due to big series.

3.5.2 The position of collective marketing in Hungary

In Hungary each poultry processing firm has built up its own organization which sells on foreign markets. For the moment the exporters refuse to establish a collective marketing organization. That is the

reason why companies are present on foreign markets one by one. They undergo each other's prices, so importers play them off against each other and keep the prices low, which is against the whole sector's interests.

Because of the lack of agreement between companies a well built up, unified brand policy cannot be used even in case of those products which enter the retail trade without any changes (for example pre-cooled and frozen bratfertig duck, goose).

The Agricultural Marketing Centre (AMC) was set up to organize domestic agricultural marketing and collective marketing of the agricultural industry. Its budget comes from state subsidy. AMC is in touch with the market players of the sector through the product council. Because of its narrow budget AMC cannot ensure a high level marketing background for all the areas, it works on the basis of the applications of organizations. They concentrate on domestic market rather than on export markets.

From AMC's fields of activity exporters can apply for:

- general marketing support (market research, shaping up marketing strategy, compiling and distributing publications, etc)
- marketing assistance of particular products (making possible to participate on exhibitions and at fairs, organizing sales campaigns, publicity campaigns and business meetings)

AMC will not be able to conduct marketing campaigns of great importance because of narrow means and lack of willingness to cooperate until the interested parties become aware of the opportunities provided by marketing and are ready to give financial support. Another condition of AMC's effective activity would be that the Parliament

should make the Agricultural marketing law. In case of big exporters domestic trade diplomacy supplies data, but the exporting companies do not really use intensively these services.

Export marketing is poorly organised. Companies cannot follow the product as far as the final consumers, because the buyers are exclusively importers or wholesalers. Mostly the importer provides the packing, or even repacks the product, so companies do not export under their logos. Hungarian poultry industry does not have its own face and packing on consumer's market. Against the professional background of AMC and due to the uninteresting of the parties we could not see traditional export marketing strategy and collective marketing within the examined period.

4. New and novel research results

On the basis of the thorough examination of the areas influencing poultry meat export which have been specified in my thesis the following facts can be established.

- 1. The competitiveness of poultry export is mostly influenced by the concentration and technological development of the production of slaughter raw material, therefore the modernization cannot be put off further.**
- 2. In the interest of cost efficiency it is necessary to increase the size and decrease the number of processing plants.**
- 3. Breeding, cramming and processing are most concerned to extend the vertical and horizontal integration, which can establish their long term cooperation.**
- 4. To be able to export successfully it is necessary to make use of the opportunities of collective marketing financed by those who are interested in the sector.**
- 5. The examination of competitiveness of the products and export data show that processed and reprocessed products are getting ahead.**

- 6. Turkey and water-poultry products of Hungary are market leaders or on the second place on our most important market, in the European Union. However there has been a fall in prices for the last two years mostly because of domestic overproduction and climbing of German production, which is worth paying attention.**

- 7. In consequence of our joining the European Union our export chances to the bordering countries will significantly change. We might give up our southern markets because of the lack of quota. However we can aim at the joining Czech, Slovak and Polish markets having a fair chance of success.**

5. Recommendations for theoretical and practical use of results

- 1.** The thesis draws the exporters' attention to the exploitation of the advantages coming from the changes of market regulations at the joining of the European Union and also to the solution to financing collective marketing and development of export marketing. To be able to prevent the market price cuts the thesis suggests developing vertical integration and fixing minimal prices in order to protect themselves and their deliverers.
- 2.** Concerning raw material producers the thesis suggests closing down the plants which use old technology, modernizing technology and concentrating breeding, whereby efficiency can be increased and price level decreases. The thesis also shows the importance of renewal and state assistance.
- 3.** Concerning processing the thesis sees the possible improvement in increasing the slaughter capacity of firms, concentration of slaughter houses and giving priority to development of more raw or reprocessed products. However it is necessary to organize vertical integration with raw material producers, to take part in collective marketing programmes and to develop horizontal integration in order to improve export conditions.

6. Scientific papers, publications and lectures in the topic of the dissertation

Scientific papers published in supervised professional periodicals in Hungarian language:

1. Remsei Sándor – Szabó István: A világ nagy baromfiexportőreinek marketingstratégiája Acta Agronomica Óváriensis (to be published)
2. Remsei Sándor – Németh Anett: A baromfi világpiac és a hazai export, Gazdálkodás (to be published)

Publications in foreign language:

1. Remsei Sándor: The Hungarian poultry sector on its way up again, World Poultry, No 9 Volume 18, 2002
2. Remsei Sándor: Collectiv marketing organizations and strategies in poultry sector, Acta Scientiarum Socialium (Tomus XVI./2004)

Presentations, consultations, and scientific works:

1. Remsei Sándor: Hazánk baromfitermékeinek exportpiaci lehetőségei, XXIX. Óvári tudományos napok: Előadások és poszterek 192. oldal (összefoglaló CD ROM, agrárökonómiai szekció (teljes cikk), 2002. október 3-4.
2. Remsei Sándor: A csatlakozás hatása a baromfiszektorra, Bálbolnai Gazdanapok 2003, október
3. Szakmai vita az Európai Unió csatlakozás magyar mezőgazdaságra gyakorolt hatásáról, Agrárgazdasági Kutató és Informatikai Intézet, 2004. április 14.