

## Struggle for Leadership: The Competitiveness of the EU and US Food Industry

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## **Abstract**

### **Introduction and goal**

Globalization is an important issue in the food industry, although most food is still locally produced and consumed. Many small and medium enterprises characterize the industry. Results of WTO negotiations intensify the international competition, in which the EU and USA are the largest players. Countries like Brazil, India and China are gaining market share. This raises the following research questions:

1. How competitive are the EU and US food industry and their sub-sectors?
2. Which role plays innovation and legislation in the competitiveness of the industry?
3. How will the competitiveness develop under future globalization and trade liberalization?

The goal of this study is to fill these knowledge gaps.

### **Methodological framework and data**

The external analysis, addressing *research question 2* describes the developments in the external environment of the food industry, such as international trade policies or the concentration of supermarkets. The internal analysis, addressing *question 1*, is the core of this study and deals with the assessment of the competitiveness of the food industry. The competitiveness is measured with five indicators based on an international economics approach:

1. Growth in real value added of a specific industry in the total food industry reflects the competition for labor and capital between different industries within a country.
2. Growth of the Balassa index reflects the export specialization level in one category of goods from one country.
3. Growth of the export share on the world market and reflects the competition performance. The growth is the absolute deviation -not an annual growth- and considers the market size.
4. Growth of the labor productivity affects the unit labor costs and by this, relative prices.
5. Growth of real value added, as major economic indicator reflects industrial dynamism.

The European food industries are benchmarked against other important competing countries: US, Canada, Australia and Brazil. A benchmark recognizes that the lowest negative growth figure will be classified as strong if all other countries have higher negative growth figures.

The future developments of the food industry competitiveness, addressing *question 3*, are assessed by the general equilibrium model of the Global Trade Analysis Project (GTAP).

Main data sources used are from official statistics: Eurostat (Structural business statistics), the UN (Comtrade) and on comparable sources from e.g. the US Census Bureau. The selected global competitors are based on an analysis of the export market shares. Relevant countries, like China or India could not be studied, due to lacking data on industry level.

## **Results**

The US food industry outperforms the EU in terms of competitiveness. The EU food industry is also weak compared to Canada and approximately at the same level as the Australian and Brazilian industry. Scenarios show that unless the productivity growth in the EU is higher than in the rest of the world, the EU competitiveness will remain weak. The US food industry is strong in economies of scale and in labor productivity. The EU is weak on these indicators. US-firms have competed for a long time in a large market, which resulted in more concentration than in Europe. US labor markets are more flexible. Only the EU competitiveness of the sub-sector processed fruit and vegetables is stronger than the US's. Brazil is relatively strong in meat, oils & fats and sugar. The findings of this research are surprisingly positive for the system of EU food legislation in general. EU based food managers consider it not as a major factor hampering competitiveness, nor is the EU system seen as inferior to the US-system.

## **Relevance**

Due to its empirical character, the results of this research, which has been carried out for the European Commission, are highly relevant for (American) professionals working in policy and industry. It provides them with an actual assessment of the competitiveness, of the food industry's environment and of future developments. This study, which included and benchmarked all sub-sectors of the food industry, is unique as far as known. The research methodology used is solidly based in International Economics. The paper can be used for a discussion among academics on pros and cons of various indicators. As (international) companies compete and not countries, discussion might be expected on the value of using additional concepts from Industrial Economics, Strategic Management or Marketing.

## 1. Introduction and goal

The food sector is experiencing a period of structural adjustment. Consumer preferences are having an increasing impact on the industry as a result of income developments, shifts in the population structure and new lifestyles. Globalisation, liberalisation of world trade and agricultural markets and emerging markets (e.g. India and China) are a second category of impacts. And major changes in technology, including information technology and biotechnology have led to new products and new methods of organising the supply chain. In the European Union (EU), the food industry is an important sector: 11% of total manufacturing value added.. It is characterised by a considerable diversity of firms and products. Small and medium-sized enterprise (SMEs) play an important role in addition to a relatively small number of very large, often globally operating, companies. On one hand, the food industry is relatively traditional, while on the other hand it implements advanced technologies. All these factors influence the development and competitiveness of the European food industry. With *the Lisbon-Göteborg Agenda*, the EU aims to make the EU economy the most dynamic, innovative and competitive in the world by 2010. However the benchmark report of the CIAA (2006) describes the deterioration of the food industry's competitiveness.

In the US the food industry is roughly of equal importance in the national economy as in the EU (1.7% versus 1.9% of value added in 2003). However the industry is less important for employment (1.3% versus 2.2% in the EU), and enterprises tend on average to be larger. The US food industry is traditionally export oriented and shares many of the major challenges in international markets and technology with the EU food industry.

This situation raises the following research questions on the European food industry's competitiveness, which are also relevant for the US food industry:

1. How competitive are the EU and US food industry and their sub-sectors?
2. Which role plays innovation and legislation in the competitiveness of the industry?
3. How will the competitiveness develop under future globalization and trade liberalization?

The goal of this study is to fill these knowledge gaps: thus helping governments and individual companies in assessing the current situation and in supporting policies or strategies. This study is unique, as far as known, as it includes all sub-sectors of the food industry and benchmarks these with non-EU countries.

The structure of this paper is as follows. Section 2 deals with the methodological framework and data; section 3 addresses the results. Discussion and conclusion will be the subject of section 4 viz. 5.

## 2. Methodological framework and data

### *2.1 Research approach*

The research is based on a strategic management approach (Wright et al. 1998; Thompson and Strickland, 2003) and the measurement of competitiveness is based on international economics theories (Krugman and Obstfield, 1994). Elements in the strategic management approach are internal analysis (measuring the competitiveness, the core of the study), external analysis and deriving strategies. The external analysis, addressing *research question 2* describes the development in the external environment of the food industry, such as demand drivers, innovation and legislation aspects. This is based on desk and survey research (see section 3.1 and 3.2). The internal analysis, addressing *research question 1*, deals with an assessment of the competitiveness of the food industry. The indicators to measure the competitiveness are subject of section 2.2. The internal and external analysis will be confronted in a Strengths & Weaknesses and Opportunities and Threats (SWOT) analysis. The future developments of the food industry competitiveness, addressing *research question 3*, are assessed by the trade model GTAP (section 2.3).

### *2.2 Competitiveness indicators: internal analysis*

Measuring competitiveness originates in the trade theories of Adam Smith, which are based on absolute cost differences between countries: costs of unique advantages. David Ricardo added comparative advantage. New trade theories incorporate different aspects in the analysis of competitiveness, such as product differentiation, innovation or economies of scale. O'Mahoney and van Ark (2003) focus on productivity. In their study, productivity contributes to the performance measurement of competitiveness. They use the growth in labour productivity or value added as performance indicators. This choice can be argued by a statement of Krugman and Obstfield (1994) '.....absolute productivity advantage over other countries in producing a good is neither a necessary nor a sufficient condition for having a comparative advantage in that good': the highest efficiency gap. Even if a sector performs well, other sectors can perform even better. In the long run, the sector that is thought to be successful performs less well than partial competitiveness studies predict. The better

performing sectors can pay an additional rent for the production factors (Van Berkum and Van Meijl, 2000). Current literature stresses several aspects of competitiveness. A main line of sustainable competitive advantage is the fundamental basis of above average performance in the long run, according to Porters' theory (1980, 1990). In this study competitiveness of the EU Food industry is defined as the sustained ability to profitable gain and market shares in domestic and export markets in which the industry is active.

The selection of competitiveness indicators is mainly based on those used by O'Mahoney and Van Ark (2003) and used by the EU (2005). The selected indicators to quantify the competitiveness of industry for this study are:

1. Growth in real value added of a specific industry in relation to the total food industry. This reflects the competition for production factors between different industries within a country. A growth in the share reflects a competitive advantage. The industry is then able to attract resources for their production. The food industry is used if a sub-sector of the food industry, e.g. dairy processing, is evaluated. Where the food industry as whole is evaluated, the manufacturing industry has been used instead of the food industry.
2. Growth of the Balassa index. This index reflects the export specialisation level in one category of goods from one country. In fact it indicates the export focus of an industry. The relative importance of an industry in the total trade will be measured by the Revealed Comparative Advantage (RCA) or Balassa index or specialisation index. The annual growth will be calculated. A Balassa index of 1 indicates that a country is equally specialised as the total world exports. A level below 1 means relatively unspecialised and above 1 relatively specialised. The growth of this indicator is used as index.
3. Growth of the export share on the world market. This performance indicator reflects the outcome of the competitive process. The export share on the world market is derived for the first and last period. The growth is the absolute deviation, and not an annual growth rate. This index takes the market size into account. Very small exporters can have large growth rates, but remain small exporters. Even with small relative growth rates, large exporters will have a larger impact on the market.
4. Growth of the labour productivity. This affects the unit labour costs and in this way the relative prices. Growth of labour productivity improves industrial competitiveness in international markets. Labour productivity is often seen as a crucial determinant of competitiveness. Labour productivity, the real value added divided by the number of employees, as such, can not be compared between different countries due to different

levels of Purchasing Power Parities (PPP). By taking the growth of the labour productivity; the indices of different countries can be compared.

5. Growth of real value added This indicator reflects the industrial dynamism. Creating added value is an important economic indicator. It is related to the industrial dynamism. Total value added is not only based on the production factor labour but also on the production factor capital and land. Again the growth is taken, so that countries can be compared easily.

The selected indicators originate from the theory of international economics. The selected approach based on international economics is more suited for comparing countries and continues to build on other approaches used for EU studies (O'Mahoney and van Ark, 2003). They indicate at country level the competitiveness. The European and US food industries will be benchmarked against each other and against other important competing countries: Australia (AU), Brazil (BR) and Canada (CA). A benchmark recognizes that the lowest negative growth figure will be classified as strong if all other countries perform less.

The above-mentioned indicators however have different scales. To compare the different scales the values will be standardised. All variables will have than the same dimension and can than easily presented in one figure.

### *2.3 Modelling future development*

The third research question deals with the competitiveness' development under future globalisation and trade liberalisation trends. The analysis was carried out with an adapted version of the general equilibrium model of the Global Trade Analysis Project model, in short GTAP-model (Hertel, 1997; Hertel and Keening, 2003). GTAP was initiated with the goal of supporting high level quantitative analysis of international trade, resource and environmental issues in an economy-wide context. The GTAP project is supported by the leading international agencies (e.g. WTO, World Bank, OECD, and UNCTAD) in trade and development policy, as well as a number of national agencies with active research programmes on these issues. This project has grown rapidly since its inception in 1993. The success of this approach is reflected in a high degree of academic recognition as well as its increasing use for policy analysis by international and national agencies for 'What if' scenarios (simulation of the effects of structural changes and policy measures).

For this study three scenarios have been constructed, based on a European perspective. In the *Continued Reform* scenario the current EU and WTO policies are considered to

continue into the future, with modifications over time that are reasonably certain to happen according to the current political situation. This scenario will project a medium-term development until 2010. The policy changes will stem from internal forces at European level. Here one can expect further reforms of those market organisations which apply quantitative restrictions on milk and sugar production or obligatory set-aside regulations. At international level, an agreement in the current Doha-Round under the WTO will bring a further decline in support to farmers together with a complete abolition of export subsidies. Growing economies in other regions of the world will also provide export opportunities for European agricultural and food processing sectors. The *Enhanced Productivity scenario*, in which there is the same policy setting as under the Continued Reform scenario, will analyse the consequences of higher productivity growth in European food processing industries as well as in European agriculture compared to other countries and regions. To identify the consequences for European food processing industries in the context of trade liberalisation, the final scenario *Liberalise* illustrates the consequences of full trade liberalisation in all sectors including a withdrawal of all domestic support in agriculture.

#### 2.4 Data

A consistent database with publicly available data has been compiled for the study. Main data sources used come from official statistics: Eurostat (Structural business statistics, Comext trade data), the OECD (structural analysis database STAN), the UN (Comtrade), FAO (supply and utilisation accounts) and from abroad e.g. the US Census Bureau, Ausstat (Australia), IBGE (Brasil), IC (Canada). The main problems in the study concerning the available data deal with the lack of data and clearly unreliable data, as well as with access to data from the main competing countries outside the EU and US. The first problem could sometimes be tackled by using alternative years, other sources or by using proxies (estimations based on comparable situations). Countries, like China, India, Thailand or Vietnam could not be studied, due to lacking data on industry level. Trade flow analysis showed that these countries have a high relevance for some sub-sectors.

Table 1 shows the breakdown of the food industry and importance of the branches in the EU. The production value of the EU food industry is much higher than in the benchmark countries: 150% the US value and 10 till 20 times the values of other countries. The EU food industry has also a higher export value to third countries. As the EU-25 started at 2004, the analysis focussed on the EU-15 countries.



Table 1 Exports and production value of the EU food industry, compared with the USA (€billion)

Branch	Exports (average 2002-2004)				Production value		
	EU-25 (incl. intra trade)	EU-15 (incl. intra trade)	EU-15 To third countries	USA	EU-25 (2003)	EU-15 (2003)	USA (2002)
Meat	25.5	24.0	4.1	5.9	146.8	137.3	129.2
Fish	12.4	11.8	2.3	3.1	17.6	16.8	9.3
Fruit and vegetables	14.9	13.6	2.9	2.7	45.5	42.4	56.5
Oils and Fats	11.7	11.1	3.2	8.6	28.1	26.5	22.3
Dairy	22.6	21.5	4.7	0.7	107.9	101.9	69.3
Cereal based	15.3	14.8	4.2	5.0	108.4	102.2	78.7
Beverages	25.3	24.8	12.3	1.3	115.3	106.1	68.9
Sugar	3.6	3.3	1.3	0.3	11.7	10.4	6.9
Food industry	131.7	124.7	34.9	27.6	785.2	729.6	483.0

### 3. Results

#### 3.1 The external environment: low population growth and differentiated products

The European food industry has a share of 1.9% in the value added of the total economy and 2.2% of the employment, often in rural areas. The food industry is, with 11% of the value added of the manufacturing industries in 2003, important. The value added of the food industry grew faster than that of total manufacturing. The EU is also the largest exporter and importer of food products.

In the US the food industry is roughly of equal importance in the national economy as in the EU (of value added in 2003). However the industry is less important for employment (1.3% versus 2.2% in the EU), and enterprises tend on average to be larger. More than in Europe, farming in the US is far away from the big cities that in the US are concentrated along the coast. As at least a part of the food processing industry is close to farming, the importance for the rural employment of the food industry might also be high in the US.

External developments which shape the European food industry are:

- A lower population growth in the EU (0.2% annually) than in the benchmark countries (between 0.9 and 1.2% annually, US 1.0%). In the US birth rates and immigration lead to more population growth than in the EU. This results in a lower growth of demand for processed food in the EU than in the US.
- Consumers prefer more convenient and healthy food and ethical issues are becoming more important: both in relation to higher levels of income and wealth.
- Technology development increases the efficiency and efficacy of raw material use, biotechnology enables production of functional food but is controversial in the EU.

- Innovation (including micro-machine processing) stimulates product differentiation in the market responsive food chain. The level of R&D expenditures in the food industry is rather low compared to total manufacturing. It should be recognised that R&D is important in the food industry, but has a different character than in e.g. telecommunications. Innovation in the food industry is more process, marketing and management oriented and less technology-push based on basic science. R&D investments are relatively (in a % of production value) lower in the US (0.35%) than in major EU exporting countries like France, UK, the Netherlands (0.6%) and Denmark, but higher than in Germany, Italy and also higher than in Canada. Italy is more oriented to traditional food products and Canada has hardly any large food companies. US companies also benefit from economies of scale in R&D.
- Trade and enterprise policies. The philosophy of the CAP changed fundamentally due to international pressure (WTO) and internal policy and budgetary reasons: a shift from market price support to income support decoupled from production but coupled to public goods. As a result, product price gaps between EU and world market levels have declined substantially and policy is moving away from quota for milk and sugar that restrict supply of raw materials.

Wholesalers, retailers and foodservice firms are an important link between the food industry and the final customers. In 2003 EU consumers spend €1,028 billion at the retailers and foodservices: the market share of retailers is 66%. The concentration is high and still increasing: the top-5 supermarkets have a market share of around 70% in most EU countries. The top-25 global supermarkets, of which 60% with a European headquarter, are active in several countries and several continents. Small scale firms with less than 5 employees are the prevalent wholesaling firms: around 70 to 80% in the EU. However over 50% of the turnover is achieved by a small number of wholesalers with 20 and more employees. Food services are of growing importance: in the US consumers spend almost 50% of their food purchases in foodservices outlets and in the EU one third. The major channels are restaurants and fast food outlets. Catering has a market share below 20% in the US and even lower in the EU. Retailers spend 80% of the turnover on purchases of goods, food services only 30%. EU-consumers buy therefore five times as much quantity in the supermarkets than in food services outlets.

### *3.2 EU food legislation positively perceived*

According to experts EU food legislation has a negative impact on innovativeness (Fraunhofer, 2003 and 2004) and competitiveness (CIAA, 2005) of the EU food industry.

Surprisingly, the findings of this research, based on a survey of 63 respondents among representatives from the food industries, show that the people who actually have to work with it, judge the system of EU food legislation in general much milder. It is not considered as a major factor hampering competitiveness, nor is the EU system seen as inferior to the US-system. Criticism focuses on details. Quite a few improvements are possible. Improvements would be welcomed in stability, clarity and accessibility of both legislation and authorities. The biggest burdens for SMEs are experienced from food hygiene and labelling legislation.

For bigger companies the pre-market approval schemes are problematic. Due to the costs and time involved, it is very hard for an average food business to bring a new additive, novel food, Genetically Modified Organism (GMO) or health claim to the market. It is not always clear precisely which procedure applies, what requirements must be met, how long the procedure will take and if a favourable outcome may be expected.

To achieve the European Commission's ambition to reduce administrative costs by 25%, audacious and radical steps are called for. Improvements are possible on the EU system of legislation as such and on EU food legislation in particular. An example is fatal deadlines for authorities: missing the deadline has the same effect as the decision to grant pre-market approval. Another example is missing clear responsibilities. Currently, the decisive responsibility with regard to GMOs shifts between the EU Commission and Council depending on the content of the decision to be taken and on the advice of EFSA. Complying with deadlines is deplorably unclear.

### *3.3 Internal analysis: weak competitiveness of the EU food industry*

The competitiveness of the EU food industry is weak, as is shown in figure 1. The EU is the largest exporter and importer of food products, even if intra-communitarian trade is excluded. The imports as well as the exports of the selected countries grew in the period 1996 till 2004, but slower than in Australia, Brazil and Canada but faster than in the US.

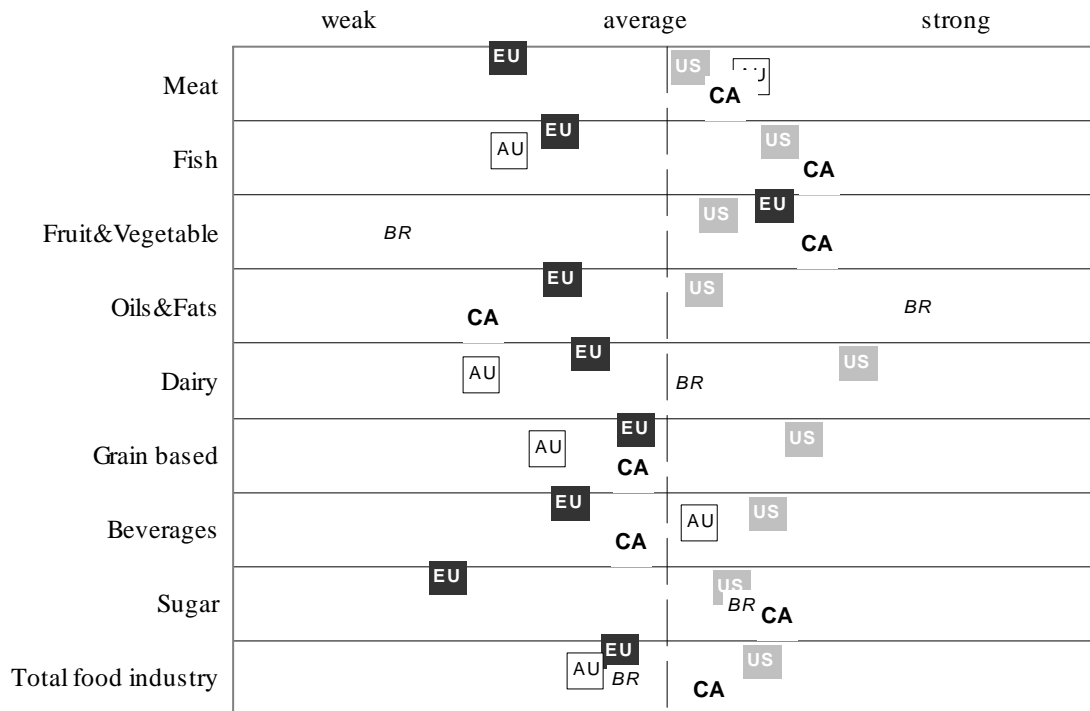


Figure 1 Competitiveness of the EU food industry for sub-sectors

On all other indicators the US outperforms the EU. Brazil is strong in the export specialisation (Balassa) and growth of the world market indicators, but the weakest in growth of the value added and value added per worker. The growth of the share of the value added of the food industry in total manufacturing is the highest in the US and second in the EU. The competitiveness of the food industry is illustrated in Figure 1, which shows a weak competitive position for the EU and a stronger position for the US and Canada. The reason behind this might be the smaller scale of enterprises, the restricted availability of raw materials due to quota systems (e.g. milk and sugar) and a lower growth of the population which determines the quantity demanded. Only for processed fruit and vegetables the EU is stronger than the US. Soybean contributes to the strong position of Brazil in fats and oils. The EU is especially weak in meat (environmental concerns), beverages (small scale in wine and partly beer) and sugar (CAP-policies). Despite the weak competitive performance, a fair number of world leading food Multinational enterprises are located in the EU.

### 3.4 Future developments: competitiveness stays weak

The European food industry is weak in economies of scale and in labour productivity. However it showed its strengths in attracting sufficient capital and labour, has an openness to the world market (export and import grew simultaneously) and is in an open competition

(many enterprises). Furthermore the CAP quota systems limit the production of raw materials like milk and sugar. The effects of different developments of the productivity growth and trade policy on the competitiveness are illustrated by scenarios (see section 2.3). In all scenarios the value added share of the food industry in the total economy declines for all countries, except for the scenario Liberalise. In the latter case in Brazil and Australia and New Zealand the value added of food industry grows faster than of the whole economy. The competitiveness of the EU food industry will deteriorate further in the Continued Reform and in the Liberalise scenario. Other regions will improve their relative position compared to the EU. In the counter-factual Enhanced Productivity scenario the competitiveness of the EU food industry improves and the value added increases. Higher productivity at farm level improves the position of the food industry, even without an enhanced growth of the productivity in the food industry. The improvement of the competitiveness of the food industry will be slightly higher if only the EU food industry has a higher productivity level. Despite the weak competitiveness the value added and export volumes grow, but slower than of the competitors. The employment in the EU food industry will decrease with 2 till 3% and 4.5% in the case of full trade liberalisation. Enhanced Productivity increases the competitiveness of the food industry, but does affect the employment negatively. Not surprisingly, because the assumption is a higher labour productivity. In all non-EU regions the employment will increase for all scenarios. In the North American region with 3 till 7%, in Brazil, 4 till 6% and in Australia and New-Zealand region even between 8 and 13%.

#### 4. Discussion

This study, which included all sub-sectors of the food industry and benchmarked these with non-EU countries, is unique as far as known. Recently no scientific competitiveness studies of the sub sectors of the EU-food industry have been conducted. Even the renowned study of Trail and Pitts (1998) or other studies by ISMEA (1999) or Rama (2005) on this subject are based on case studies, without a systematic analysis of all food processing sectors and all EU countries. The study of Coyler et al. (2000) is an exception in this respect in that it deals with all sectors of the US food economy, although the legal issues are missing. This study provides comparisons between the EU and third countries, between sub-sectors and even between EU countries (see Wijnands et al., 2007 for detailed information)

The selected indicators originate from theories of international economics. These approaches are better suited for comparison countries and continue to build on other approaches used for EU studies (O'Mahoney and van Ark, 2003). They indicate the

competitiveness at country level. However companies and not countries compete. Several other disciplines also deal with competitiveness and are more focussed on decision making of companies. Industrial Economics emphasises strategies (costs and differentiation) as well as the aspects of the value chain (Porter 1980; Porter, 1990). In the strategic management approach enhancing the core competence of the resources is one of the key elements (Hamel and Prahalad, 1994; Hunt and Morgan, 1995). Market orientation, product differentiation and innovation are key determinants in the marketing approach (Deshpande and Webster, 1989). In the descriptive parts of each industry several other variables are discussed, such as the consumption, self-sufficiency, import and export patterns of the main countries, the structure of the industry and the leading companies (Wijnands et al., 2007). These variables are related to the outcome of the above-mentioned five indicators. It is recommended to use these other approaches in follow-up studies as they will provide more firm oriented conclusions.

## 5. Conclusions and recommendations

The US food industry outperforms the EU in terms of competitiveness. The competitiveness of the European food industry is weak compared to the US and Canada and approximately at the same level as the Australian and Brazilian industry. Scenarios showed that unless the productivity growth in the EU is higher than in the rest of the world, the EU competitiveness will remain weak. The US food industry is strong in economies of scale and in labor productivity. The EU is weak on these indicators. US-firms have for a long time competed in a large market, which resulted in more concentration than in Europe. Labor markets are more flexible. Despite the weak competitive performance, a fair number of world leading food enterprises is located in the EU. Moreover the importance of the food industry in total manufacturing is growing. Only the EU competitiveness of the sub-sector processed fruit and vegetables is stronger than the US's. Brazil is relatively strong compared to the EU in meat, oils & fats and sugar. The findings of this research are surprisingly positive for the system of EU food legislation in general. EU based food managers consider it not as a major factor hampering competitiveness, nor is the EU system seen as inferior to the US-system.

Innovation in the food industry is more management oriented and less technology-push based on basic science.

European enterprises are recommended to exploit economies of scale (to increase productivity), economies of scope (differentiation) based on cultural difference in Europe and trying to be a first mover in the use of new technologies (like micro-machine processing). The

government policies could be directed to further harmonization of legislation within the EU as well as world wide, to supporting advanced industry standards and to enterprises and trade policies, which will not weaken the competitiveness. EU authorities can increase their support for the European industry by engaging in export negotiations and by recognising scientific assessments performed under the jurisdiction of well-equipped foreign authorities. Research, initiated by policy makers, can contribute to understanding the driving forces of competitiveness, to innovation, to institution building concerning property rights and to supporting the availability of up-to-date databases.

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