Food chains and value system: the case of potato, fruit, and cheese

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Abstract. *The aim of the paper is to analyse patterns of value system sharing along food chains, so to explore the agro-food enterprises capacity to be competitive and sustainable. The research focused on three food chains: potato, fruit, and Grana cheese of Emilia Romagna region. The paper adopts the value system approach. The methodology is aimed at creating a consolidated financial statement for each food chain so to re-create the chain operating profit and identify how this is shared among the different food chain stages. The analysis is carried out on 189 enterprises for the potato chain, 187 for the fruit chain and 203 for the cheese chain. The number of enterprises was invariable over the 5 year 2003-2007, leading to some 2,900 financial statement analysis. The chains analysed show differences. In the potato and fruit chains 35% of value is created by distribution, whereas in cheese chain only 13.6%. Over the five years value decreases 5% in fruit and potato and 9% in cheese. The lack of adequate strategic food chain partnership allows an increasing retail market power over the whole chain at the expenses of the primary sector entailing a declining sustainability for all chain actors.*

Keywords: food chain, value system, profitability, potato, fruit, cheese

1. Introduction

Agri-food sector is increasingly facing challenges due to emerging economic and social trends. These are both exogenous to the single economic dimensions, such climate change, global economic downturn, and shrinking EU budget, and endogenous referring to the increasing attention over food safety and consumer trust, long-term decline in consumer demand towards commodity products and evolving consumer demands in favour of new products development - i.e. healthy foods, premium and indulgence foods, ethical, organic and locally produced foods - and concentration of market power into an oligopoly of major retailers. These trends are contributing to expecting structural change in all stages of the food chain, that is agriculture, industry and distribution. The underlying concerns over these phenomena call for strong attention over competitiveness and sustainability of the food chain, connected to each stage performance, but also to their mutual interactions, thereby creating systemic relations among companies. The creation of the value remains, also in modern economies, the objective at the basis of every business. As mentioned above, the dynamics of its creation nevertheless have deeply changed. The traditional self-sufficient and self-governing approach left the place to the more complex systemic approach, that unavoidably requires networking strategies and co-operation and co-production among enterprises. Market competition is realised through integrated systems of enterprises, and the new cooperation and integration approaches led to overcome the traditional conflict relations between customers and suppliers. The systemic and food chain perspective has become the most effective and efficient approach to achieve performing results.

The increasing interest over food chain issues is registered at all political and programming level, that is European, national and regional. At EU level, both DG Agriculture and DG Enterprise are increasingly focusing on the competitiveness of the food chain. 2003 and Health Check 2008 CAP reforms are promoting an agricultural sector better responsive to the market by freeing EU farmers from restrictions and prescriptions and by paying independently from the volume of production, thereby creating a CAP geared towards consumers and taxpayers. In addition, as stated in the Community strategic guidelines for rural development (programming period 2007 to 2013) approved by the Council “the reformed CAP and rural development can make a key contribution to competitiveness and sustainable development in the coming years”. In particular, one of the main lines of activities in rural development policies and plans for 2007 to 2013 is Axis 1: Improving the competitiveness of the agricultural and forestry sector. Community strategic guidelines for rural development state that rural strategies should improve the competitiveness of

the agricultural sector "by focusing on the priorities of knowledge transfer, modernisation, innovation and quality in the food chain". In the EU perspective only by improving agrifood chain integration, Europe's food industry can challenge global competition and rural economies, can create and retain value, and can contribute to economic growth and employment increase.

The European Commission strong interest over the food chain approach and the competitiveness issue has been recently confirmed by the cutting edge establishment of the High Level Group (HLG) on the Competitiveness of the Agro-Food Industry set up in 2008[1]. The formal objective of the body is to identify the factors, future challenges and trends that can influence the competitive position of the European Agro-Food Industry as well as to formulate recommendations for actions over the short, medium and long term in public policy and the regulatory framework which would enhance the sustainable development and competitive position of the sector. The work carried out is based on an integrated and holistic approach to include all relevant existing policy areas and all sectors involved in the food chain, from farm to fork, that is from agriculture to consumer[2].

Also at EU member states level, the food chain approach is increasingly adopted [3]. Italian Rural Development Plan 2007-2013 strongly focuses on food chain as a way to promote development and competitiveness of rural areas and economic actors active in rural territories. Moreover, since 2002 UK national government has supported a public initiative called Food Chain Centre, part of the national strategy to improve the competitiveness and profitability of farming, whose vision is "most efficient UK food chain supported by the most effective flow of information". Also UK current Rural Development Plan strongly supports food chain initiatives as a way to foster development and increase chain actors profitability. At regional level, Emilia Romagna rural programming document identified in the food chain strategy the way to coordinate and support the integration among food chain actors and therefore bring a more balanced market power distribution among economic subjects.

This overview suggests the extent to which the policy and institutional framework is currently acknowledging a strategic role to the food chain as a way to support farmers' better networking to the market and the consumers, to sustain food processors in their economic relations with distribution, and to attempt to integrate wholesalers and retailers with upstream chain actors. The aim of the present paper fits effectively with the contextual elements above and sheds some light on patterns of value system distribution along food chains over time, so to explore the agro-food enterprises capacity to be competitive and sustainable and to better understand the economic power relations of the different chain stages. The analysis is carried out on three food chains – potato, fruit and Parmigiano Reggiano and Grana Padano cheese – of Emilia Romagna region over five year time 2003-2007.

2. Conceptual framework

Despite the efforts made towards reaching a unanimously accepted and shared definition of the terms "system" and "supply chain", a degree of ambiguity remains with regard to the concept to which to refer. This situation also impacts on approaches to the study of the agrifood system. Despite being the object of prolonged debate, a unanimously shared view of the most appropriate method of analysis for examining the relationships between the parties which make up the sector under investigation has yet to be found. The heterogeneous nature of methodologies thus represents the natural expression of the continued need to identify clearly and objectively the components and relationships that link the economic entities involved in the system under consideration.

2.1. Food chain concept

The terms "supply chain" and "system" have frequently been used as close equivalents of the terms "agrifood chain" "sector" and "stage". This varied mix of terminology, however, conceals a desire on the part of authors to define new paradigms with which to consider the agrifood industry from different

[1] The High Level Group (HLG) on the Competitiveness of the Agro-Food Industry was set up by Commission Decision of 28 April 2008 (2008/359/EC) and launched officially on the 12 June 2008 by Vice-President Verheugen, following the study "Competitiveness of the European Food Industry - An economic and legal assessment" and the conference: "Promoting the leadership of the Agro-Food Industry" held in November 2007.

[2] The following areas of interest were addressed during the HLG discussions: Agricultural and Environmental Policy; The Internal Market for Food; The Operation of the Food Chain; Research and Innovation; Trade and Exports

perspectives [18] [7] [30] [4]. By referring to the minimum unit of observation considered in the different studies of systems, it is possible to draw a distinction between those whose approach is strictly macroeconomic [6] [11] [19], microeconomic or a blend of both [29] [2]. Davis and Goldberg [6] were among the first to introduce the concept of "agribusiness", which they defined as the set of economic institutions involved in the agrifood business, which can be broken down into as many sub-systems as there are categories of agricultural product [11]. From a distinctly microeconomic perspective, the concept of agrifood chain proposed by Malassis [19] finds tangible expression in the functionalist approach to the study of the system and in the notion of supply chain / product respectively. The key to the reading of this analytical perspective consists in interpreting the agrifood chain as a group of economic entities involved in fulfilling the functions of production, transformation and distribution of the agrifood product, and which are linked by functional and structural relationships aimed at meeting the food requirements of the demand side. Malassis's contribution regarding the concept of the agrifood chain stands out for its markedly operational slant, as well as being inextricably linked with the product to which the study pertains. Looking deeper into this perspective, the concept of the agrifood chain appears to represent more closely an analytical methodology, a descriptive instrument and a criterion for highlighting the relationships that link the activities of the primary sector with those both upstream and downstream. In line with Malassis's contribution, Arena, Rainelli and Torre [1] conjugate the concept of the agrifood chain as a criterion of classification and analysis of the economic system, which must be systematically and theoretically defined. A large and varied range of issues, however, gravitates around the requirements indicated by the authors. These dilemmas include the fact that the adoption of any system of representation of reality, simplified by category, inevitably leads to a loss of appreciability of the complexity of the system. It generally emerges that the concept of the agrifood chain frequently refers to an organized set of interdependent elements reciprocally linked with each other. Of particular importance is the notion of the system proposed in General Systems Theory (GTS) [34], according to which a system represents a group of entities that interact reciprocally with relationships of a functional and structural nature, which are capable of changing according to the reference environment and the cognitive objective of the study. By espousing the analytical approach of GTS, the identification of the boundaries of a system can thus be a choice guided by factors which are functional to the research or of a more purely structural nature. This approach circumvents the dilemma, which has often emerged in studies, of establishing a unanimously accepted criterion for identifying the perimeter encompassing the agrifood system, insofar as the latter can change as a function of the objectives of the research. In the light of findings, the functionalist approach of Malassis and the notion of the system which emerges from GTS appear to blend beneficially with each other as a useful approach for delimiting the boundaries of any agrifood chain under examination.

2.2. Food chain competitiveness

Competitiveness and value-generation within a system are frequently-recurring themes in economic research projects focusing on the agrifood sector. Competitiveness in particular is a topic which has spawned an abundance of research activity aimed at defining its meaning and nature, and approaches to obtaining a competitive edge. The subject is extensively debated in both microeconomic and macroeconomic research. The former relates chiefly to contributions aimed at studying the competitive strategies of companies or systems of businesses, whereas the latter relates primarily to the study of a sector of the economy or the national economy as a whole. Regardless of the reference framework, competitiveness is considered to be a multi-dimensional concept. Some authors see it in terms of productivity [21] [28], the ability to act and react to market-generated stresses more quickly than competitors [31] [16] [10], the ability to stay in business by making the most effective use of the available resources and safeguarding investments [12] [14] [23], the capacity of a company to generate value [26] and its capacity to attain and retain over time a favourable position in the market [27]. The different interpretations of the term "competitiveness" are thus indicative both of the importance of the subject and of the difficulty of confining its meaning within a single conceptual framework. Interpreting the concept of competitiveness in a distinctly market-oriented light, Fahey [9] refers to it as the capacity to make a company or a system of companies favourably different in the eyes of consumers. Other cases, by contrast, yield a vision more centred on the aptitudes of the company. Kogut [17], for example, by focusing more on the causes than on the effects of competitiveness, equates competitiveness to a favourable situation for the company or system of companies [25], generated by a benevolent combination of corporate resources and the ability to manage them. In other contributions, competitiveness is equated to a company philosophy, rather than to a business objective to which to aspire, insofar as it constitutes an essential pre-requisite for ensuring the

financial and economic sustainability of the productive activity and the capacity to generate value over time [33] [5]. It is for this reason that the concept of competitiveness is frequently anchored to a medium and long-term timeframe, within which the business must succeed in orienting itself dynamically and profitably with respect to the market, in such a way as to attain better performance than its competitors [20]. From this perspective, enterprises or groups of enterprises occupy a favourable position on the market when they manage to generate more value than their competitors and when the extent of that value is greater than the cost incurred in generating it. In other words, an entity holds a competitive advantage when it manages to attain and retain consistently over time a higher degree of profitability than its competitors [13]. The theoretical model proposed by Porter [27], on the other hand, departs from the traditional functional classification of the areas within the company and focuses instead on the activities[3] undertaken by the latter to achieve its objectives. Competitiveness is thus defined as the capacity of a company to perform its activities in a better way than its competitors, combined with the fact that the market attributes a value to those activities [15]. It is thus the task of the company to identify and maintain those activities which generate value and reduce or eliminate the others. The combination of these interdependent activities, linked by relations of a functional nature, gives rise to the business's value chain. Optimizing and coordinating the various links in the value chain contributes to gaining competitive advantage through various competitive strategies, such as reducing production costs, differentiating the product offered for sale, and reducing transaction, distribution and product utilization costs. Analysis of a company's value chain thus provides an effective instrument for internal diagnosis in support of corporate decision-making relating to the search for the best strategies for attaining and retaining competitive advantage.

2.3. Value system

From a long-term perspective, companies need to be aware of the opportunities open to them and make synergic use of the levers at their disposal, so as to reposition themselves profitably within the competitive arena, thus ensuring their ability to create value. The aptitude of a business to create value is the fruit of synergic optimization of internal production processes and direct and indirect relations with stakeholders. Corporate strategy is thus the art of optimizing internal processes, and positioning or repositioning the company profitably within its value chain (Norman and Ramirez, 1994). In this light, it becomes important to focus on the company as an integral part of the economic system in which it operates, whose vitality is a pre-condition of preserving and improving the capacity to create value over time. There is an increasing need to abandon the perspective of "internal" analysis, centred on the concept of value-added, in favour of "external" analysis, which has a closer affinity with the concept of the value chain, and thus overcome what Shank [32] identifies as two major problems: starting too late and finishing too soon in considering the stakeholders in the analysis of value creation. Freedom from the constraints of an "internal" perspective of corporate competitiveness, and the importance of the role played by the environment outside the company in assuring the latter's capacity to create value, clearly emerges in Porter's theoretical model of the value chain. In line with Malassis's functionalist concept of the chain [19], the value chain proposed by Porter finds expression in the combined set of values created by companies, reciprocally interconnected by links of a functional nature, from the supply of raw materials all the way to the end-users of the transformed product. The finished product thus represents the focal point of the value chain, while the chain itself is made up of all the activities upstream and downstream of the company's economic system which contribute to satisfying, directly or indirectly, the needs of the end-users of the product itself [24]. It thus becomes apparent that competitiveness and the capacity to create value are born of the efficiency of individual companies and of the entire network of businesses of which the company in question forms an integral part. In this respect, the value chain of a company fits into and interacts with the value chains of its suppliers upstream and those of its customers downstream [26] [8]. In this case, the focus is not on the value created by the individual company, but on the integrated system of values created as a whole along the entire chain, which different economic players produce jointly [24], and on the way in which the value is distributed along the chain.

As a whole, the value system thus represents the result of the value created by the company added to the value created by the activities of all the businesses which make up the system. Each company has a share of participation in the value created, which depends on the value perceived by the final customer and on the characteristics of the system in which the company itself operates, such as the level of

3 According to the value chain model, a company's activities are divided into two main categories: primary activities, which make up the entire transformation process right up to sale of the product, and supporting activities, which are necessary for optimum performance of the primary activities.

competitiveness of the markets, bargaining power in relation to suppliers and customers and relationships and level of integration, as well as the policies implemented in the sector.

3. Materials and methods

3.1. Materials

The analysis of the value system is based chiefly on accounting data of a capital, economic and financial nature, which can be determined from the financial statements of the individual companies selected to represent each of the chains to which the study relates. All of the companies considered, with the exception of a few indirect suppliers, are located in the Emilia-Romagna region. By perusing, checking and validating the financial statements viewed, it was possible to analyse the statutory financial statements of 189 enterprises for the potato chain, 187 enterprises for the fruit chain and 203 enterprises for the cheese chain within the period 2003 – 2007. The process of acquiring accounting data was dictated, on the one hand, by the need to give a medium term temporal perspective to the analysis, and on the other, by the need to ensure that the results were sufficiently up to date. The selected companies thus represent a consistent sample for the entire period in question. The accounting data relating to farms and to some of the financial statements for the industrial phases were acquired from the database of the regional accounting network held by the Agriculture Department. For other types of company, the financial statements, complete with explanatory notes and directors' reports, were obtained from specialized data banks[4]. For this reason, the companies selected were all joint-stock companies, which are required by law to file financial statements.

3.2. Methods

The chain, meaning the series of agents and operations that go into producing and transferring a given item of produce, can be effectively projected in the archetype of the value system made up of the value chains of the individual companies that constitute the chain itself. For this purpose, in light of the fact that any researcher embarking on the study of complex systems must be both an acute observer and a skilled designer, the analysis of the value system starts with the definition of the perimeter and architecture of each of the three chains under examination. Having defined the structure and range of the system, the methodological approach involves selecting companies operating concurrently in the five years in question, which can be taken as reference frameworks for each of the functional phases into which the agrifood system under examination can be divided. Selecting the companies constituted a preliminary step in gathering the accounting data used in the subsequent analysis of the value system along each chain.

3.2.1. Chain mapping

Defining the architecture of an agrifood system is rarely a simple task. The difficulty in designing the structure of an agrifood system derives from the complexity of the stages involved in the physical flow of goods, as well as the extent and complexity of the relationships that link the parties engaged in meeting market demand for foodstuffs. It should also be noted that the extent and range of the field of investigation can be modulated according to the characteristics of the production sector in question, the reference object[5] and the aims of the analysis. In a private context, the choice may depend on the breadth of the business area of the company and the opportunities for forging relationships of integration with other agents. In a public context, by contrast, the limitation might be influenced by the boundaries of the areas of control and intervention that apply to the individual bodies.

Given that an extensive range of information of a technical, economic and financial nature is required for each stage, the extent and degree of complexity constitute an inevitable compromise between cognitive

4 AIDA, Bureau van Dijk

5 The degree of precision rises in proportion to the extent to which the reference object is defined in terms of its characteristics and production and distribution process. In this respect, a single commercial reference would be the most appropriate choice. The aim of analysing the value chains of the entities that make up a value system, however, dictates the need to refer to the product categories or the divisions within which the various entities operate.

requirements and the practical possibility of locating the necessary information[6] . The structure of the chain can be effectively depicted in a sequential, mono-directional scheme of the value system in the form of a flow sheet. By providing a system overview which also identifies the boundaries considered in the survey, this approach enables to highlight those aspects of a functional nature that distinguish the agrifood system in question and, as a whole, enable the chain to meet the market's demand for foodstuffs (Malassis, 1973). This form of representation therefore delivers a dual benefit: first it constitutes the framework on which the subsequent stages of the study are built and which ensures that the study meets the necessary criteria of repeatability and comparability; second, meanwhile, it provides the first descriptive result of the technical and functional characteristics that distinguish the specific agrifood system under investigation. For each chain, a focus group (FG) was held, which lasted approximately 3 hours and was coordinated and moderated by the Study Director. Each FG involved ten opinion leaders representing each stage of the chain. During the meeting, information of a qualitative nature was collected regarding the key players in each stage of the chains, and the organisational forms, types and intensity of the relationships between them. The findings that emerged from the discussions thus provided a preliminary action in designing the chain and in subsequently selecting the companies. With specific reference to the systems examined, this study[7] was conducted on the basis of the structure shown in Figure 1. In this case, each stage shown is (respectively) a direct or indirect supplier of the stages located downstream of it and a customer of those located upstream.

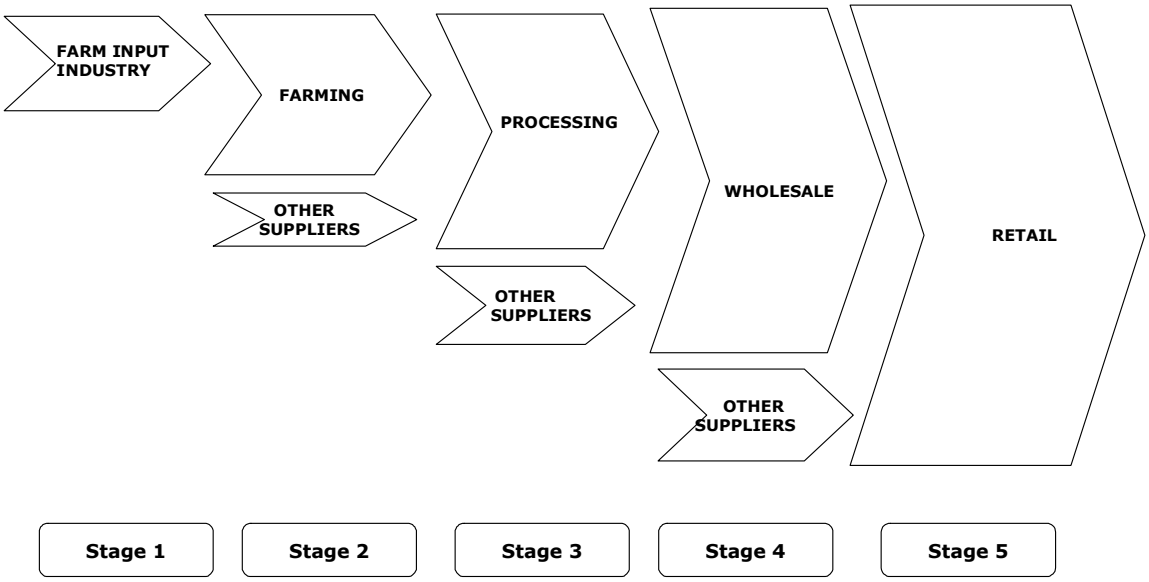

Figure 1. The value system

3.2.2. Selecting the companies

Identifying the profiles of companies is a particularly important stage, insofar as it influences the sampling and selection of the productive entities to be considered in the survey. Using the basis of the value system model illustrated above and with specific reference to suppliers of farms, the observations from specialised data banks were selected from among companies which, in various capacities, supply raw materials and services to farmers for the running and management of their farming activity. This category includes suppliers of fertilisers and phytopharmaceuticals, fuels and agricultural machinery hire. With reference to the agricultural phase, consideration was given to all farms which generate at least 40% of their revenues from the sale of agricultural produce. For the subsequent processing phase, consideration was given to all companies which transform the agricultural produce in question into food products. The commercial phase was broken down into the wholesale and retail trade. The wholesale division encompasses businesses which supply retailers, whereas the retail division encompasses entities

6 The highest degree of precision and accuracy would be attained if the study were to analyse the value chain of a specific commercial reference, for which the individual components and processes necessary for production and distribution were known and defined. Since the necessary information falls within the domain of company auditing, however, it would not be easy to source.

7 The study was conducted within the framework of a research project run by DG Agricoltura from the Emilia-Romagna region, aimed at constructing a system of knowledge for the purpose of governing interventions in the agrifood industry

set up for the purpose of selling goods to final customers, such as hypermarkets, supermarkets and normal trade. The analysis also took account of indirect suppliers of transport and logistics services and other business consulting services (e.g. administrative and accounting). Two distinguishing features were jointly considered in the company selection process: a "target" number, dictated by the number of companies that make up the sector in question, the need to obtain a sufficient number of observations to enable average group data to be calculated and the availability of a five year set of financial statements. For the purposes of defining the sample of companies, use was made of asset-related data and specific information obtained from the FG. The sampling plan in particular was adapted on the basis of the findings of the FG regarding the numerical composition of each stage in the chain, in order to ensure the closest possible adherence to reality.

3.2.3. Analysis of the value system

The analysis of the value system in each chain is based on the hypothesis that the chain itself can be conceived as a "group" of companies comparable to an industrial holding company and its subsidiaries, rather than an accidental combination of operators brought together by the market by virtue of their membership of the same production chain. If we accept this perspective, we can also accept the assumption that, in chains, like in groups of companies, it is possible to consolidate results in order to produce "consolidated financial statements for the chain". In this light, the procedures used for calculating the average values of the accounting data drew upon the income statement of the different companies for each stage into which the chain is divided. In particular, this process of consolidation and analysis of value adhered to the following processing stages: reclassification of the income statement, common sizing, weighting and consolidation.

Reclassification – A concise income statement was compiled for each company, defined in terms of gross production (GP) and net value added (NVA). A statement of this type is highly informative both for the companies concerned and for external bodies, because it quantifies the new wealth produced and highlights how such wealth is distributed among the parties that played a role in generating it (Table 1).

Common sizing – To facilitate comparison with other entities in the same stage, or in different stages within the chain, it is helpful to common sizing the financial statement values into individual percentage of a total. The representation of financial statements in percentage form is in fact a recognised technique for analysing financial statements. Total revenues from sales and services are assigned the value 100, and all entries thereafter are expressed in percentage form (Table 1). In practice, each financial statement entry is transformed into a composition index. If the stage concerned is made up of a group of companies, it may be advisable to calculate average values on the basis of common size values rather than absolute values. From a methodological point of view, it should be specified that in both cases, the indices were determined with reference to the individual company and were calculated on the basis of the values assumed in the five-year period under examination.

Table 1. Common size income statement (example)

1.	Revenues	105,0
	- Sales	**100,0**
2.	Intermediate consumption	25,0
3.	Gross value added	80,0
	Depreciation	8,0
4.	Net Value added	72,0
	Labour	50,0
5.	Operating income	22,0

Weighting and consolidation – For this last phase, we need to know the extent of the relationships between companies in each chain. This information is gleaned in part from the notes to the financial statements and the accompanying directors' reports, and in part directly from operators from different chains during the focus group (Table 2).

Table 2. Composition of intermediate consumption (example)

	2003	2004	2005	2006	2007
INTERMEDIATE CONSUMPTION	100,0	100,0	100,0	100,0	100,0
raw materials	35,1	37,8	38,1	34,2	33,5
fuel	7,1	8,4	10,5	9,6	9,4
hired machinery	26,6	28,6	28,8	25,8	25,2
seeds	31,2	25,2	22,6	30,4	31,9

As previously explained, the income statements of the selected companies provide the starting point for reconstructing the value system. From an operational point of view, having attributed the value of 100 to the total revenues from sales of a stage of the chain (in this study, the sales of farms), the task is to calculate the contribution of the upstream and downstream companies to the total value of sales of the chain as a whole. The extent of this contribution can be measured in terms of the sum of the costs incurred for the purchase of raw materials and services. For each stage in the chain, these costs represent nothing other than the revenues from sales of the companies operating in the preceding stage of the chain. On the basis of this assumption, we can produce a set of consolidated financial statements, from which it is possible to determine the total income generated by the chain and to see how the total figure is divided between the various operators (Table 3). The parameter chosen for the purposes of analysing the value generated is return on sales (ROS). This indicator, obtained from the ratio of typical operating profit and total amount of sales, highlights the share of revenues that remains once operating costs have been covered. In other terms, the ROS indicates the company's capacity to generate and retain income from sales. Operating profit is one of the best parameters for assessing company performance, because it is influenced neither by extraordinary items nor by the financing decisions made by companies, whether out of choice or necessity. ROS is therefore the most neutral indicator for representing the value that the market attributes to companies for the activities that they perform.

Table 3. Chains' value creation (example)

		Farm input industry	Farms	Other suppliers	Processing	Other suppliers	Wholesale	Other suppliers	Retail
		Stage 1	Stage 2		Stage 3		Stage 4		Stage 5
1.	REVENUE	26,0	102,6	72,5	211,2	57,0	282,7	36,0	351,1
	- SALES	25,4	100,0	70,7	194,4	54,7	269,3	34,6	336,8
2.	INTERMEDIATE CONSUMPTION	22,6	25,4	53,2	170,7	34,4	249,1	20,4	303,9
3.	GROSS VALUE ADDED	3,5	77,2	19,3	40,4	22,6	33,6	15,6	47,3
	DEPRECIATION	0,6	6,2	2,2	10,1	1,8	5,4	1,4	8,3
4.	NET VALUE ADDED	2,9	70,9	17,1	30,3	20,8	28,2	14,3	39,0
	LABOUR	2,0	48,3	13,5	24,2	18,2	19,3	12,4	30,8
5.	**OPERATING INCOME**	**0,8**	**22,6**	**3,6**	**6,1**	**2,7**	**8,9**	**1,9**	**8,2**

3.2.4. Validation of results

The second focus group, carried out in the advanced stages of analysis of the dynamics of value in the chains under examination, marked the first step in validating preliminary results and collecting feedback from operators for the purpose of fine-tuning the analytical procedure and assimilating any observations of use in interpreting the results obtained.

4. Results

The results focus on the performance over time of four main indicators for the three chains analysed – potato, cheese, fruit - which respectively focus on the value of sales, the value created, the sharing of the value along the chain actors, and finally the profitability of the capitals invested. As explained in the

previous paragraph, these indicators are analysed considering all chain actors as belonging to one single company with one specific financial statement. The findings show the performance over time of the consolidated financial statements. Results show that downstream the farming sector there are a number of other stages and sectors' activities which work and profit, at times with benefits and earnings extended to all chain actors and other times with concentration of the risks and economic downturns at the expenses of the farming sectors. The service and processors actors seem to be in the position of passing on upstream along the chain exogenous difficult phenomena, and at times in particular the distribution can still increase its value. However, it is to be underlined that most of the overall chain value is created at the farm level, thereby confirming the crucial role that this sector plays in a systemic perspective of the regional economy. There are some distinctions among the three chains ought to be highlighted. The chain which shows the highest potential of value of sales creation in relation to an analogous value to the farm sector is the potato chain. Whereas the cheese chain shows a rather low capacity of creating high value of sales. This means that where the row material requires significant investments from other sectors so to process it and then sell it this does not lead to increasing sales, and neither to increasing value at the end of the stage. In terms of profitability of the investments, the prominent role is played by stage actors' suppliers in all chains. The weakest position is again covered by the cheese processors.

4.1. Sample description

Some types of enterprises are inevitably linked to many systems when different chains are taken into consideration. In this framework enterprises can provide services (logistics, administration, packaging) to a number of food chains and stages. Nevertheless, it is important to underline that within enterprises' value chain, the weight varies being determined by FG qualitative analysis's results and also by quantitative analysis of the intermediate consumptions drawn from financial statements. The analysed sample has a high heterogeneity both from an economic and a structural point of view (Table 4). This heterogeneity derives from the criteria of selection of FG enterprises and represents the investigated context.

Table 4. Basic descriptive statistics of sample (average 2003-2007)

		Farm input industry	Farms	Other suppliers	Processing	Other suppliers	Wholesale	Other suppliers	Retail
		Stage 1	Stage 2		Stage 3		Stage 4		Stage 5
Potato									
- enterprises	n.	60	55	24	14	42			18
- sales	Mln €	15,6	0,1	20,9	28,0	27,8			188,7
- assets	Mln €	11,6	1,0	13,5	21,5	19,0			174,8
Fruit									
- enterprises	n.	48	45	42	19	42	15	24	18
- sales	Mln €	11,1	0,2	20,9	11,8	27,8	21,7	20,9	188,7
- assets	Mln €	6,9	1,3	13,5	13,8	19,0	20,3	13,5	174,8
Cheese									
- enterprises	n.	59	41	24	29	42	14	24	18
- sales	Mln €	10,7	0,1	27,8	26,2	27,8	16,6	20,9	188,7
- assets	Mln €	6,7	0,5	19,0	17,9	19,0	7,7	13,5	174,8

4.2. Value of sales

The potato chain, with reference to the period 2003-07, registered a value of the sales of packed ready to sell product equal to 3,5-3.6 times that of the agricultural raw material of origin. Considering the output value coming from the main food chain stages, counting the value of the agricultural production equal to 100, the value from the conditioning, storing, handling and packaging results equal to about 95, while the distribution stage produces a further increase of the value, reaching about 160. Analyzing the single years and still keeping the row material value equal to 100, the chain has recorded strong oscillations in the capacity of creating value. In particular, the best performance was recorded in 2005, with a final value equal to 456, while 2007 had the worst result, with a value equal to 287 (Figure 2) .

The cheese chain shows a rather peculiar performance. Giving 100 to the value of row agricultural products, the average final value for the years 2003-2007 including all chain stages, that is processing, wholesaling and distributing is around 80. Analyzing the yearly data, 2005 is performing better than the other years, yet it does not pass the 200 threshold.

Finally, again with reference to the period 2003-07, the fruit chain value of sales of the product ready to be sold is equal to 220-230 the value of fruit at the farm level. Of this, 50 stays within conditioning, another 50 within wholesaling and 130 within the distribution stage. Yearly, there are significant differences. 2005 is confirmed to be the best year also for fruit, reaching a final value of sales equal to almost 3 times the value at farm level.

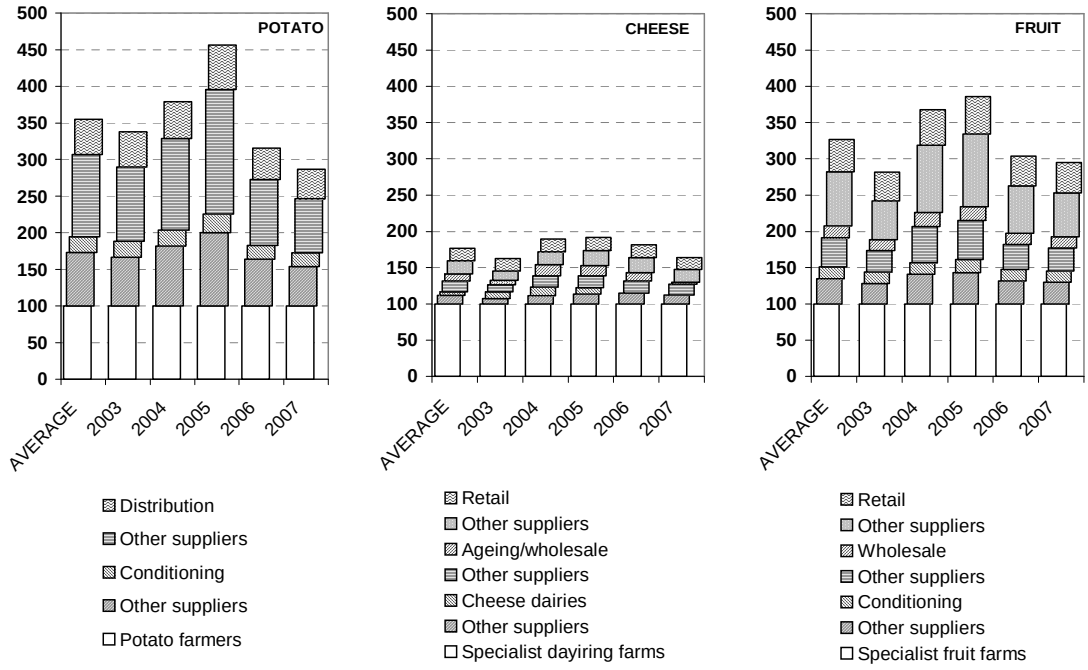

Figure 2. Value of sales (€; agricultural production=100)

4.3. Value creation

The analysis of the value created by the whole potato chain – identified sum of the averages of 2003-2007 return on sales - showed a satisfactory result, since the relation between the value and the operating results created is equal to around 20% of the total value, corresponding to a value of 71. The dynamics of such indicator shows two peeks, at the beginning and at the end of the period considered, while the values created result much lower in 2004 and 2005 (Figure 3). In the cheese chain the relation between the total value chain and the operating results is 18%, equal to a value of 32. By analysing the yearly performance, 2003 is the year which registers the best operating result (32), in proportion with the total chain value. Finally in the fruit chain, the relation between the total value chain and the operating results is 19%, equal to a value of 63. The performance of the operating results over time registers a peek in 2003 (71) and in 2007 (66), especially in relation with the total chain sales value.

4.4. *Value pie* sharing

Analyzing the sharing of the value among the different chain actors over time, two main phenomena can be highlighted. First, it is evident that the farmers and the distribution absorb an important quota of the total value. Second, over time farms play the role of the "shock absorber", since they get loaded of the economic oscillations in favour of a good stability of the other chain stages. In the potato chain, the value is strongly concentrated at the farm and distribution stage. However, whereas over time the distribution suppliers, conditioning and conditioning suppliers keep the same level of value, farmers' quota of value in 2005 (around 20) is half the value in 2003 and 2007 (around 40) which corresponds to an increase in the value of the distribution stage (Figure 4). In the cheese chain, the overall value of the operating results is

strongly concentrated in the agricultural stage of the chain, which in turn is also almost the only chain stage which absorbs the overall diminishing chain value of the operating results.

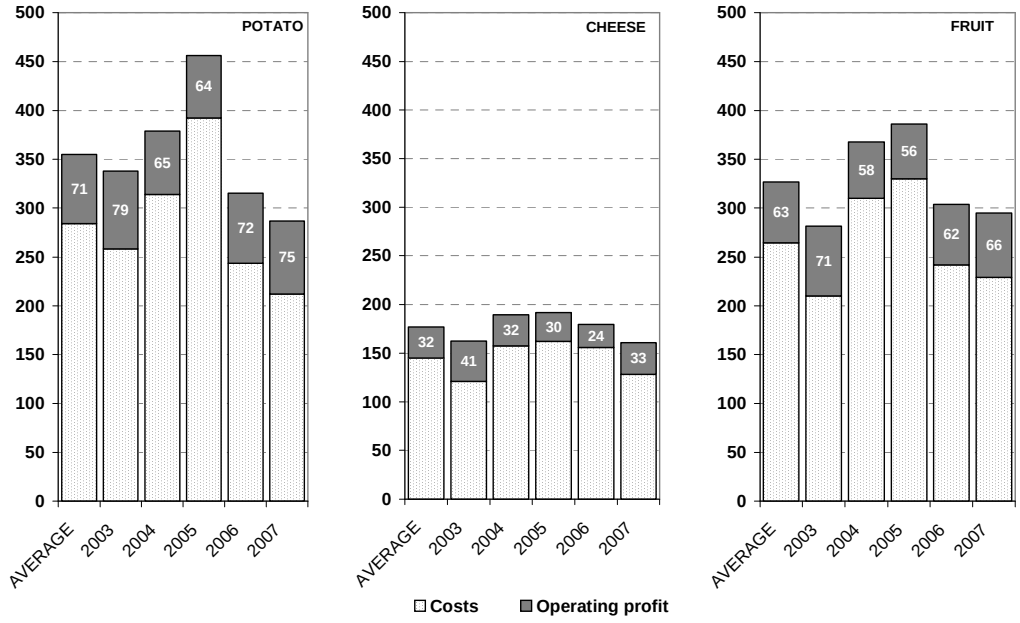

Figure 3. Analysis of value of sales (€; agricultural production=100)

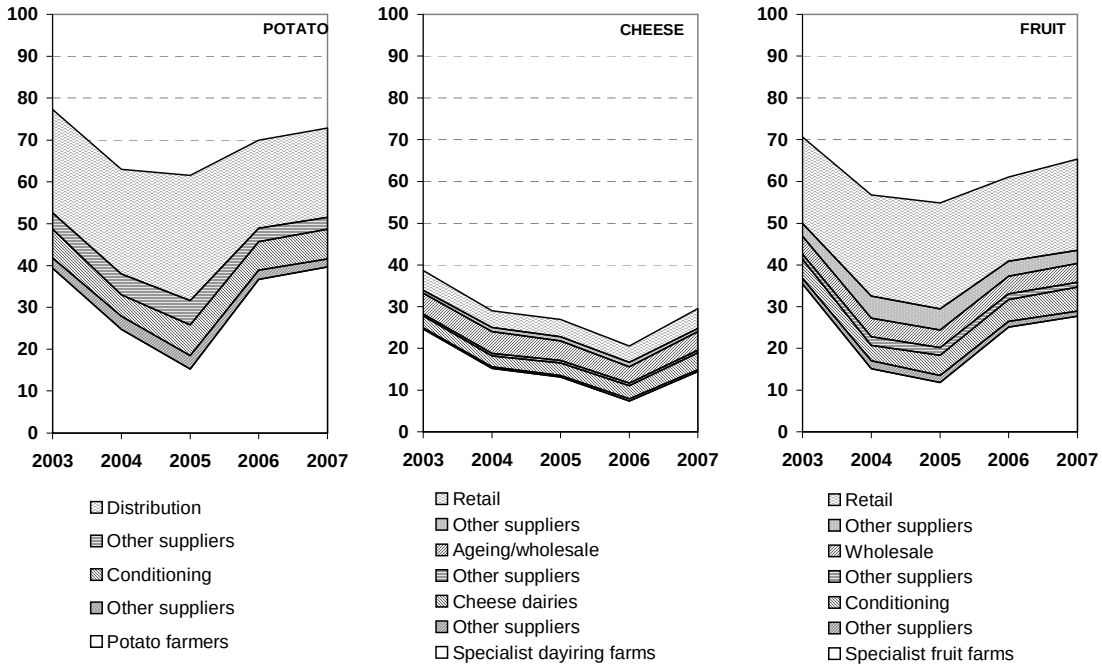

Figure 4. The sharing of the "value pie" (€; agricultural production=100)

Similarly, in the fruit chain, the value is mainly concentrated at the farm and distribution stages. However, it is interesting to analyse that when there is a general contraction of the overall chain operating results value, this is concentrated at the farm level and it is not proportionally registered in the other chain stages. Actually, there is a slight increase of the operating results at the distribution stage, as it is particularly evident in year 2004 and 2005.

4.5. Profitability

The analysis of capitals profitability, based on the relation between the operating results and the same capitals on average of all five years considered (2003-2007), shows satisfactory levels for all three chains stages, besides in particular the processing stage in the cheese food chain which is below 2% (Figure 5). The results emerging through an undifferentiated approach of the various chains show that given an overall average around 4,8%, the suppliers of all stages perform better than the other chain stages. This is particularly evident for the retailers and wholesalers and not so straightforward for farmers' suppliers, since farmers' profitability shows low levels in all chains. Moreover, it is interesting to see whether there are differences among the food chains analysed. Focusing on the overall chains, the potato performs better than the others, followed by fruit and then, at some distance, by cheese chain. Both fruit and potato chain taken as a unique entity perform overall above the average, and in both cases the stages which suffer the most are the farming stages. Whereas in the cheese food chain most stages perform rather low, especially the farmers (around 2.2%). Finally, the comparison among the same stages of the different chains shows that the fruit chain performs better than potato at the downstream stages (around +2% - + 0.2% of average), and potato performs better than fruit at the upstream stages (+0.1% - +0.3% of average).

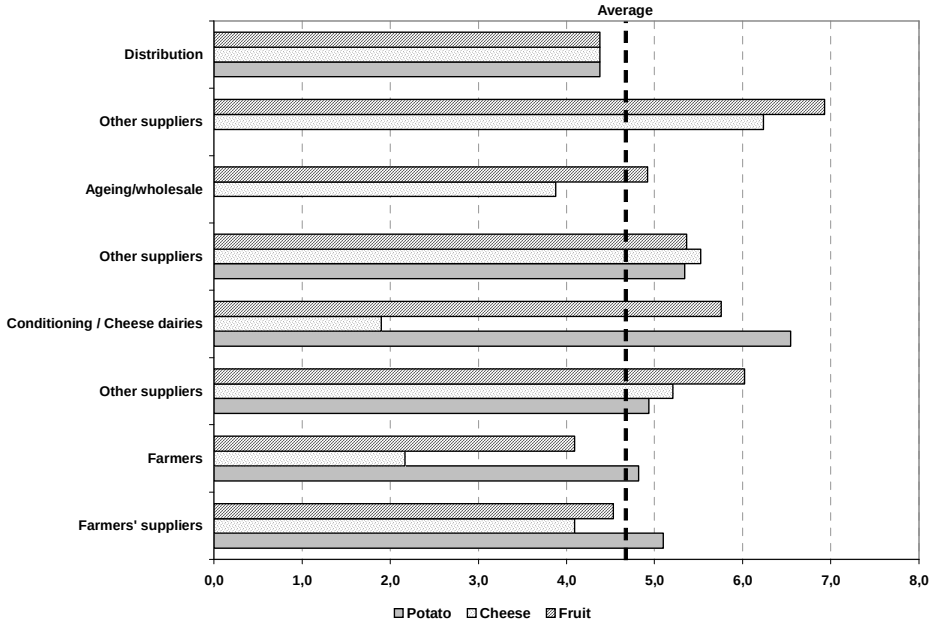

Figure 5. Return on Investment (%)

5. Final remarks

The adopted approach for the definition of value chain gave the framework for identifying the boundaries of the single chains analysed, mapping the internal systems active in the chains, and analyzing the patterns and interactions' effectiveness at the basis of the chains economic performance. At the basis of the presented approach there is the belief, as sustained by the theoretical models analysed, that competitiveness is to research in the functionality of the whole system, rather than in performance of the individual business. The presented approach goes in the direction of satisfying the need of models for the evaluation of the performance of structures and of inter-companies organizational patterns. If theoretical and methodological contributions attempt to go in that direction, their applications are still focused inside the single business dimension. Effectiveness and efficiency indicators still represent the only performance evaluation models in most of businesses. The methodology presented, based on the model of the value system, is an attempt to overcome the qualitative and descriptive approaches for the analysis of the competitive advantage. The present research considers the food chain as a coordinated group of businesses adopting a holding company perspective so to be able to appraise the balances between the various actors and food chain stages. This starting point allowed to study the single chains' economic behaviour in terms of economic agents' power relations and competitiveness of the chains. Each chain

includes a number of systems and sub-systems which can be considered economic entities, which even though are not necessarily and consciously acting as if they were sharing a common goal, are still strongly linked by functional and structural relations so to deliver agro-food products. The analysis carried out clarified the relations which undergo between the primary sector, other food chain stages and their own suppliers. Each chain stage has an upstream and a downstream set of economic relations which are expressed in different ways. Only the combination of all indicators analysed for each food chain provides a full picture of the interacting dynamics at the basis of each chain performance. The multi-dimensions of the concept of competitiveness should lead to extrapolate conclusive elements only through the interpretation of a set of dynamic performance indicators. The five year comparative approach adopted for the analysis of each indicator for each chain shows that changes in the value of sales, the value compared to the operating results, the value sharing, and the capitals' profitability impact differently in the various chain stages.

The potato chain is a rather strongly polarized food chain in favour of two main chain stages, that is the farmers and the distribution. The potato primary production leads to good multiplications effect for sales value for other chain stages, in particular suppliers, which in total lead to an overall value creation, compared to the return on sales, concentrated at the farm and distribution level. Overall the potato chain performs rather well over time, thereby creating promising conditions in terms of competitiveness and sustainability. However, there is some incongruity on the impact of the value distribution through the years. Retailing seems to have the power of keeping a good level of value at the expenses of the farmers in particular. Also in terms of capitals profitability, the potato chain performs well with significantly high peak. In the potato chain economic power relations seem to be in favour of the distribution since negative dynamics exogenous impact in particular on the farmers. These, in turn, can keep on staying on the market thanks to the overall high value of sales, good value created and to their capacity of increasing or imposing their role along the chain. However, this is the expression not of a common goal shared among chain actors or of the optimization of the various links of the chain, but rather on the interpretation of the other chain stages as competitors or systems from whom absorbing part of the missing value due to the reduction of the sales. This dynamic is still rather contained therefore ensuring a fairly good chain competitiveness and sustainability.

The cheese chain presents peculiar characteristics. The value of sales is limited for all chain stages, the value created is low and is distributed unequally in favour of the farming stage through all the years, and the profitability gained is low for most chain stages, including the farmers. This chain is strongly focused on the primary sector, but since the farming activity does not lead to interesting economic performing results for all other chain stages there is a problem of sustainability for the whole chain. This chain does not even show the level of value creation which could initiate an economic power competition among chain actors. Given the value distribution pattern, the chain stage which should have the highest interest in the performance of the overall chain is the farmers. However, unfortunately, farmers might not have the entrepreneurial skills needed in order to orient the cheese chain more dynamically and profitably with a market-oriented production rather than production-oriented. This chain shows how the limited sustainability perspective is mostly linked to a limited capacity of defining strategies for attaining competitive advantage, at the expenses of the whole chain.

The fruit chain is characterized by good levels of sales value which, measured as multiplications of farmers' sales value, is rather well distributed. These sales created lead to good levels of value creation which is polarized in the farm and distribution stages. Over time, as seen in the potato chain, there is a trend which shows how the contraction of value creation occurred in some years is translated into an unequal sharing of the negative performance among the chain stages, at the expenses, in particular, of the farmers. Actually, the distribution manages to take some of the value lost by farmers. Over the five years, farmers report a level of profitability much lower than retailers and wholesalers. The strength and competitiveness over time is based by the good sales value, but these are eroded by the unequal distribution of value over time among chain stages which sees the distribution playing a predominant role. Also this food chain exists, in the first place, thanks to the fruit production carried out by the primary sector. The continuous squeezing down of their value and the low levels of profits might undermine the existence of the whole chain. Data cannot show the extent to which downstream stages purposely manage their business and achieve their economic performance thanks to a competitive advantage strategies against chain's exogenous competitors or thanks, instead, to efficiency reasoning applied or imposed on upstream chain stages. However, the competitiveness of the fruit chain can be ensured only through an economic advantageous combination of interdependent activities for all chain stages. Given the difficult

economic situation of other chain stages, distribution should increase internal business strategies so not to hinder other actors and jeopardize the whole chain competitiveness and sustainability.

The chain organizational pattern analysed is crucial when competitiveness and sustainability over time is the objective of small and medium farms and enterprises as is the case of the three food chain analysed. Within the framework of the present paper economic units as farmers and enterprises are viewed as if they were belonging to a common organizational pattern under the form of a chain. Therefore, the bottom line idea is that food chain components, especially small economic units, must be aware that a successful business will be reached thanks to chain relationships and by way of a virtuous supplier-buyer relation between companies. Small and medium enterprises' main reason to working together is to be competitive and build together the competitive advantage of the companies and the products put on the market. The present research shows that the sense of food chain identity and the mutual and common work preparatory for competitive performances, including the small businesses, needs further maturity.

The three case studies show that there is an increasing and strong interdependence among chain systems and sub-systems which should force each chain stage to interpret its own performance as based on the pre-requisite of the existence, in the first place, and sustainability, in the second place, of all other chain stages. Aware of this starting point the whole chain should improve its capacity of coordinating and looking outside the chain in order to study the market, both to identify product attributes and maintain the activities which generate value, and to face competitors bringing together each chain actor competitive advantage. Furthermore, each food chain actor should better aim at attaining and retaining economic performance achievements and a competitive advantage over time thanks to the coordination and optimization of other chain actors. Food chains dynamics showed by the present research show that economic agents are still far from fully adopt the concept of value system according to which the chain is a group of entities aimed at fulfilling food requirements of the demand.

Further research should be aimed at providing additional elements regarding the horizontal and vertical integration at the basis of the actors mutual relationships. This would be in line also with the increasing economic and political interest over food chain dynamics at European, national and regional levels. Current economic agents and political actors' awareness on the interdependence of food chain dynamics on a number of fields is growing, as it is becoming clear the chain does not end within the economic dimension, but it impacts the consumers, at the end of the chain, in their role of end-user of the chain output, and the territory, at the beginning of chain, in its various agricultural and rural socio-economic declinations.

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