The Effect of Competitive Advantage on the Economic Performance of Spanish Agro-Food Firms

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Paper prepared for presentation at the 110th EAAE Seminar 'System Dynamics and Innovation in Food Networks' Innsbruck-Igls, Austria
February 18-22, 2008

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Abstract

The objective of this work is to analyse the relative importance of three groups of competitive advantage factors on firms' results of the Spanish agro-food industry. Competitive advantage factors correspond to three aspects: agro-food firms internal sources called, in this study, Potential Resources (RP); agro-food firms relationships with other firms, which are called Specific Firms Relationships (RE); and, the market and industry characteristics plus the industrial localisation, which are included in the so called Market Structure and Industry Location (EMI).
Seven hypotheses have been formulated to asses direct and indirect relationships between RP, RE, EMI and economic Results (R) specifying causality directions between explicative indicators for each competitive factor. The seven hypotheses have been combined in a hypothetical model with structural equations defining firms' competitiveness. A sample of 294 firms has been used and 17 variables related to competitive advantages have been selected. Indicators related to Potential Resources refer to technological levels, development of new products as well as promotion and advertising activities. Agro-food firms' relationships are taken into account introducing variables accounting for relationships with suppliers, distributors and other firms. The Market Structure and Industry are taken into account considering the concentration degree of the food distribution firms, entry of new firms into the market and product prices, among others. Results have been measured with indicators measuring investment over sales, added value and export intensity.
Results indicate that Potential Resources and the Specific Firms Relationships explain better the variability of the Results with a strong relationship between those two groups of variables. Altogether this analysis supports 4 out of the 7 proposed hypotheses. The most important variables influencing results are product and process innovations as well as relationships with suppliers.

Keywords: *agro-food industry, Spain, competitive advantages, confirmatory factorial analysis, structural equations model*

Introduction

The strategic approach as well as the business strategy has tried to give an answer to the question why some enterprises have more economic benefits than others. The sustainable competitive advantages are probably, among many answers, the best reasons to explain firm success in the market (Hitt el al., 2003). Currently, firms have to face a changing environment as a result of the complex technological progress and the economic globalisation. A consequence is an increasing competitiveness and a change on firm competitive strategies. These changing characteristics require that firms need more resources and skills, greater flexibility for their activities and

capabilities for a global presence (Menguzzato, 1995). The agro-food industry is also involved in this competitive environment.
In Spain, the agro-food industry is of great economic and social significance as it happens in most developed countries. Changes occurred in the production of agricultural raw materials, the distribution and on consumers' behaviour have influenced the Spanish agro-food industry (Albisu et al., 2005; Albisu and Gracia, 2003). It is an industry with heterogeneous firms of diverse characteristics and structures as well as differentiated production means.
In 2004, the Spanish agro-food industry ranks the second among all industries in the country, accounting for 17% of total sales and 20% of total industrial production, and it is the first industry considering the added value with 15% of the total (INE, 2005). During the last years there has been an expansion of production, an improvement of labour conditions and the balance trade, as well as a technological modernisation and production diversity.

Theoretical framework and model hypotheses

The strategic approach looks for linkages between strategic decisions and firm performance. The final objective of the different theories is to find reasons expressed by factors that could explain firms' success and the variability of their results, as well as the ways of reaching competitive advantages. The principal difference between conceptual frameworks that explain competitiveness is the manner they clarify firms results.
In this work, the analysis of different theories has been undertaken attending the source of firms' competitive advantages. It is distinguished between individual firm advantages (Resources based-view and Capacities), advantages derived from firms' cooperation (Business Networks and Industrial Districts) and the external competitive advantages (Economic and Industrial Organisation). The differences between the approaches is remarkable, especially if we realise that there is not an agreement about the definition of competitive advantages.
The Resources based-view and Capacities theory utilises the word distinctive competences, as a means of competitive advantage, which implies a relative advantage of individual and organisational abilities. The paradigms of Business Networks and Industrial Districts are mainly based on shared resources and the collective learning to explain sources of competitive advantages and greater economic benefits. Lastly, the Economic and Industrial Organisation theory is based on the evaluation of the external view of competition to reach more attractive positions. All the approaches agree that the competitive advantages can not be observed directly and they have to be inferred from certain observable variables.

Having into consideration the different expressed theories, it has been determined three types of competitive advantages: 1) firm individual advantages, which are called Potential Resources (RP), and they gather the use of firms internal resources, according to the Resources based-view and Capacities theory; 2) the cooperation relationships that the agro-food firms have and it is called Firms Relationships (RE), which value the capacity for the agro-food firms to take advantage of those relationships to gain competitive advantages; it is based on the Business Networks and Industrial Districts paradigms; and 3) the enterprises external advantages, which are called Market Structure and Industrial Location (EMI), as a reference to the contribution of the Economics and Industrial Organisation theory.
The theoretical and empirical review has allowed detailing the most relevant firms' activities and characteristics for each of the considered competitive advantages. It allows firstly to analyse the direct relationships among competitive advantages (RP, RE and EMI) and the firms economic results (R), (RP$\Rightarrow$R, RE$\Rightarrow$R and EMI$\Rightarrow$R), which produce the most important model hypotheses. Secondly, the interactions between competitive advantages (RP, RE and EMI) and results variability (RE) are analysed and they conform a hypothetical model.

Individual enterprise advantages

The Resources based-view and Capacities theory is based on the fundamental premise about the existence of heterogeneity among firms according to their resources and capacities, which explains the different results. More specifically it is influenced by the type, quantity and nature of their resources and capacities (Wernerfelt, 1984; Amit and Schoemaker, 1993). The firms have and develop their resources in a unique manner. This unique way to combine and to apply resources is linked mainly with the innovation (capacities to develop products), brand recognition or practical experiences (production, advertisement, promotion and sales), and professional knowledge (human resources and organisational capacity). Whenever the selection and use of those resources remain sustainable, they can be considered as competitive advantages which can mark differences among firms and they generate greater economic benefits.
The group variable of Potential Resources (RP), or competitive advantage mentioned before in this work, has much in common with the concepts of distinctive competence, firm specific advantage defined by Johansson (1983) and Ajaron (1993), or ownership advantages described by Dunning (1993). Potential Resources can be defined as those specific resources and capabilities, which have been developed and accumulated internally in the firm and largely take the form of possession of distinctive skills and intangible assets (resources), and they are, at least for a period of time, exclusive or specific to the firm possessing them. Firms that possess such unique skills and resources that are special and hard to imitate will outperform their rivals. It can be considered that they favour the economic development and the internal accumulation of intangible resources as well as the distinctive, exclusive and specific capacities for a particular firm. In our case, the Potential Resources are necessary for the agro-food firms to compete in a market highly concentrated, with a demanding consumer and a short products life. The superior resources that allow firms to have strong positioning, in markets where they try to avoid price wars, are based on knowledge. Among the resources which induce strong positioning it is worth mentioning the product and process innovation, research and development (Hyvönen and Kola, 1998; Rama, 1998, Trienekens *et al.,* 2008), the brand and firm reputation and the human resources (Grunert and Baadsgaard, 1992). These resources permit to undertake activities, which generate knowledge and skills based on intangible resources and capacities that jointly with other factors lead towards a different position with respect to other enterprises. This is the theoretical support to mention the first hypothesis to be checked in this work:
H_1: The variable Potential Resources (RP) has a direct and positive impact on Results (R).

Firms cooperation advantages

Other approaches believe that the individual competitive advantages are complemented with collective advantages or interaction approaches, called shared resources. It is worth to point up the Business Networks and Industrial Districts paradigms. Both of them are based on specific shared resources plus the collective knowledge and learning to explain sources of competitive advantages and greater economic benefits. The conceptual development of the Business Networks has its roots on the industrial marketing approach for firms relationships.
A network is understood as a group of independent enterprises that carry out activities and control resources among them with an explicit pact to undertake their relationships (Hakansson, 1987). Firms learn to organise jointly certain activities such as establishing responsibilities to develop trust and compromise for greater interdependency. The value concept, in the Business Networks paradigm, is based on the fact that the connected firms have access to distinctive resources and capacities of other firms allowing for a shared management. This network is sustainable as it is backed by the reciprocal learning.
The first studies about agro-food relationships stressed the strategic significance of relati-

onships between agro-food and distribution firms and the impact on products quality as well as the importance for small and medium enterprises. Those relationships establish not only working but personal links and reinforce trust generating an appropriate environment to exchange resources and capacities between firms.
The cooperation activities for the agro-food firms are developed between production and distribution activities (Mamaqui et al., 2002). However, in the last few years a reasonable number of agro-food firms cooperate on research and development, product promotion, etc., which implies that they have changed their attitudes with respect their relationships with other enterprises. Thus, instead of taking into consideration a single firm, as the focus for the analysis, is better to have a group of interrelated firms.
Vertical relationships established along the agro-food chain among suppliers, transformers and distributors as well horizontal relationships are considered as elements of strategic significance. A requisite that allows building up trust about quality and delivery conditions, as well as reinforcing social and personal linkages in such activities as final product development, research and development, and technological knowledge. In this work, the competitive advantage related to the Business Networks is applied to relationships along the agro-food chain but also relationships between agro-food firms and other type of enterprises for research and technological development.
Based on the discussion above, firms cooperation advantages, can been defined as those specific resource and capabilities which have been acquired through the firm accumulation of the ties with other business actors most often developed over time. The second hypothesis is based on those concepts:
H_2: The Firms Relationships (RE) variable has a direct and positive effect on Results (R).

External competitive advantages

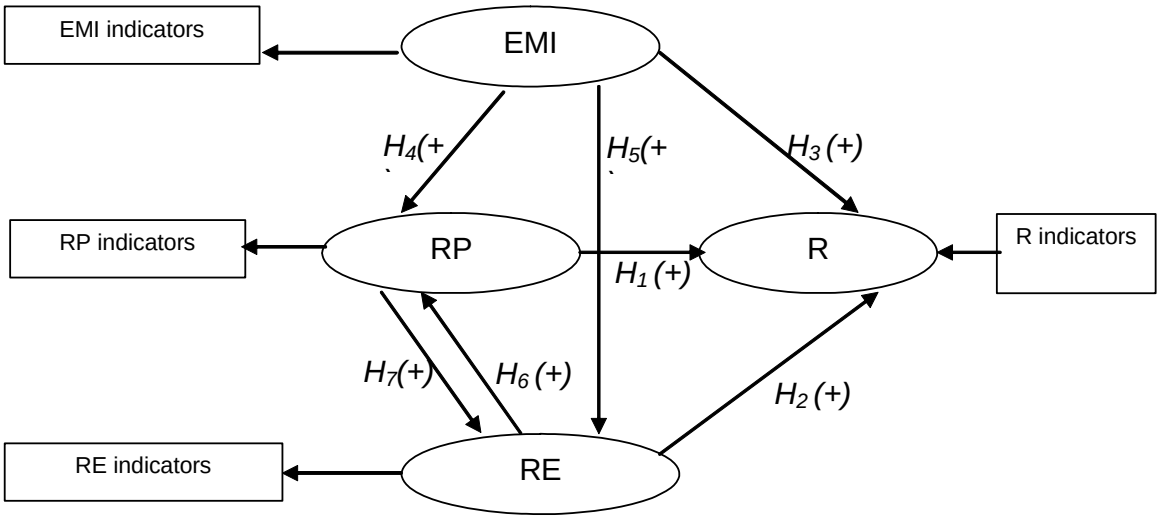
The Economic and Industrial Organisation theory considers that the industry and country or region**,** as an entire system, is a better analysis unit that a single firm. An industry is considered as a group of firms that produce substitutive goods or services which are sold to common buyers so they act as competitors (Bain, 1968; Shaffer, 1980; Scherer and Ross, 1990).
The Efficient Consumer Research paradigm suggests that the most concentrated markets favour the adoption of collusive agreements and consequently to obtain extra economic benefits. It is from 1980' on that the incorporation of strategic components is considered determinant for the analysis of the industry internal dynamics and its external connections. Firms belonging to the same industry obtain different economic benefits as a result of their strategic decisions as it is explained in the New Approaches of the Industrial Organisation (Geroski, 1988; Bresnahan, 1989; Cotterill and Harper, 1995).
In this work, the agro-food external competitive advantages are called Market Structure and Industrial Localisation. Different factors have been considered such as the
development of the local agro-food market, the distribution concentration, the competitive level, etc. which are conditioned by the abundance of resources related to favourable production factors (raw materials, employment), infrastructures and government policies. These factors are considered by many authors as specific advantages of firm location (country, region) that can be of benefit for firms set up there (Porter, 1994; Hill and Deeds, 1996) or industry capacities (Foss and Eriksen, 1995). Whereas firm resources and capabilities are clearly something intrinsic to firms, country, region and industry specific factors are more directly related to the environment in a broad sense.
For the Spanish agro-food enterprises, which are mainly small and medium, factors such as opportunities related to the increasing demand of processed local food products as well as its close location to raw materials production and industrial sites can be a good source of external com-

petitive advantages. This leads to the following hypothesis:
H_3: The variable Market Structure and Industrial Location (EMI) has a positive and direct effect on Results (R).

The combined view of competitive advantage: *interaction effects*

In this study, the analysis of interaction effects between RP, RE and EMI are of particular interest to determine the variability of results. The different theoretical approaches have different explanations to interpret results and their lines of thought are not clearly different. Several authors consider that there is an interacting between use of internal resources and shared or external resources in order to obtain firms competitive advantages (Rangone, 1997; Winter, 1995; Collis and Montgomery, 1995). Thus, the direct relationships between RP, RE and EMI with R, can be affected by the interaction relationships among the three variables.
There are factors related to firm location than can be affected by the development of their own resources. Firms react with external factors, such as external competition, concentration levels, government policies, etc. employing strategic determinations for a better use of their own resources. Consequently, market forces influence results by business management modifications undertaken by firms to better use their own internal resources.
Studies about the agro-food market conduct reach the conclusion that it is basically oligolopistic market, which encourages the creation of entry barriers based on product positioning, brand recognition and advertising intensity. Thus, there is an indirect effect of the market structure on economic results, by the impact that the market has on firms' resources, which is related to new products and brand image developments. The following hypothesis is formulated:
H_4: There is an indirect relationship from the Market Structure and Industrial Location (EMI) variable to Potential Resources (RP) factors when explaining the Results (R) factors.
Firms' relationships are affected by the structure of the market and the industrial location as well as by other factors. The generated advantages as a result of firms' relationships are determined partly by the type of customers, suppliers and competitors from the country and region. On environments with small and medium size firms their relationships are affected by government policies dealing with infrastructure investments and continuous education and training.
Likewise, professional organisations generate favourable contexts to develop cooperation and collaboration relationships among firms for research and development activities, technological exchanges, production areas, products promotion, etc. This effect of the environment on firms relationships leads us to formulate the following hypothesis:
H_5: There is an indirect relationship from the Market Structure and Industrial Location (EMI) to Enterprises Relationships (RE) variables when explaining the Results (R) factors.
There are also complementarities between the development of internal resources and the relationships that a firm establishes with other firms. It is reasonable to suggest that relationships are generated partly because firms have different complementary resources. On the other hand, relationships influence resources because, along those contacts, each business tends to acquire new resources or to improve the existing ones. Thus, there are expectations of reciprocal impacts between potential resources and firms relationships, which leads towards the formulation of the last two hypotheses:
H_6: There is an indirect relationship between Firms Relationships (RE) and Results (R), if there is a relationship from Potential Resources (RP) to Firms Relationships (RE).
And vice versa:
H_7: *There is an indirect relationship between Firms Relationships (RE) and Results (R) if there is a relationship from Potential Resources (RP) to Firms Relationships (RE).*
The seven hypotheses are combined in a Structural Equations Model as illustrated in Figure 1. The arrow number corresponds to the hypothesis number. The model shows that direct relati-

onships from EMI, RP and RE to R could exist, and indirect relationships from RP to RE and from RE to RP and R might happen. The latent variables (EMI, RP, RE and R) have been inferred by indicators (observable variables).



EMIMarket Structure and Industrial Location
RP Potential Resources
RE Specific Firms Relationships
R Results

Figure 1. Structural hypothetical model for the Spanish agro-food firms with the relationships between competitive advantages and results variability

Data and measurement

Data and measurement are derived form a nationwide survey "Encuesta de Estrategias Empresariales" (ESSE). The survey tries to capture mainly information about firms' internal activities which implies all decisions that agro-food firms take about their competitive decisions. This survey is representative and it combines exhaustive criteria as well as random selections. In our case the selected firms are in the food and beverages group according to the CNAE classification. The number of agro-food firms interviewed are 339 and there are selected only those with more than 5 employees, which represents around 5% of the total for the entire country. Within this group there are selected firms with two requisites: those that have remained in the industry, al least during 5 years, answering the survey and those that have continuously provided the information required by this survey. Finally the number of selected enterprises is 294.

Structural equations model with observable and latent variables

A structural equations model (SEM) contains two-conceptually separated parts: the relationships between the latent variables and their respective manifest indicators are referred to as "the measurement model and the relationships among the latent variable are called "structural model". In the measurement model the indicators can be modelled in two ways: i) as reflective o ii) as formative. In this case the measurement model has been specified as reflective the underlying premise is that corresponding latent variable produces a certain behaviour that is captured by means of the manifest indicators (Williams *et al.*, 2003).

The selection of exogenous and endogenous observable variables (Table 1), which are mainly ordinal and categorical measurements, determines the analytical techniques of the MEE with observable and latent variables.

Table 1. Variables selection for the structural equations model of the Spanish agro-food firms

Variables	Symbol	Measurement
Market Structure and Industrial Location (EMI)	ξ_{EMI}	*Latent variable exogenous*
Observable Exogenous Variables		
-Price variation of production factors	X_1^{EMI}	ordinal (i*=3)
-Product price changes along one year	X_2^{EMI}	ordinal (i=3)
-Principal motive for price changement	X_3^{EMI}	ordinal (i=3)
-Evolution of the main market	X_4^{EMI}	ordinal (i=3)
-Evolution of the enterprise market share	X_5^{EMI}	ordinal (i=3
Potential Resources (RP)	ξ_{RP}	*Latent variable exogenous*
Observable Exogenous Variables		
-Process innovation	X_1^{RP}	ordinal (i=3)
-Product innovation	X_2^{RP}	ordinal (i=3)
-Number of new products	X_3^{RP}	continous
-Principal objective for activity promotion	X_4^{RP}	ordinal (i=3)
- Product quality	X_5^{RP}	ordinal (i=3)
-Market studies to commercialize new products	X_6^{RP}	categoric (1,0)
-Activities to train personnel	X_7^{RP}	categoric (1,0)
Specific Firms Relationships (RE)	ξ_{RE}	*Latent exogenous variable*
Observable Exogenous Variables		
-Agreements with raw materials suppliers	X_1^{RE}	categoric (1,0)
-Selling agreements with retailers and wholesalers	X_2^{RE}	categoric (1,0)
-Use of their own networks	X_3^{RE}	categoric (1,0)
-Technological collaboration with clients	X_4^{RE}	categoric (1,0)
- Technological collaboration with suppliers	X_5^{RE}	categoric (1,0)
Results (R)	η_R	*Latent endogenous variable*
Observable Endogenous Variables		
-Investment/total sales(%)	Y_1^R	continous
-Value added in the productive process	Y_2^R	continous
- Export intensity (%)	Y_3^R	continous
-Export intensity (%)	Y_4^R	continous

*i = 1,2,....m; Number of categories.

For each ordinal variable or dichotomous "z", which could be x or y by LISREL understanding,

there is a latent variable of responses *z**, which satisfies the categories of the original variable "*z*". The variable *z** represents attitudes of ranked answers of the variable *z* within the continuous rank from "$-\propto$ to $+\propto$". The latent variable and continuous response *z** is used to solve the SEM and not the variable "*z*" (Jöreskog, 2001 and 2002).
If the variable "z" has *m* categories, including the dichotomous answers, the connection between *z* and *z** is:

$$(1) \qquad z=i \quad \Leftrightarrow \quad \begin{cases} \tau_{i-1} \prec z^* \prec \tau_i & i = 1,2,...m \quad y: \\ -\propto = \tau_0 \prec \tau_1 \prec \tau_2 \prec ..... \prec \tau_{m-1} \prec \tau_m = +\propto & \\ \tau_{i,1} \prec z^* \leq \tau_i, & i = 1 \\ z^* \leq \tau_i & i = 0 \end{cases}$$

τ = parameters that indicate threshold values for the variable *z**

The estimation method is the asymptotic extension of the maximum likelihood estimator, which is formulated in two independent parts: one about the proportions and the other about the threshold values for the categories, which is implemented in LISREL 8 by the name of Iteratively Re-weighted Least Squares (Jöreskog et al., 2001). The joint analysis of observable indicators and unobservable variable data is part of the Confirmatory Factorial Analysis and structural relationships in the programme PRELIS 2.52 and LISREL 8^{TM} (Jöreskog and Sörbom, 2000; Jöreskog, 2001).

Analysis and results

The data analysis is conducted in several steps**. T**he development of the model requires checking firstly that the observable variables can be grouped in three latent factors called RP, RE and EMI which represents an independent and multidimensional construct of three types of competitive advantages for Spanish agro-food enterprises. The model permits a double interpretation of the variables, which allows explaining the firms competitive position and also it provides insights for the results variability. Second a Confirmatory Factor Analysis is run to approach reliability of the 17 individual observable exogenous variables. The purpose of this step is to make sure that the observed variables are satisfactory representations of the theoretical construct they are meant to measure. The measurement models along with the estimated reliabilities of the individual items are listed in Table 2.

Table 2. Estimated reliabilities of the indicators of the source of competitive advantage.

Latent variables	Indicators	Standarized Loadings	Item reliabilities
ξ_{RP} r_c =0,650	-Process innovation	0,83 (41,86)	0,61 (5,54)
	-Product innovation	0,62 (31,20)	0,39 (6,84)
	-Introducction of new products	0,46 (23,18)	0,79 15,63)
	-Principal objective for activity promotion	0,72 (19,97)	0,74 31,20)
	-Activities to train personnel	0,86 (41,55)	0,25 (4,58)
	-Market studies to commercialize new products	-0,38 (-16,63)	0,28 (6,10)
ξ_{EMI} r_c =0,677	- Price variation of production factors	0,67 (38,96)	0,79 15,63)
	- Product price changes along one year	0,49 (23,18)	0,43 (8,42)
	- Principal motive for price changement	0,53 (33,51)	0,88 17,69)
	- Existence of significant competitors	0,32 (21,59)	0,39 (4,75)
	- Evolution of the enterprise market share	0,46(30,05)	0,71 13,96)
ξ_{RE} r_c =0,632	- Agreements with raw materials suppliers	0,79 (38,96)	0,37 (6,84)
	- Selling agreements with retailers and wholesalers	0,46 (23,18)	0,79(15,63)
	- Technological collaboration with clients	0,61 (31,20	0,36 (5,54)
	- Technological collaboration with suppliers	0,57 (35,34)	0,41 (8,40)
η_R r_c =0,780	- Investment/total sales(%)	0,37 (18,45)	0,77
	- Export intensity (%)	0,53 (13,51)	(15,41)
	-% Sales to three most important clients	0,57 (33,35)	0,25 (0,18)
	-% Export intensity (%)	0,52 (33,51)	0,64 (12,0)
			0,76 (15,0)

In parentheses t-value; r_c = index of composite reliabilities

The measurement model for RP shows that innovation resource development (process and product), new product introduction and advertising best reflect the construct. The EMI are almost determined by the level of raw material costs, variation price for the food products and market share. For the advantage RE only includes one indicators, technological relationships between retailers and costumers. The items reliability is moderately high for most of the indicators of R with export intensity as an exception.

For the constructs of exogenous latent variables RP, RE and EMI the variables explain jointly 65%, 63% and 67% of the variance, respectively. The latent construct according to the values expressing the consistency of each construct it is satisfactory represented by the observable variables. Based on the reliability value evaluation and the t-value of each item, the data analysis only includes ten measures of competitive advantage.

Confirmatory Factor Analyses is then further used to test the hypothesis that the observed independent variables measure the three independent constructs concerning RP, RE and EMI, re-

spectively (H1). The test of the construct validity is performed by contrasting H1 with alternative hypotheses considering that the observed variables represent fewer than the three latent constructs (Table 3).

Table 3. Goodness-of-fit indices for one, two and three Confirmatory Factor Analysis models.

Hypotheses CFA	Goodness-of-fit data		
	χ^2	d.f.	*p*-value
M_1.H1: Three-factor CFA, no constraints on correlation between latent variables ($\phi_{ij} \neq 0$)	32,4	13	0,05 a)0,08 b)0,97
M_2.H2$_{-1}$:Two-factors CFA. Correlation EMI - RP fixed to unity ($\phi_{EMI,RP} = 1$)	67,0	14	0,00 a)0,10 b)0,72
M_{2-1}.H2$_{-2}$: Two-factors CFA. Correlation RP - RE fixed to unity ($\phi_{RP,RE} = 1$)	67,0	14	0,00 a)0,00 b)0,86
M_{2-2}.H2$_{-3}$: Two-factors CFA. Correlation EMI - RE fixed to unity ($\phi_{EMI,RE} = 1$)	238,7	15	0,00 a)0,13 b)0,00
M_3.H3 :One factor CFA. Correlation RP-RE; RP-EMI; y EMI-RRE fixed to unity ($\phi_{EMI,RP}$)=($\phi_{RP,RE}$)=($\phi_{EMI,RE}$)=1	248,4	16	0,00 a)0,00 b)0,068

a) p-value index RMSEA and b) p-value index CFI.

A number of confirmatory factors model have been specified and applied to the data in order to perform the test. Model 1 is the three-factor model with no constraints correlations between the latent variables. Model 3 is equal to Model 1 except that the correlations between the three latent variables are fixed to unity, which changes the model into a one-factor model. Model 2 specifies three variants of two-factor model by fixing one of the correlations between latent variables to unity and settings the others ones free. Each hypothesis can be examined with a chi-square goodness-of-fit test, the RMSEA, with values between 0,008 and 0,1, and the GFI with values greater than 0,9, which means that the model gets a good adjustment. Table 3 provides the results. The evidence supports the results that the first model in the Table fits the data best and consequently the hypothesized three factors model structure. The estimation of the equations for the confirmatory analysis of three factors provides very good adjustment indicators; $\chi^2 = 28{,}4$ (13 degrees of freedom and values for p = 0,05, RMSEA = 0,08 and GFI=0,97).

The submodels structure contains the direct and indirect relationships between latent variables specified in the hypothetical model: from ξ_{EMI} ,ξ_{RP} and ξ_{RE} to η_R and the interactions $\xi_{EMI} \Rightarrow \xi_{RP}$, $\xi_{EMI} \Rightarrow \xi_{RE}$, $\xi_{RE} \Rightarrow \xi_{RP}$ y $\xi_{RP} \Rightarrow \xi_{RE}$.

Six structural equations have been presented and estimated to introduce one by one the interaction effects. The structural equations model with the first three hypotheses with direct effects has been considered as the basic model. Other five models have been generated derived from the basic model. Following this reasoning and the order of the planned interactions for hypothesis 4 to 7 that include non lineal relationships (interactions) the structural models to be estimated are:

Model_0 (M_0). Basic model, to test hypotheses $H_1 - H_3$

Model_1 (M_1). To test hypotheses $H_1 - H_4$

Model_2 (M_2). To test hypotheses $H_1 - H_3$ and H_5

Model_3 (M_3). To test hypotheses $H_1 - H_5$

Model_4 (M_4). To test hypotheses $H_1 - H_3$ and H_6

Model_5 (M_5). To test hypotheses $H_1 - H_3$ and H_7.

The estimation results of the structural equations model jointly with the latent construct of three types of competitive advantages are presented in Table 4.

Table 4. Standardized estimated coefficients .

Path estimated for submodel measurement	Estimated Structural Equation Models					
	M_0	**M_1**	**M_2**	**M_3**	**M_4**	**M_5**
λ_{x1}^{EMI} **($x_1 \Rightarrow \xi_{EMI}$)**	1	**1**	**1**	**1**	**1**	**1**
λ_{x2}^{EMI} **($x_2 \Rightarrow \xi_{EMI}$)**	**0,30** **(3,08)*** **	0,39 (4,01)***	0,70 (8,00)/***	0,84 (10,43)***	1,02 (12,34)***	**0,64** **(6,00)*** **
λ_{x3}^{EMI} **($x_3 \Rightarrow \xi_{EMI}$)**	**0,54** **(6,68)*** **	0,25 (2,06)**	0,23 (3,50)**	0,54 (5,42)***	0,26 4,04)***	**-22,8** **(-14,3) *** **
λ_{x4}^{EMI} **($x_5 \Rightarrow \xi_{EMI}$)**	**0,81** **(11,54)*** **	0,71 (945)***	0,70 (7,80)***	0,74 (9,08)***	0,79 (8,00)***	**0,064** **(16,23)*** **
λ_{x1}^{RP} **($x_1 \Rightarrow \xi_{RP}$)**	1	**1**	1	**1**	1	**1**
λ_{x2}^{RP} **($x_2 \Rightarrow \xi_{RP}$)**	**0,21** **(2,16)** **	0,42 (5,12)***	0,28 (4,98)***	0,34 (4,95)***	0,59 (6,40)***	**0,67** **(7,32) *** **
λ_{x3}^{RP} **($x_3 \Rightarrow \xi_{RP}$)**	**0,33** **(5,83)*** **	0,54 (6,68)***	0,62 (5,12)***	0,40 (2,84)**	0,35 (3,45)**	**0,48** **(6,39) *** **
λ_{x4}^{RP} **($x_4 \Rightarrow \xi_{RP}$)**	**0,61** **(5,80)*** **	0,35 (4,80)***	0,65 (5,70)***	0,62 (4,83)***	0,49 (4,58)***	**0,37** **4,48*** **
λ_{x2}^{RE} **($x_2 \Rightarrow \xi_{RE}$)**	**0,65** **(10,09)*** **	0,38 (8,08)***	50,5 (4,76)***	0,31 (4,39***	0,34 (3,22)**	**1,77** **(14,65***)**
λ_{x3}^{RE} **($x_4 \Rightarrow \xi_{RE}$)**	**0,34** **(3,44)*** **	0,39 (4,00)***	0,32 (4,43)***	0,39 (6,56)***	0,28 (4,96)***	**0,36** **(3,72)** **
λ_{y1}^{R} **($y_1 \Rightarrow \eta_R$)**	**0,80** **(11,57)*** **	0,79 (10,45)***	0,72 (7,82)***	0,74 (9,08)***	0,77 (8,05)***	**0,83** **(9,76)*** **
λ_{y2}^{R} **($y_2 \Rightarrow \eta_R$)**	**0,55** **(8,09)*** **	0,43 (8,58)***	50,5 (4,76)***	0,31 (4,39***	0,44 (5,22)**	**0,51** **(7,35)*** **
λ_{y3}^{R} **($y_3 \Rightarrow \eta_R$)**	**0,34** **(3,44)*** **	0,40 (4,20)***	0,52 (7,43)***	0,67 (8,46)***	0,48 (6,96)***	**0,59** **(8,72)*** **
Path estimated for structural equations submodels						
α	*0,11* *(1,05)*	*0,07* *(0,66)*	*0,15* *(1,68)**	*0,05* *(0,68)**	*0,09* *(0,067)*	***0,05*** ***(0,89)***
γ_1 **($\xi_{RP} \Rightarrow \eta_R$)**	0,20 (1,98)**	0,18 (1,68)**	0,14 (2,40)**	0,23 (2,50)**	0,23 (1,67)*	**0,21** **(2,58) ** **
γ_2 **($\xi_{RE} \Rightarrow \eta_R$)**	0,18 (2,34)**	0,14 (2,20)**	0,17 (1,69)*	0,17 (1,69)*	0,31 (2,79)**	**0,24** **(2,87)*** **
γ_3 **($\xi_{EMI} \Rightarrow \eta_R$)**	0,22 (2,07)**	0,08 (1,32)	0,16 (0,62)	*0,15* *(1,08)*	0,17 (1,09)	**0,11** **(1,75)** **
γ_4 **($\xi_{EMI} \Rightarrow \xi_{RP}$)**		0,08 (0,87)		0,07 (0,85)		
γ_5 **($\xi_{EMI} \Rightarrow \xi_{RE}$)**			0,12 (1,32)	0,017 (0,629		
γ_6 **($\xi_{RE} \Rightarrow \xi_{RP}$)**					0,11 (2,00)**	
γ_7 **($\xi_{RP} \Rightarrow \xi_{RE}$)**						**0,17** **(2,94) *** **
Goodness-of-fit indices						
χ^2	**52,4** **v=34** ***p*=0,003**	**56,6** **v=32** ***p*=0,003**	**57,1** **v=32** ***p*=0,003**	**54,4** **v=33** ***p*=0,005**	**56,4** **v=32** ***p*=0,025**	**54,4** **v=32** ***p*=0,035**
R^2	**0,11**	**0,080**	**0,0081**	**0,081**	**0,11**	**0,18**
RMSEA	**0,77**	**0,070**	**0,070**	**0,072**	**0,069**	**0,063**
GFI	**0,95**	**0,92**	**0,94**	**0,93**	**0,93**	**0,96**

In parentheses t-value (*** p<0,01; **p<0,05;* p<0,10). *v –d.f.*.

The coefficients of both measurement models (exogenous and endogenous variables) are highly significant (p<0,01). Thus, the measurement model for the three types of competitive advantages is again confirmed with the joint estimation of the structural submodels.

Although the RMSEA and GFI values are acceptable for all the structural equations estimated models, according to the values of p for χ^2 and R^2, one of the six estimated models presents the best indicators and consequently the best solution for the analysed data.

According to the results found for the six models, the structural coefficient of the relationship between Market Structure and Industrial Location is significant and positive in two of the six estimated models, (M_0) and (M_5), respectively. Although hypothesis H_3 for this relationship in both models is partly confirmed (p<0,10).

The hypothesis about the interaction relationship between Market Structure and Industrial Location and the variables Potential Resources and Specific Enterprise Relationships are not confirmed, because the coefficients of these relationships are not significant in the models M_1, M_2 and M_3. For the Spanish agro-food enterprises the variables related to the market and the industry do not affect the relationships between Potential Resources, Specific Firms Relationships and Results.

The coefficients for the direct relationships between competitive advantages of Potential Resources, Specific Firms Relationships and Results are significant and positive in all models.

If we consider the interaction between Potential Resources and the Specific Firms Relationships we can only confirm the interaction relationship between Potential Resources with Specific Firms Relationships (hypothesis H_7) as it has a positive and significant coefficient in model M_5. This model with values of χ^2 =54,4 v=32, p=0,035, RMSEA=0,063 and GFI=0,96 has the best adjustment and it presents the best estimated structural coefficients. The determination coefficient R^2 =0,18 indicates that the model explains 18% of the results variability.

The structural coefficients estimated in model M_5 are significant and they have the expected positive sign. Thus, four hypotheses are confirmed in the model:

H_1: RP⇒R, H_2: RE⇒R, H_3: EMI⇒R and H_7: RP⇒RE.

Concluding remarks

The confirmatory analysis has shown that the latent construct with three competitive advantages provides high adjustment indicators and significant estimated coefficients, at 1% level, in comparison to other four models that have one or two latent factors related to the Spanish agro-food industry.

The estimated results of the structural model confirm four of the seven hypotheses. Results from the estimated structural equation M_5, shows that for the direct relationship between Market Structure and Industrial Location (EMI) and Results (R), the estimated coefficient is significant (p< 0,10), and the hypothesis H_1 is partially confirmed which means that the EMI indicators are correlated directly and positively with Results.

The interaction relationships of the variable Market Structure and Industrial Location (EMI) and the variables Potential Resources (RP) and Specific Enterprises Relationships (RE) are not confirmed, as the coefficients of these relationships are not significant in the estimated structural models. However, it exists a strong positive relationship between Potential

Resources (RP) and Specific Firms Relationships (RE) with Results (R), so hypotheses H_1 y H_2 are confirmed. The competitive advantages indicators called RP and RE are the most important to explain results variability as this interaction relationship is part of the established relationships between Potential Resources (RP) and Specific Firms Relationships (RE). The interaction relationship coefficient between Specific Firms Relationships and Potential Resources is positive and significant, so hypothesis H_7 is confirmed. Thus, the variable Potential Resources explains directly the Results of the Spanish agro-food firms and indirectly through a positive relationship with Specific Firms Relationships (RE).

Consequently, the relationships between the agro-food firms and the distribution are the most important. If those relationships could be in both directions along the agro-food chain, having into consideration that the analysis confirms positive interactions of these relationships on results variability, would help the agro-food firms to take advantage of opportunities and competitive advantages.

According to the data, less than 30% of the agro-food firms analysed has qualified personal and it is not relevant in the contrasted measurement model. It is necessary to emphasise more this activity in the agro-food firms, as the personal qualification and training increases the possibility to add critical resources and better employment. It has a positive effect on the decision making process about future firms activities.

This work has certain limitations. Only ten indicators of a total of seventeen firm competitive advantage indicators were considered in the confirmatory analysis. There are direct relationships between competitive advantages and results in the model. Nevertheless, the firms obtain competitive advantages with different objectives such as client loyalty, consumer satisfaction, low cost production, etc. It is possible with a larger data set to obtain models explaining a greater variability percentage.

References

Ajaron, Y. (1993), “In search of the unique: can firm-specific advantages be evaluated”. *Journal of Management Studies*, Vol. 30 No 1, pp. 29-36.

Albisu, L.M., Mamaqi, X., and González, M. (2005), “La industria agroalimentaria: actividad fundamental para el desarrollo del sistema agroalimentario aragonés”. *Economía Aragonesa*, No Diciembre, pp. 91-109.

Albisu, L.M., and Gracia, A. (2003), “La industria agroalimentaria española y la ampliación a la UE”, *Economía Industrial*, No 344, pp. 99-110.

Amit, R., and Schoemaker, P. (1993), “Strategic assets and organizational rent”, *Strategic Management Journal*, Vol. 14, pp.33-46.

Bain, J.S. (1968), *Industrial Organization*. John Wiley and Sons, New York.

Bollen, K.A. (1989), *Structural equation with latent variable*. John& Wile, New York.

Bresnahan, T. F. (1989), *Empirical Studies of Industries with Market Power.* Handbook of Industrial Organization Vol. II, North Holland.

Collis, D.J., and Montgomery, C.A. (1995), “Competing on resource : strategy in the 1990s”, *Harvard Business Review*, Vol. 73 No 4, pp. 118-129.

Cotterill, R. W., and Harper, C.D. (1995), *Market power and Demsetz quality critique: An evaluation for food retailing*. Food Marketing Policy Center, Research Report Nº 29. University of Connecticut.

Dunning, J. (1993), *The globalisation of business. The challenge of the 1990s*. Routlege. London.

Foss, N. J., and Eriksen, B. (1995), "Competitive advantage and industry capabilities". *En Montgomery C. A. (ed). Evolutionary and resource-based theories of the firm*. Boston, Kluwer.

Geroski, P.A. (1988), "In pursuit of monopoly power: recent quantitative work in industrial economic", *Journal of Applied Econometrics*, Vol 3, pp. 107-123.

Grunert, G.K., and Baadsgaard, A. (1992), *Market-based process and product innovation in the food sector.* A Danish Research Program. MAPP, Working Paper nº1, ISSN 0901-4446.

Hakansson, H. (1987). *Industrial technological development: a network approach*. Rutledge, London.

Hitt, M.A., Ireland, D.R., Hoskinson, R.E., and Joseph, G.L. (2003), "Strategic Management". *In Hitt M.A, Ireland D.R., Hoskinson R.E., Joseph G.L., Hosk R.E (ed). "Strategic Management. Competitiveness and Globalisation (Concepts and Cases)*". Fifth edition With Info Trac College. Cincinnati Thomson-South Western, Ohio.

Hyvönen, S., and Kola, J. (1998), "New policies, new opportunities, but new treats: the Finish food in the EU". *In: Traill B.W., Pitts E. (ed). Competitiveness in the food industry.* Blackie Academic and Profesional, London, pp. 253-281.

INE, Instituto Nacional de Estadística (2005), Panorámica de la industria: estructura y características, www.ine.es/revistas/cifraine/0105.pdf

Johansson, J., (1983), *Firm specific advantages and international marketing strategy.* Dollhouse Discussion Paper in International Business.

Jöreskog, K.G., and Sörbom, D. (2000), *PRELIS 2, version 2.52 for MS Windows 2000, Windows 95, Windows 98 and Windows NT.* Scientific Software International, Inc.

Jöreskog, K.G. (2001), Analysis *of ordinal variables: Preliminary analysis*. Scientific Software International http://www.ssicentral.com/lisrel/corner/htm

Jöreskog, K.G. (2002), Structural equation modelling with ordinal variable using LISREL, SSI http://www.ssicentral.com/lisrel/corner/htm

Mamaqi, X., Meza, L., and Albisu, L.M. (2002), "Factores que influyen en la competitividad y estrategias de las empresas agroindustriales en Aragón, España". *Agroalimentaria*, Vol. 14, pp. 69-88.

Menguzzato, M. (1995), "La triple lógica de las alianzas estratégicas". En: *Cuervo et al. (ed.). Dirección de Empresas en los ´90*. Ediciones Civitas, pp. 503-523.

Porter, M. E. (1994), "Towards a dynamic theory of strategy". En Rumelt R. P., Schendel D., Teece D. J. (ed.). *Fundamental issues in strategy.* Boston: Harvard Business School Press.

Rama, R. (1998), "Estudio empírico sobre las fuentes de la innovación en la industria internacional de alimentos y bebidas". *Revista de Economía y Empresa*, Vol. 32, pp.1-18.

Rangone, A. (1997), "Linking organizational effectiveness, key success factors and performance measures: an analytical framework". *Management Accounting Research*, Vol. 8, pp. 207-219.

Shaffer, J.D. (1980), "Food system organization and performance: toward a conceptual framework". *American Journal of Agricultural Economics*, Vol. 62, pp. 310-18.

Scherer, F.M., and Ross D. (1990), *Industrial market structure and economic performance*. Houghton Miffin, Boston.

Trienekens, J., Uffelen, R., Debaire J., and Omta, O. (2008), "Assessment of innovation and performance in the fruit chain: The innovation-performance matrix", *British Food Journal*, Vol. 110, Nº 1, pp. 98-127.

Wernerfelt, B., (1984), "A resource – based view of the firm". Strategic Management Journal, Vol. 5, pp. 171-180.

Williams, L.J., Edwards, J.R., and Vandenberg R, J. (2003), "Recent advances in causal modeling methods for organizational and management research". *Journal of Management* Vol. 29, pp. 903–936.

Winter, S.G. (1995). "Four Rs of Profitability: rents, resource, routines and replication". In: Mongomery C. (ed). *Resource-based and evolutionary theories of the firm: toward a synthesis*. Kluver Academic Publishers. Boston.