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Loïc Sauvée

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## Efficiency, Effectiveness and the Design of Network Governance

Loïc Sauvé

Department of Management Sciences

ISAB, Postal address: rue Pierre-Waguet, 60000 Beauvais, France

Tel/fax : 33 (0)3 44 06 25 25 / 33 (0)3 44 06 25 26, E-mail: loic.sauvee@isab.fr

### ABSTRACT

The design of networks in their institutional and organizational aspects is a key determinant of their competitiveness. Consequently managers in agricultural and food industries have to address the question of governance design, i. e. of choices concerning the content and the architecture of business relationships. We will define network governance as the institutional matrix that encapsulates the configuration of multi-stage business arrangements within a given strategic network. Our objective is to show that the design of network governance must follow a two-track principle of efficiency and effectiveness. Both are organizational standards of global performance. The first one is an internal standard of performance measured by the ratio of resources utilized for a specific output, while the second one gives a measure of objectives reached by the organization for external evaluators. Drawing from transaction-cost economics and strategic management theory, we propose a grid that allows the simultaneous assessment of these two aspects. The grid is then applied to two stylized agrifood networks. We show that the choice of a governance form is an optimization calculus. A limited number of network governances are able to meet an efficiency/effectiveness principle. In these agrifood networks, the governance optimizes a cost-and-value ratio, but creates at the same time the conditions for flexibility and adaptability while developing and sustaining (tangible or intangible) strategic assets.

Keywords: Agrifood Sectors, Effectiveness, Efficiency, Governance, Network.

### INTRODUCTION

The rapid development of business interrelationships leading to network forms of organization is a key phenomenon of modern agrifood economies. Consequently, managers in these industries have to address the question of governance design, i.e. of the choices concerning content and architecture of these networks. Our objective is to show that the design of network governance must follow a two-track principle of efficiency and effectiveness fulfillment. Grounded in transaction-cost theory and strategic management analysis, our model for organizational choices and design operationalizes and endogenizes simultaneously two types of criteria concerning respectively, transactional alignment and strategic resources. The optimization principle for one particular network is to be found in the fulfillment of an efficiency principle, on the one hand, and an effectiveness principle on the other hand. Our model is applied to two stylized agrifood networks commonly found in the agricultural and food business sectors. Firstly we will define our conception of governance, its pertinence and specific content when applied to network forms of organization. Then we develop our model of governance choices based on our two-track principle. The model is applied to two stylized agrifood networks, a producers/cooperatives/union of cooperatives network and a producers/organization of producers/private firm network. Concluding comments follow.

### NETWORKS AND NETWORK GOVERNANCE

We would like to define precisely our acceptance of the term of governance. Widely used in supply chain management theory (see for example Hobbs, 1996, Lazzarini *et al.*, 2001, Sporleder, 1999, Zuurbier and Hagelaar, 2000, Zylbersztajn, 1996 for applications to agrifood chains), the concept is notwithstanding subject to different types of operationalization. We first delineate our conception of

governance in relation to the network form of organization. Then, stemming from these theoretical backgrounds, we propose a common grid for a comparative study of network governance.

### Governance in Networks

Anderson *et al.* (1994) define networks, or business networks, "as a set of two or more connected business relationships, in which each exchange relation is between business firms that are conceptualized as collective actors" (Anderson, Håkansson & Johanson, 1994:2). The essence of this definition is the concept of 'collective actor' and consequently the existence of collective actions. This point is also emphasized by authors such as Lorenzoni & Baden-Fuller (1995). For them "networks can be thought of as a higher stage of alliances, for in the strategic center there is a conscious desire to influence and shape the strategies of the partners, and to obtain from partners ideas and influences in return" (Lorenzoni and Baden-Fuller, 1995:157).

Many researchers showed the usefulness of the concept of governance for the study of networks (see for example Ghosh and John, 1999; Håkansson and Johanson, 1993; Powell, 1990). The starting point of their research is that networks can be seen as a combination of governance structures, with multilevel relationships between horizontally or vertically-related entities. Basically, the same working hypothesis, previously defined by Williamson (1996), applies: governance structures aim at mitigating all forms of contractual hazards found between the partners in a transaction-cost economizing way. But, at the same time, networks are complex organizational forms not reducible to a simple single transaction unit. For Ghosh and John (1999) the rationale of networks' institutional design is to be found in an "extension to the core model (of transaction-cost economics) by developing the interactions between the creation and claiming of value (...) on the choice of governance forms"(Ghosh and John, 1999:142).

In total, governance in networks is an institutional structure for which the role is simultaneously to define a process of adjusting durably a collective action (or strategy) between autonomous entities through the establishment of a 'private order' (Williamson, 1996) and to design mechanisms (either contractual or non-contractual) enabling the assurance, at the lowest cost, that the individual behavior of partners follows the rules for collective action.

### Network Governance as a Combination of Authority Structure and Interorganizational Mechanisms

Network governance being defined, let us now consider the components of its organizational design. Following previous works on this question (mainly Brousseau and Fares, 2000, Heide, 1994, Stinchcombe, 1990) we will consider two main dimensions of network governance : the allocation of decision rights and the interorganizational mechanisms.

Allocation of decision rights and decision holder(s). Authority is a specific means to govern specific contractual relationships, distinct from hierarchy as well as market relations. Authority is the institution of a private order between autonomous entities. In networks it can be achieved by other means than hierarchical governance but also by uni- or multilateral contractual provisions. Four types of authority modes are identified, from the most informal to the most formal: influence, trust, leadership and *ad hoc* institution (Ménard, 1997).

The allocation of decision rights defines who takes decisions and the nature of these decisions. Such an allocation of decision rights determines the roles and mutual obligations of the parts. As long as the allocation of decision rights coincides with property rights (i.e an independent firm responsible for its decisions) this identification is trivial. But in complex networks, delegation (or even sub-delegation) of decision power will occur. This delegation of power will not systematically coincide with property rights. The strategic center (or network captain, as suggested by Campbell and Wilson, 1996:127), through authority seen as a means, has a pivotal role in structuring the network. From an analytical point of view, the study of authority within networks is crucial to understanding who is in charge of strategic decisions and identifying the means by which the strategy is implemented. Beyond the diverse forms that authority can endorse in networks, its objective will always be to back up the strategic center. The critical dimensions of a strategic center are, according to Lorenzoni and Baden-Fuller (1995:147): to create value for its partners, to act as a leader, rule setter and capability builder, and to simultaneously structure and set up the network strategy. These critical dimensions will help to identify the decision holder(s) within the network.

Interorganizational mechanism. As soon as an authority principle and an authority structure have been set up within a network, the question of interorganizational relationships between partners emerges. The objectives of these mechanisms are to promote desirable behavior and prevent undesirable behavior. The means to achieve these objectives are diverse and many scholars have suggested that several types of mechanisms are possible. All of these mechanisms may be seen as decision procedures to fill the gap of contract incompleteness and to enforce the contractual promises. Heide (1994) for example identifies the planning and adjustment processes, the monitoring procedures, the incentive systems, and the means of enforcement. For Stinchcombe (1990), these mechanisms can be summarized in: incentive system, dispute resolution, and standard operating procedures. Brousseau and Fares (2000) define an incentive and coercion scheme, a supervision device and an arbitration mechanism. Following these authors, their findings are synthesized and a grid of two generic key mechanisms is suggested for insuring the continuity of network cooperation: incentive and control systems.

The incentive and control mechanisms are designed to "incite the agents to follow the behavior required, or, on the contrary, to dissuade them from adopting behavior that is opposed to their commitments" (Brousseau & Fares, 2000:411). For Stinchcombe (1990) an incentive system is a "way of measuring or otherwise observing levels of performance of a contractor or of a contractor sub-unit and allocating differential compensation based on the level of performance, without further recourse directly to the market" (Stinchcombe, 1990:226). Incentive and control mechanisms usually rely on performance or observable behavior. It has been widely recognized that the level of costs for measuring performance explains, to a large extent, the choice of incentive and control schemes.

In spite of the wide variety and diversity of devices inside each type of situation, these three generic mechanisms are found in all situations. These mechanisms play the role of invariant schemes in the face of universal contractual hazards: adverse selection, moral hazards, free riding. In any case, the ability to protect the value within the network in the long run is the determining factor for the success of the cooperation.

#### THE DESIGN OF NETWORK GOVERNANCE : WHAT PRINCIPLE OF CHOICES?

When it comes to the design of an optimal governance structure within the network, one must consider the principle(s) explaining arbitration processes. Following Pfeffer and Salancik's (1978) mold-breaking work in organization theory, we suggest considering two principles, efficiency and effectiveness. We will show that it is possible to bring together these two notions in a common framework. Then we cross the analysis with our institutional grid, considering network governance as a combination of authority structures and principles on the one hand, and interorganizational mechanisms on the other hand.

##### Efficiency

In transaction-cost theory, the concept of efficiency gives the rationale for organizational choices. The key notion of remedialness helps to understand this rationale. For Williamson, the choice of a governance form is made and thus is efficient when no "*feasible* superior alternative can be described and *implemented* with expected net gains" (Williamson, 1999:1092). An alignment principle gives the best governance form according to the different types of contractual hazards found between the transacting agents. As long as this alignment principle is applied in a static comparative analysis, i. e. when we consider that all the strategic choices as exogeneous, this efficiency principle is sufficient. But authors such as Ghosh and John (1999) and Nickerson (1997, Nickerson *et al.*, 2001) pointed out the necessity of a complementary approach to better understand organizational choices. Their widened perspective suggests that some variables, considered previously as exogeneous, must be endogenized. Indeed, two types of difficulties have been pointed out by these researchers when it comes to assess the content of strategic choices and their implications for the design of network governance.

The first problem is the identification of contractual hazards created by the multilateral dependencies. Contractual hazards are not given in themselves but instead are related to specific coordination objectives. For instance, the traditional alternative between cost-domination and product-differentiation strategies will lead to different contractual hazards and thus to different types of incentive mechanisms.

The second difficulty may be explained by the limitation of a static comparative analysis. Organizational efficiency cannot help to identify the ability of one particular network to maintain (or even

expand) overtime. This ability will depend upon the creation and protection of a quasi rent. Again, organizational choices are not reducible to a static and cost-minimization principle. Westgren (2000) showed that a model of alliance formation must address clearly this question of rent earning and protection.

#### Effectiveness

As suggested by Pfeffer and Salancik (1978) "the effectiveness of the organization depends on which group, with which criteria and preferences, is doing the assessment" (Pfeffer and Salancik, 1978:33). In a sense the concept of effectiveness shows that what is being produced is as important as the way (i. e. the ratio of input to output) it is produced. This concept is "applied by all individuals, groups or organizations that are affected by, or come in contact with the focal organization. Effectiveness as assessed by each organizational evaluator involves how well the organization is meeting the needs or satisfying the criteria of the evaluator" (Pfeffer and Salancik, 1978:34).

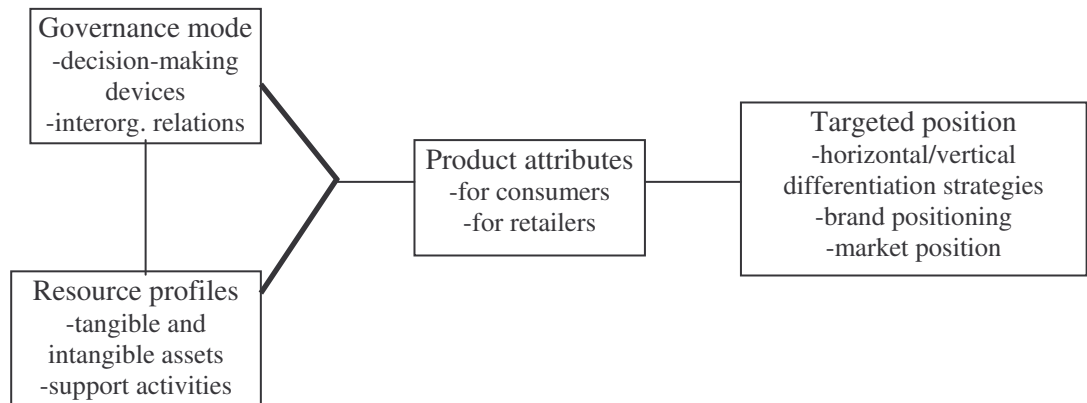
Considering examples of agrifood business networks oriented towards satisfaction of their clients, these external evaluators are mainly retailers and final consumers. The criteria show at the same time the ability to satisfy consumers (or clients in a broad sense), but also the ability to choose, at a given time and space, the right utility. This is why effectiveness, as a global standard, is much more difficult to assess than efficiency. As Nickerson *et al.* (2001) pointed out, "consumers are heterogeneous and no one strategy optimally serves all consumers" (Nickerson *et al.*, 2001). But this concept of effectiveness will be a way to endogenize strategic choices and their interdependence with resources and governance forms. The use of proxies about competitiveness in the long run (like market share, evolution of turnover, price premium etc.) will be a useful means to measure it. Thanks to these proxies, we will consider the effectiveness of the organization as a basic assumption.

#### An Integrated View: Effectiveness and Efficiency as Organizational Standards for Governance Design

Operationalization of effectiveness and efficiency concepts must be considered jointly. Our framework brings together the transaction-cost alignment of governance forms with contractual hazards on the one hand, and the matching of resource/governance form pairing with different kind of strategies on the other hand. Following Ghosh and John (1999), this is probably Nickerson (Nickerson *et al.*, 2001, Nickerson, 1997) who offers a more complete view of transaction-cost economics in this strategy perspective. For him, individual transactions and strategy can be linked together. To do so he considers that the firm (or the network) is an "expanded institutional set-up", and offers a way for identifying feasible strategies. He shows that the ambivalence of networks is to be found in the design of governance. The network owes its existence, in the long term, to its capacity to unify its strategy in coherence with independent entities. Unlike fully integrated firms, networks, through cooperation, allow simultaneously joint actions and freedom.

Our model of choices for governance design actually applies this "positioning-economizing" perspective to the categories of network governance defined previously, i. e. authority structure and incentive/control mechanism. For Nickerson *et al.* (2001) "each target position and corresponding resource profile/organization pairing represents a strategy. Consumers respond to the choice of strategy by purchasing products based on the match between their preference and utility and the costs and benefits of products attributes offered by alternatives strategies (...). Heterogeneity in firm strategy reflects that firms occupy different feasible resource profile/organization pairing" (Nickerson *et al.*, 2001:254). Then "a target market position is supported by an underlying resource profile, which is paired with an organizational structure to generate product attributes consistent with the target position" (Nickerson *et al.*, 2001:254). Figure 1 shows our conceptual framework, with the underlying idea of a codetermination (or alignment) between two set of key variables: governance form with resource profile (vertical alignment on the left), governance form/ resource profile with strategic orientations (horizontal alignment on the right). These alignments are explained by the fact that "market position, resources, and governance are interdependent, which means each must be chosen with respect to others." (Nickerson *et al.*, 2001:252).

Figure 1  
Efficiency, effectiveness and governance design: a conceptual framework



source: adapted from Nickerson *et al.* (2001:255)

### NETWORK GOVERNANCE IN AGRIFOOD SECTORS : A STYLISTIC COMPARISON

A research programme on quality strategy and organization of agrifood chains will serve as a basis for empirical testing (Mazé *et al.*, 2001). In the spirit of Yin (1994), we focus the analysis on case studies seen as a vector of an analytic generalization. Thus, "a previously developed theory is used as a template with which to compare the empirical results of the case study" (Yin, 1994:31). Two types of networks have been retained, both being emblematic forms of organization within the agrifood sectors. For confidentiality reasons, our examples are fictitious but draw heavily from real cases. Moreover we must acknowledge that both types of networks represent a market *success*. We thus will consider that, in spite of strategic heterogeneity, they came through the efficiency and effectiveness standards. In other words these two networks are comparable in terms of pairing between governance forms and strategic orientations.

#### Network Architecture

The type A network is a three-level network organizing independent producers, their cooperatives and two subsidiary companies. At the basis of this network, one hundred fresh tomato producers invested in greenhouses and are highly specialized in tomato production. These producers are organized in two cooperatives, mainly in charge of technical aspects of production and of the sorting of the products. These cooperatives recently invested in new packing stations and in traceability systems. These cooperatives created two joint ventures. The first one is a specialized company for input supply of biological and integrated pest management programme (including technical services and supply of insects). The second one is in charge of the list of specifications, of controls over the production process, of marketing and sale actions. This joint venture is also the owner of the brand (figure 2).

The type B network is a four-level network joining independent producers, their producers' organization, a formal 'interaction' entity, and a private firm. The basis of the B type is a private company for processed vegetables, owner of the brand for canned vegetables. The factory is exclusively supplied by one producers' organization (hereafter PO). About three hundred individual producers are involved in this PO. A formal structure of collective coordination exists between the PO and the factory called the interaction committee (hereafter IC) (figure 3).

Figure 2  
 Type A: Producers/cooperatives/union of cooperatives network

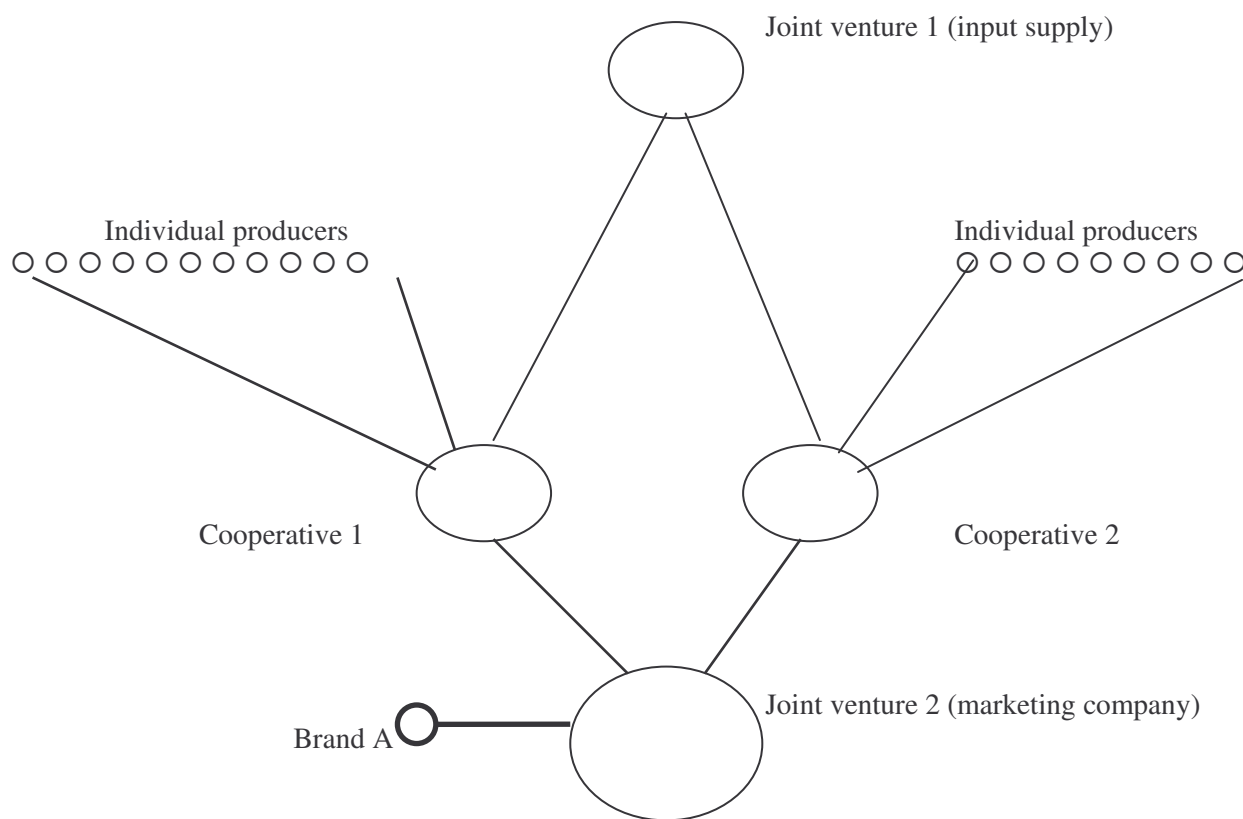
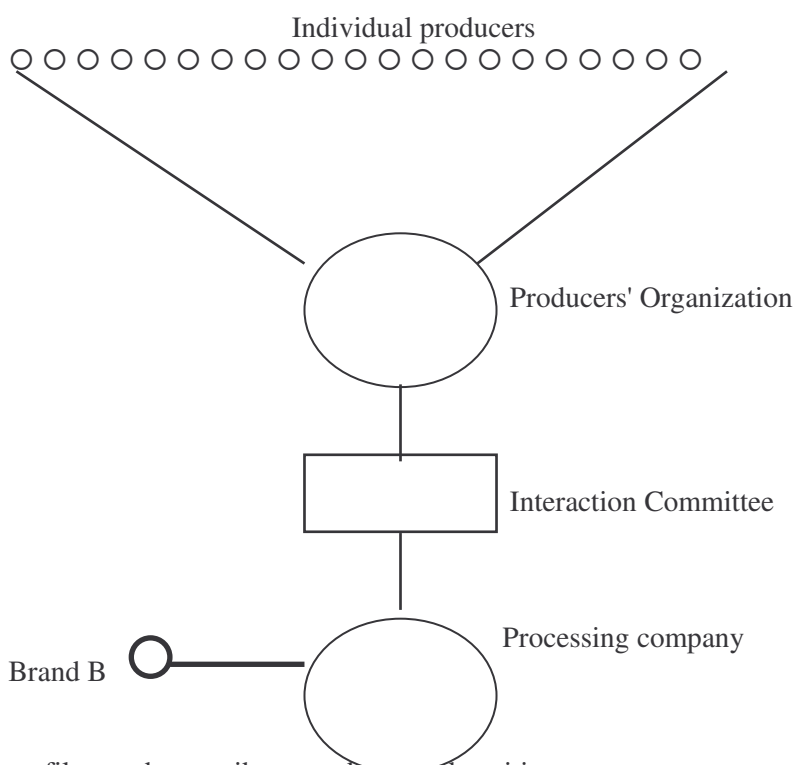


Figure 3  
 Type B: Producers/PO/IC/private firm network



Effectiveness: resource profile, product attributes and targeted position

In type A network, two categories of attributes are at the basis of the differentiation strategy. The first one is the pesticide-free specification for the fresh tomatoes, obtained with the application of a very strict list of specification at the production level; the second one is the visual aspect of the tomatoes in terms of color and size. These product attributes are highly dependent on strategic resources developed indoor. First of all, the investments in a specific input provider for organic farming appear to be a strategic resource. Complementary investments have been made in human control means such as specialized technicians and agronomic supervisors for growers, as well as in a complete information system tracking the products from greenhouses to packing stations and sales.

In type B network, one attribute clearly distinguishes the brand from other types of similar products: its organoleptic characteristic. Most of this characteristic comes from a tight planning coordination between the growing operations and the processing company, and through a close control by technicians of field activities and calendar. From that, strategic assets can easily be identified: there is the know-how of field operators, control means (human resources), procedures for close coordination between farmers and the processing factory.

These two networks clearly reach effectiveness, in the sense that their brands reflect market success, with a rapid growth on their respective markets. Moreover the products sold under the brand names benefit from a significant price premium. They also show longevity, created both more than twenty years ago. This alignment between resource profile, product attributes and targeted position (cf. table 1) leads to the choice by consumers. This step of the analysis is a way to identify the key resources: indeed each resource profile creates *specific exchange conditions*. Following transaction-cost economics predictions, these conditions call for an economizing form of governance.

Table 1  
Resource profiles, product attributes and targeted positions

	Resource profile	Product attributes	Targeted positions
Type A network	Specific investments in input supply Specific investments in control means and traceability systems Brand goodwill	Pesticide free products  Visual quality Service quality Reputation	Vertical differentiation with top-of-range products Horizontal differentiation with variety of products
Type B network	Specific investments in control means Brand goodwill	Organoleptic quality Reputation	Vertical differentiation with top-of-range products

#### Agrifood network governance: empirical evidence

Considering the strategic assets identified within the two types of network, let us now consider the choice of governance form that will lead to efficiency. From this principle, an alignment between an institutional set up and a resource profile is a necessary condition. Our dependent variables will be the two main dimensions of network governance defined above: decision holder for strategic resources and interorganizational relationships between autonomous partners in the network. Let us first describe these two dimensions.

Type A network shows a two-level pilot: cooperatives and subsidiary firms. The cooperatives, through the delegation of adhesion contracts with individual producers, are in charge of the traceability system and operational decisions (such as sorting and packaging of products). The two subsidiary firms act in behalf of their owners, the two cooperatives. One of them is in charge of the marketing and planning decisions, as well as controls over growing operations. The other one is in charge of input providing for integrated and biological pest management programme.

In type B network, all the marketing decisions are in the hands of the processing firm. The producers' organization acts as a collective transactor: individual producers delegate their decision rights concerning commercial relationships with the processing company to the PO. An Interaction Committee

(IC), as a negotiation structure, and has the formal right after negotiation to stop the decisions for planning, to set prices and growing operations calendar.

As shown in table 2, the studied networks have in common a rather complex and multileveled allocation of decision rights. Nevertheless one common feature emerges: in both case the owner of the brand (the marketing company in case A, the processing firm in case B) centralizes the main strategic decisions, i. e. the decisions that have a clear impact on brand value through their role on strategic assets. At the same time several types of operational decisions are taken at complementary levels: cooperative, PO, subsidiary company or even Interaction Committee levels. The main difference between the two networks is the institutional support for collective decisions. With financial links and cooperative contracts, type A network is closer to an "equity network" (Sporleder, 1999) than B type network.

Table 2  
Decision-making devices

Network type	Decision holder	Decision mechanism	Decision content
Type A network	Input supply company	Financial links	Input supply
	Marketing company	Financial links	Promotion and sales Volume planning and segmentation Controls over production and list of specification
	Cooperative	Adhesion contracts	Sorting and packing of products Traceability system
Type B network	Producers' organization	Adhesion contracts	Collective negotiation Technical advices
	Interaction Committee	Association links	Volume planning Price set Calendar planning
	Processing firm	-	Marketing and volume planning

These networks rely on different interorganizational mechanisms. To fully understand these mechanisms, control and incentive must be considered as complementary mechanisms in networks. Control mechanisms are a necessary condition to protect the value. In order to limit the cost of control, there is a trade off between behavior-based and outcome-based mechanisms. This trade-off will depend upon the information characteristics of transactions. But this necessary condition is not sufficient to fully understand the design of interorganizational relationships. The creation and the distribution of a stream of quasi rents will create incentives, for the partners, to maintain the collective value of interfirm relationships. This may be done through the price system (for example a price premium for product quality) or by the threat of termination of the relationships. Here it is shown that a price system (thus combined with a price premium) within the network leads to self-motivated agents and is a way to limit the costs of monitoring and controlling the partners (table 3).

Control mechanisms are very similar in the two types of networks. Controls over the list of specification and over the production process are centralized. Decentralized mechanisms are limited in number and importance. Incentive mechanisms differ substantially. In the type A network, the rent is centralized and then dispatched to the individual producers according to internal rules. In type B, the role of the processing company is not significant in the distribution of the rent. In a sense there is a reciprocity

principle in the first case. We suggest that this is because individual producers are the residual claimants of the brand, contrary to individual producers in case B.

Table 3  
Incentives and control mechanisms

	Incentive mechanisms		Control mechanisms	
	Centralized	Decentralized	Centralized	Decentralized
Type A network	Rent distribution through branded products (ex post) Segment and volume distribution (ex ante)	Price system (for visual characteristics of products)	List of specification (ex ante) Production process (ex post)	Self control for some type of products
Type B network	Volume distribution (ex ante) Producer selection	Price system (for technical performance)	List of specification (ex ante) Production process (ex post)	-

#### Some Managerial Implications

Economizing, if understood in a proper manner, is the "best strategy" (Williamson, 1999). To do so managers should consider the institutional set up of their business networks as a whole. From a managerial perspective, a few comments may be made. Firstly, one of the strategic assets of a network is its information system. Indeed, the way information is collected, dispatched and connected to the measure of performance links together the individual behaviors and the strategic objectives of the network. Secondly, we suggest focussing the design of network governance on the creation, sustaining and (re)distribution of quasi rent. We find here a major difference between type A and B networks. In case A, individual producers are incited to follow some specific behaviors. A reciprocity principle may exist specifically when financial ties link the partners together. Without this reciprocity principle, the use of control means should be more developed, as in case B.

Nevertheless these two networks, through their market success, have in common a global coherence between organizational efficiency and effectiveness. We think that the alternative between the redistribution of quasi rents between the partners within the network and the limitation of the quasi rent distribution associated with extensive controls over partners should be observed in all networks.

#### CONCLUDING COMMENTS

In the context of European agrofood sectors, many networks are built around product differentiation strategies. We suggest that managers, in designing their network governance, should clearly address a two-track principle of efficiency and effectiveness. This principle is a way to match an organizational/resource profile pairing with specific differentiation objectives. Empirical testing with successful marketing strategies shows that the design of network governance must optimize a cost-and-value ratio. Our study of network governance indicates that some specific features could explain the choice of network governance through its institutional and organizational design. Centralized decision over strategic assets and thus an identified decision holder seems necessary to maintain strategic coherence over time. But, at the same time, we show that operational decisions may be decentralized at different levels within the network, while control and incentive mechanisms rely upon totally decentralized means (like market-based relationships). Network governance's main feature is its unique combination between a configuration of decision rights unified around strategic purposes. Further research will help to fully understand the role and significance of governance in agrifood networks.

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