

**UNIVERSIDADE DE SÃO PAULO**

**FACULDADE DE ECONOMIA, ADMINISTRAÇÃO E  
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**DEPARTAMENTO DE ADMINISTRAÇÃO**

SÉRIE DE WORKING PAPERS  
WORKING PAPER Nº 03/027



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COMPETITION IN FOOD AND AGRIBUSINESS**

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# **ECONOMICS OF NETWORKS AND PATTERNS OF COMPETITION IN FOOD AND AGRIBUSINESS**

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## **Abstract**

The paper discusses the concepts of agrifood chains, systems, networks and netchains. It addresses the issue of whether network concept is useful to understand the agri-food-business industry and if there are important consequences to extract regarding strategies and industry configuration. Most part of the literature on networks includes production systems (chains) as a special case within networks. Thus, the latter concept would be the most general. We argue that networks and production systems should be kept as distinct concepts in order to capture different strategies and coordination choices.

Networks should include interdependent entities and entail network externalities. Furthermore, network strategy and governance should involve delegation of decision rights to allow collective action and strategy. Decision rights are dispersed among network participants, thus requiring cooperation and commitment to collective strategy. Strictly Coordination Systems privilege vertical interdependencies, but not exclude lateral relationships. Network externalities may be absent and a leading organization holds the residual decision rights through contract termination clauses or buying power. When networks and SCS main characteristics are present, we have a netchain or netsystem.

Networks, production systems and netchains may be addressed as governance structures using Transaction Cost Economics, Agency Theory or Property Rights approach. There is no need for developing any new approach or science.

**Key words:** *agrifood systems, networks, chains, netchains, agribusiness strategies.*

## Introduction

During the last decade of XX Century, the concept of agri-food-business system has achieved worldwide acceptance and was adopted by most of academic and business documents. It was recognized that firms decision-makers had to considered the effects and constraints coming from suppliers and distributors in order to guarantee strategies success (Spiller (1997), Ménard (1996), Brousseau & Codron (1997), Phillipe, F. & L. Sauvé (1997), Zylbersztajn & Farina (1999))

Progressively, the concept of network has appeared in a number of papers and journals that address agri-food-business subject. Though very antique, the concept of network has gained momentum with the dizzy growth of information industry. Of course, for telecommunication, internet, software industries, network effects are strong and have important consequences for competition issues, such as the problems of *switching costs*, *lock in*, *winner take the most* (Economides, 2001)

The question I would like to address in this paper is whether network concept is useful to understand the agri-food-business industry and if there are important consequences to extract regarding strategies and industry configuration. That is, the paper will focus on network effects and strategies and not on the network as a governance structure, as this last issue is addressed in Zylbersztajn and Farina (2002)

The present paper argues that network effects are present in agri-food-business but in many cases, the concepts of production chain or production system are still the most appropriate. Although firms maintain vertical, horizontal and lateral relationships with other firms, extrapolating stricter production chains, the network concept will be useful if it brings contribution to understand firms and network strategies and the consequences to competition patterns.

### 1. Defining Network

There are a number of definitions of networks, from very generic to stricter definitions.

Ménard (2002:4) defines a network of firms as "... a very generic term, widely spread in sociology and management sciences, and that covers about all arrangements defining a set of recurrent contractual ties among autonomous entities. Two subsets have been more extensively studied. One is the supply chain system adopted to coordinate in many industries. The other is about distribution channels.). Therefore, we can learn that a network is a hybrid form of governance, and that what we call agri-food-system is a special case of a network. There is not special with a network in this sense.

Omta & Trienekens's definition of network also emphasizes the organization aspect, though introducing a flavor of strategy as they mention the value-adding objective of this organization. "Networks are looked upon as the total of actors within one industry and/or between related industries, which can potentially work together to add value to customers. Chains are considered to be composed of the actors in these networks, which vertically work together to add value to customers. ... A supply chain can be considered to be a special form of a supply network, in

which the inter-organizational relationships between the upstream and downstream partners with the focal firm are of a dyadic form” (Harland, 1999).

The economics of networks approach is well represented by the work of Nicholas Economides (1996 e 2001). Once again, networks and chains cannot be distinguished by their nature. “Networks are composed of links that connect nodes. Network components are complementary to each other. The complementarity is a crucial economic relationship and it is compatibility that makes complementarity actual. These characteristics are also observed between different classes of goods in non-network industries. A pair of vertically related industries is formally equivalent to a one-way network.” Economides (1996: 675-676).

Chain concept emphasizes vertical relations, while networks comprehend both vertical, lateral and horizontal relationships among independent entities. Therefore, network is a more general concept. Notwithstanding, Lazzarini et al (2001) explicitly differentiate chains from networks and suggest the concept of a netchain.

A netchain is “a set of networks comprised of horizontal ties between firms within a particular industry (layers), such that these networks are sequentially arranged based on the vertical ties between firms in different layers. The authors integrate supply chain analysis and network analysis by recognizing that complex inter-organizational settings embody several types of interdependencies which are associated with distinct sources of value (strategic variables yielding economic rents) and coordination mechanisms (stability of inter-organizational collaboration). To be considered a network the horizontal ties between firms must entail horizontal interdependency, pooled (associated with network externalities) or reciprocal (one agent’s input is another agent’s output and vice-versa). On the other hand, in sequential interdependencies one agent’s input is another agent’s output (Lazzarini et al (2001: 7- 12).

Sauvée (2002) adds one more characteristic to define a network: delegation of decision rights. That is, a collective action or strategy is adopted and it can be accomplished if and only if the network independent entities cooperate. There is not a dominant firm that concentrates the decision rights, although a strategic center could be identified.

If a leading company unilaterally adopts a strategy and contracts suppliers and distributors, keeping the residual decision right through unilateral termination clauses or through its buying power, then instead of a network we have a strictly coordinated agribusiness system<sup>1</sup> (Zylbersztajn & Farina, 1999).

The concept of network is obviously useful to understand competition in industries such as communication, information, computer hardware and software, where network externalities abound. The question turns out to be: is network economics important for understanding competition and coordination in agri-food-businesses? In which circumstances?

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<sup>1</sup> We use production system instead of supply chain because it is more general - distribution or further processing are also important. Instead of chain we adopt system in order to separate the coordination issue from a strictly technical approach.

## 2. Agri-food systems and network effects

Most part of network effects is based on technological features or consumer preferences. The literature does not provide examples of strong network externalities in food demand, such as for software and communication sectors. Moreover, agri-food production exhibits high technological tolerance<sup>2</sup> (Hirschman, 1958; Farina, 1996), which means that network consequences for competition, emerging from interconnection and compatibility requirements, such as *winner take the most*, *lock in phenomenon* and *switching costs*, are almost absent from the agri-food systems (Economides, 2001). However, there are a number of situations where network effects are present, mainly related to competition on quality attributes of products. Where competition is based on quality, network effects will improve the market position of network organization.

### 2.1 Public standards and Private Standards

Historically, food standards have emerged with the rise of markets for commodities, often as public standards to reduce transaction costs and increase efficiency, allowing expansion of trade. Standards were viewed as public goods necessary in the presence of imperfect and asymmetric information that cause market failure (Reardon & Farina, 2001).

Kindleberger (1983: 377) argues that standards are public goods due to the non-rival and non-exclusion characteristics. Moreover, standards present network externalities: the larger the number of producers and consumers that adopt a standard, the larger the advantages of additional users to adopt it, due to comparability and inter-exchangeability. As pointed by Lazzarini et al (2001:15) the standardization process creates a pooled interdependence with weak social ties and structural roles. In this case, the adoption of network as governance structure is not advantageous. The exchange through market mechanisms would be efficient.

However, standards are not merely public goods to resolve market failures -- they are strategic instruments of market differentiation and market share and niche protection by food companies (Reardon & Farina, 2001). As pointed by Economides (1996: 677), the firm has the option of making its products partially or fully incompatible, with components produced by other firms. This can be done through the creation of proprietary designs or the outright exclusion or refusal to interconnect with some firms. In agribusiness terms, the firm has the option of create its own standard, defining special quality attributes that differentiate the firm's product and excludes rivals. A good example is the Carrefour stamp for *origin controlled produce* in Brazil. The Carrefour standard includes sensorial attributes (size, colour, cleanliness), as well as production process attributes such as water contamination control, use of pesticides, varieties and packaging. The private standard will be a source of value if it is difficult or costly to reproduce. In

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<sup>2</sup> Albert O. Hirschman (1958) defines technological tolerance in the context of the theory of the unbalanced economic development. The stricter the technological requirement of a certain standard, the lower the technological tolerance

the Brazilian case, developing suppliers and coordinate the production system are the key barriers.

One must consider the capacities of firms to formulate and enforce private standards. The main capacity variable appears to be the buying power of the firm. This can be strong when the firm is giant and operating nationally and buying inputs widely (such as Carrefour or McDonalds), or it can be strong when a firm is only medium or small but in a niche market with a restricted set of possible suppliers of its inputs (such as many organic produce firms). They are not large or sophisticated but do set private standards and have a strong effect on the practices of suppliers.

In this case, a leading company adopts a differentiation strategy, whose result depends on the coordination of vertically related firms, in order to guarantee proper input supply and distribution. The arrangement has been called *strictly coordinated system* (SCS), emphasizing the alignment among strategies, transaction attributes and governance structures (Zylbersztajn & Farina, 1999). If we adopt a broad definition of network, this would be a network example, but nothing would be added to the former explanation and, the use of network concept would be redundant. If we adopt the Sauvée stricter definition, then SCS is a better concept to use in the mentioned situation.

A combination of netchain and network concepts as stated by Sauvée seems to provide the best framework to be adopted. **Network is a set of independent entities linked by horizontal interdependencies, which adopt common strategies and share the residual decision rights. Strong vertical ties are the basis of strictly coordinated systems, when specific assets are involved and there is a clear position of a leading firm. Networks have not a dominant firm, which holds the residual decision rights, and the role of each participant in the definition of the strategy is not proportional to its capital.**

## 2.2 Competition among networks and strictly coordinate systems

Two examples could illustrate the networks effects, strategies and organization: organic products and a case study provided by Fast & Food, a logistic operator, which coordinates a complex network in the franchising food business.

### 2.2.1 Organic Products

Organic products constitute a kind differentiation strategy based on the production processes. Product attributes cannot be observed or verified costlessly by the costumer, requiring a third part certification.

The concept of netchain is useful for understanding coordination and competition in organic markets. In the farmers' level layer, there are a number of producers linked by strongly horizontal interdependences and network externalities. The costs of controlling water contamination and organic inputs provision is lower, the larger the number of farmers adopting the organic production process in a geographical area. Moreover, as technological research for organic production is not well organized as the conventional technology, there are important knowledge exchanges among farmers.

The production and commercialization of organics present high asset specificity as price premium depends on the realization of transactions among several vertically related agents. Should these transactions not occur, redirection of the organic product to the conventional product market would involve a loss of asset value, since this market does not value the procedures adopted in organic production and the costs are, in general, greater. Moreover, if there is agrochemical contamination in any stage of product commercialization or processing, it is very difficult to identify and attribute responsibility. It is even more difficult to obtain reimbursement of the loss of asset value from whoever provoked the damage.

Thus, investment in production and commercialization of organics could only be made through vertical integration or adoption of idiosyncratic relational contracts due to the elevated transaction costs involved. The adoption of certificates issued by third parties is a transaction cost reducing tool that makes feasible the operation of the market of organic products, by guaranteeing conformity to the pre-defined standard.

Organic products are representative of a network organization and strategy. In the market different networks will compete to each other and the efficiency in vertical and horizontal coordination may be crucial for competitiveness.

#### 2.2.2 Fast & Food: a case-study

Fast & Food is a young Brazilian firm that handles logistics and product development for food franchises, which have been growing swiftly. The growth of franchise stores motivated by the expansion of away-from-home meals without the support of an efficient distribution system created the opportunity for the emergence of Fast & Food. The hiring of a logistical operator allowed franchises to serve the final client, guaranteeing supply, standardization of items of purchase, lower unit cost of inputs, centralized management of operations and information, among other benefits. In addition to the service of logistics, Fast & Food began to offer managerial reports of operations in order to facilitate shop and chain management. Furthermore, the firm created the department of meal development and franchise solutions, including developing and coordination of suppliers. The main clients of Fast & Food are small and medium franchising companies that have not enough size to coordinate its own network, such as McDonalds. Moreover, their growth is facilitated by the Fast & Food operation. Fast and Food business could be resumed in one word: network creation and coordination.

Fast & Food case differs from McDonalds experience. The latter is a leading company that develops its own recipes, specifies input standards and chooses suppliers and franchisees as well. Although there is food network around McDonalds, the strictly coordinated system seems more adequate to understand the dynamics and operation of this system.

Giraffa's competes with McDonalds. A network that adopts a collective strategy competes with a strictly coordinated system led by McDonalds. If competition is strong, economic profit tends to be equalized excepted profits except by brand-names and other product differentiation. No space for inefficiency would be allowed – neither in production, nor in coordination.

### 3. Conclusion

Most part of the literature on networks includes production systems (chains) as a special case within networks. Thus, the latter concept would be the most general.

We argue that networks and production systems should be kept as distinct concepts in order to capture different strategies and coordination choices.

Networks should include interdependent entities and entail network externalities. Furthermore, network strategy and governance should involve delegation of decision rights to allow collective action and strategy. Decision rights are disperse among network participants, thus requiring cooperation and commitment to collective strategy.

SCS privileges vertical interdependencies, but not exclude lateral relationships. Network externalities may be absent and a leading organization holds the residual decision rights through contract termination clauses or buying power. When networks and SCS main characteristics are present, we have a netchain or netsystem.

Networks, production systems and netchains may be addressed as governance structures using Transaction Cost Economics, Agency Theory or Property Rights approach. There is no need for developing any new approach or science.



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