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Vertical Coordination in Agribusiness: Concepts, Theories, and Applications

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SUMMARY

Industrial organization and transaction-cost economics are the two core theories devoted to the study of vertical coordination. Stemming from these theories and using some of their concepts, new approaches in organizational economics and strategic management yields a broadened perspective on vertical coordination issues. Vertical coordination may be interpreted as a process of a firm's contractual choices in a world of limited information, where economic, strategic and legal aspects are combined. The objective of the firm's efficiency-seeking behavior is to find, in a competitive environment, the best configuration of contractual relations and integration among a continuum of alternatives. Consequently, the purpose of the analysis is to build, in a positive way, a framework of a firm's decision-making. We attempt to build such an integrative framework; an application of this framework to the vertical coordination in the U.S. broiler industry is provided.

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B-Vertical coordination in agricultural economics research

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Introduction

Vertical coordination!¹ has always been a major field of economic research, in both theoretical and empirical aspects. Industrial organization theory has focused on vertical integration and make-or-buy decisions and is mainly built on a technological and imperfect competition basis. The transaction-cost theory has developed a contractual vision of firm and markets and has opened new perspectives for the study of vertical coordination. Complementary and sometimes critical researchers from the fields of agency theory, strategic management, and organization theory have pushed further and extended the Williamsonian paradigm and some industrial organization insights.

We will see that the fields of organizational economics (Barney and Ouchi, 1986) and evolving science of organization (Williamson,1993a) could provide renewed theoretical foundations to understand and analyze the complex and polymorphic phenomena of relationships between firms. In the same vein, integrative approaches implementing strategic dimensions and organizational economics appears to be a promising way of research. Our objective is to show that these recent contributions can lead to new perspectives in vertical coordination, seen as a result of strategic planning choices. Consequently, the purpose of the analysis is to understand how the decisions are made and to propose a framework of firms' decision-making.

The text is divided in two parts. The objective of part one is to understand, from the most significant works, what are the concepts used in the study of vertical coordination between firms. Indeed, each theory focuses on certain aspects of the phenomena in order to represent it in an intelligible way and in a specific perspective. The modern conceptions of vertical coordination are deeply influenced by two branches of economic theory: transaction-cost and industrial organization theories. These well-known theories are summarized in their main features. The emphasis is put on recent syncretic theories, and notably on their conceptual contributions to the understanding of vertical coordination. Part two addresses the main applications of these theories found in the agricultural economics and agribusiness literature. The vertical chain structure of agricultural subsectors, the heterogeneity of their vertical coordination mechanism² and the importance of quality and chain management issues have interested many agricultural economists in applying or testing theoretical hypotheses. Then we attempt to determine a possible methodological framework for the study of vertical coordination. An application to the alternative business linkages of the broiler industry illustrates the proposal.

A-Theoretical backgrounds³

1)Mainstreams: Industrial organization and Transaction Cost Economics

The industrial organization and the economics of vertical integration

The industrial organization view of vertical coordination is essentially a market transaction/internal organization dilemma⁴. Two factors may influence the firm's make-or-buy decisions: technological economies in the production process and imperfect competition in upstream or downstream markets. Two types of technological economies are usually defined: economies of scale

¹ We will define vertical coordination as the process of specifying - for a reference firm and activity - a particular configuration of ownership, control and exchange over upstream/downstream activities. Upstream/downstream activities are activities that precede/follow the reference activity in the sequence of steps from producing raw materials to delivering a finished product to a customer (cf. Milgrom and Roberts,1992).

² Figure 10 at the end of part A gives the major influences and relations between these theoretical backgrounds.

³ Appendix 1 shows the diversity of these mechanisms in the main agricultural subsectors.

⁴ For a complete survey, see Perry (1989).

and economies of scope⁵. Existence of economies of scale in vertically related activities may explain vertical integration strategies. When economies of scale are significant at the supply or customer stages, the firm's uses of input or sales of output may or may not be sufficient to achieve the minimum efficient scale. Thus, for a low level of usage, there is a significant advantage not to integrate the activity but instead to use the market and independent firms. Economies of scope refers to another type of technological economies. These economies occur when a firm can produce several interrelated products⁶ together at a smaller cost than a group of single-product firms. Unlike economies of scale which are due to non-linear production functions, economies of scope are due to the benefits of the association of several production functions. These technological economies provide an explanation to understand the particular set of production stages carried out within a single firm. Indeed, in a competitive environment, firms will seek to minimize their production costs and will therefore seize these technological opportunities. But this production function vision of the firm is not by itself sufficient to explain the vertical integration decisions: industrial organization theorists also consider the competitive environment and in particular the vertical imperfect competition.

The underlying hypothesis on vertical market competition is that market failures will explain vertical integration decisions. In other words, this is only because markets are not perfect that there is integration. According to Perry (1989), "imperfect competition gives rise to three types of incentives for the imperfectly competitive firms to integrate into the neighboring competitive stages: (1) the internalization of efficiency losses from the imperfect competitive behavior, (2) the ability to extract infra marginal rents from the competitive stage, and (3) the ability to price discriminate within the competitive stage". The models describe vertical mergers and more generally integration of activities within the firms as a means to capture oligopolistic/monopolistic rents (cf. Perry, 1989).

Primarily focused on monopolist integrating forward and monopsonist integrating backward, industrial organization models are extended to situations of monopolistic competition where incentives to integrate are created by more than two stages of production, and are generalized to oligopolistic/oligopsonistic situations. Imperfect competition may also stem from imperfect and incomplete information situations. If not available, valuable private information can be acquired through vertical integration. For instance, the price of an intermediate input can be concealed by an upstream firm and can generate quasi rents.

Drawing from industrial organization theory, strategic management scholars show that motives for vertical integration may arise from strategic purposes, in order to create (or exploit) market power (Harrigan 1984, 1986; Stuckey and White, 1993). For instance, forward integration to customer segments can protect firms from direct competition or substitute products. Highly integrated firms will resist more efficiently the entry of new competitors. The barriers to entry thus erected can limit competition.

In industrial organization theory, explanations of vertical integration decisions are based exclusively on technological economies and imperfect competition situations. The firm is not seen as a passive production function but is also a strategic agent acting in a dynamic and uncertain environment.

Transaction cost analysis: the governance structures of vertical transactions

Instead of studying the firm as an entity, Williamson (1979, 1985, 1989) considers the transaction as the basic unit of analysis. Under behavioral assumptions of opportunity and bounded rationality of economic agents, this theory affirms that "institutions of economic organization have a transaction-cost origin" (Williamson, 1979), where the transaction costs are the costs of carrying out transactions.

⁵ Economies of scale: the reduction in average cost that is achievable when a single product is made in large quantities. Economies of scope: the reduction in total cost that is achievable when a group of products are all made by a single firm, rather than being made in the same amount by a set of independent firms.

⁶This scope can be either horizontal or vertical.

The central hypothesis of Williamson's work is that "transactions, which differ in their attributes, are assigned to governance structures, which differ in their costs and competencies, in a discriminating -- mainly transaction cost economizing -- way (Williamson, 1979)." Therefore, knowing the significant dimensions of transactions will allow one to predict governance structures. According to Williamson, the critical dimensions of transactions are:

- the frequency with which they recur,
- the degree and type of uncertainty to which they are subject, and
- the condition of asset specificity”⁷

Four generic governance structures and three contracting forms are considered (cf. figure 1): market (classical contracting), trilateral (neoclassical contracting), bilateral and unified (relational contracting). The market governance structure is the main structure for "non-specific transactions of both occasional and recurrent contracting" (Williamson, 1989). In this particular type of transactions, markets are seen to be efficient and the specific identity of the parties is unimportant.

Trilateral governance involves two types of transactions: occasional frequency of both mixed and idiosyncratic assets. In these cases, "the interests of the principals in sustaining the relation are especially great" (Williamson, 1979). Then, "given the limits of classical contract law (the market governance) for sustaining these transactions and the prohibitive costs of transaction-specific governance, an intermediate institutional form is needed" (Williamson, 1979). A third-party assistance will resolve disputes and evaluate performance.

The bilateral and unified governance structures are both considered as relational contracting forms. They occur when transactions are recurrent and involve mixed or idiosyncratic assets. Williamson distinguishes the case where the autonomy of the parties is maintained (bilateral governance) and where the transaction is organized within the firm (unified governance or vertical integration). Bilateral governance occurs in the case of mixed assets and recurrent transactions; both parties have a strong incentive to sustain the relationship. What is needed here is "some ways for declaring admissible dimensions for adjustment such that flexibility is provided under terms in which both parties have confidence" (Williamson, 1979). Unified governance is required when transaction-specific assets become more idiosyncratic and therefore when incentives for trading weaken. A complete vertical integration allows adaptations without the need to "consult, complete or revise interfirm agreements" (Williamson, 1979).

Figure 1: Characteristics of transactions and governance structure.

		Investment characteristics		
		Nonspecific	Mixed	Idiosyncratic
Frequency	Occasional	Market Governance (Classical Contracting)	Trilateral governance (Neoclassical contracting)	
	Recurrent		Bilateral Governance (relational contracting)	Unified Governance (relational contracting)

Source: Williamson (1979)

⁷ Five kinds of asset specificity are found: site specificity, physical asset specificity, human asset specificity, dedicated asset, brand name capital (Williamson, 1989).

In the transaction-cost theory, each type of vertical governance structures will stem from the characteristics of transactions. Under the assumption of economic efficiency and competition, the chosen governance structure will minimize the total transaction costs⁸.

According to Milgrom and Roberts (1992), it is useful to separate the transaction costs in two categories:

- coordination costs: these are the costs of "monitoring the environment, planning and bargaining to decide what needs to be done" (precontractual costs).

- motivation costs: these are the costs of "measuring performance, providing incentives, and enforcing agreements to ensure that people follow instructions, honor commitments, and keep agreements" (post contractual costs).

In a complementary work, Williamson (1991) notes the dimension of governance structures related to adaptation to economic changes, which is according to him the source of organizational dynamics. He considers two types of adaptation:

- adaptation type A (autonomy) where "consumers and producers respond independently to parametric price changes so as to maximize their utility and profits, respectively".

- adaptation type C (cooperation) where "the needs for coordinated investments and for uncontested (or less contested) coordinated realignments increase in frequency and consequentiality" (Williamson, 1991).

Governance structures will vary in their efficiency to adapt to economic changes (type A or type C) because they rely on instruments of control with variable *incentive intensity*. Market governance structure is particularly efficient in adaptation A, while hierarchy is better to orchestrate coordinated actions in adaptation C. Figure 2 gives the main distinguishing attributes of three generic forms of governance structure: market, hybrid and hierarchy. The choice of a governance structure is not only linked to characteristics of transactions but also to external conditions.

Figure 2: Distinguishing attributes of market, hybrid, and hierarchy governance structures.

Attributes	Governance structure		
	Market	Hybrid	Hierarchy
<i>Instruments</i>			
Incentive intensity	++	+	0
Administrative controls	0	+	++
<i>Performance Attributes</i>			
Adaptation (A)	++	+	0
Adaptation (B)	0	+	++
<i>Contract law</i>			
		+	0

0= Weak

+= semi strong

++=strong

Source: Williamson (1991)

⁸ This conception of efficiency is closed to neoclassical assumptions: perfect competition conditions lead to economic efficiency

Transaction-cost theory gives a contractual representation of vertical coordination. The central notion of governance structure is able to join economic and legal aspects. But, taking into account many criticisms and aware of the limitations of his own framework, Williamson (1993b, 1994a) progressively broadened the scope of transaction-cost theory to a more general theory of economic organizations. Indeed, his conception of market or organization failures as the only determinant of vertical integration decisions is probably too restrictive. As shown by Medema (1992)⁹, the treatment of opportunism is incomplete and the minimization of transaction costs is only one of the motives for vertical integration. He argues that "the governance structure is the product of an evolutionary process which is worked out over time, a many period game characterized by power play". He suggests for example that opportunism is the exercise of power or authority from one firm vis-à-vis the other. We will see that, in spite of these limitations, theorists from other fields heavily use transaction-cost concepts and perspectives.

2) Agency theory and the design of vertical control

Agency theory deals with the relationship between two parties in which one party (the principal) delegates work to another (the agent). The theory is focused on the contract between these two parties and seeks to determine the optimal contract, i.e. the contract with the most efficient organization of information and the lowest costs. This agency structure is found in a wide range of settings such as relations between employers and employees, owners and managers, insurance companies and their customers, buyers and suppliers.

Eisenhardt (1985,1989), borrowing from Ouchi (1979,1980) and Barney/Ouchi (1986), shows that agency theory and organization theory have important links and complementarities, mainly because both of them deal with ambivalent cooperative/conflictual behaviors. We will see that this complementarity is particularly relevant for the study of control strategies between firms.

Two branches in agency theory are generally recognized (Eisenhardt,1989): the positivist theory and the principal-agent theory¹⁰. The two streams of thought share a common unit of analysis (the contract between a principal and an agent) and similar assumptions but differ in the formal treatment. The first branch is more descriptive and mainly concerned by the relevant variables (the 'governance mechanisms') of contracts. The second branch develops models -- under a wide range of quantitative variables -- and defines the contracting optimum solutions.

According to Eisenhardt (1989), these differences are not crucial for organization theory. The contracting problem remains with its two dimensions: the agency problem and the risk sharing problem. Agency problem arises because of information asymmetry between the parties. Adverse selection occurs when one party (principal or agent) is better informed than the other about the characteristics of the transaction. For Milgrom and Roberts (1992), *adverse selection* is "a kind of precontractual opportunism that arises when one party to a bargain has private information about something that affects the other's net benefit from the contract and when those whose private information implies that the contract will be especially disadvantageous for the other party agree to a contract. "*Moral hazard* refers to the lack of effort on the part of the agent, because the task is too complex to be completely controlled. Milgrom and Roberts (1992) define it as a "form of post contractual opportunism that arises when actions required or desired under contract are not freely observable". Besides, the agents may differ in their behavior vis-à-vis risk; the agency theory tries to resolve both the question of risk sharing and of the cost of transferring that risk.

⁹ This author provides a good synthesis on transaction-cost limitations about vertical integration issues. He considers that "transaction-cost theory has not departed very far from static, neoclassical optimization analysis(...). A more complete theory will contain a substantial evolutionary component, with a greater emphasis on the roles of factors such as forbearance, goodwill, interdependence, and power in the transaction process." Brousseau (1993) and many strategic management scholars share a relatively close view (cf. A.3 and A.4).

¹⁰ The main authors of these two streams are Jensen/Meckling (1986) for the former and Grossman/Hart (1986) for the latter.

For Eisenhardt (1989), "the heart of principal-agent theory is the trade-off between (a) the cost of measuring behavior, and (b) the cost of measuring outcomes and transferring risk to the agent". Instead of the traditional approaches focusing on structural alternatives such as matrix, decentralization and divisionalization, Eisenhardt (1985) puts the stress on control characteristics and mechanisms. The organizational approach to control suggests that two strategies are available:

- assessing the performance of the agent, measured either by the behavior or its outcome. The cost of this performance evaluation depends upon the information characteristics of the performed tasks. According to Eisenhardt, these characteristics are the ability to know the transformation process (*task-programmability*) and the ability to measure outcomes (*separability*)¹¹.

- minimizing the divergence of interests and/or preferences among the members. In that case, the need to control members is lessened because they "understand and have internalized the goals" (Eisenhardt, 1985). Numerous means could achieve this objective, among them the selection of members, training... The choice between these two strategies is essentially determined by the ease of performance evaluation, i.e. readability of tasks in both their programmability and separability dimensions.

In a simple low/high framework applied to the dimensions of task characteristics, the control strategies can be classified in three categories (cf. figure 3)

FIGURE 3: Organizational theory and control strategy.

Outcome measurability	Task programmability		
		<i>Perfect</i>	<i>Imperfect</i>
	<i>High</i>	Behavior/outcome Control	Outcome control
<i>Low</i>	Behavior Control	Socialization "clan" control	

Source: adapted from Eisenhardt (1985)

This representation of control design may be usefully completed by several elements borrowed from agency theory perspectives. First of all, in agency theory, information as well as information systems have a dynamic role: they are considered as commodities that can be purchased or sold. Thus, they play an active role in the choice and in the design of control strategies. Secondly, agency theory shows that uncertainty plays a central role in the definition of contract. Indeed, the optimal contract must minimize the control costs plus the residual loss due to an imperfect control. Uncertainty, in for instance performance evaluation, affects directly the choice of a control mechanism.

Finally, Eisenhardt's syncretic approach leads one to consider the task characteristics and the measurement system characteristics as the key dimensions for explaining the choice of a control strategy (cf. figure 4). This choice of a control strategy is an important aspect of the linkages between vertically interrelated organizations. Her approach helps to understand the choice between alternative control mechanisms, but also to consider the continuum of contract forms between the two extremes of outcome-

¹¹Programmability: ability to observe what and how the work is done. Separability: ability to observe/identify what has done the work

based and behavior-based control strategies. For instance, a control strategy can combine behavior control with compensation of efforts through multiple rewards.

FIGURE 4: The choice of a control strategy.

Task characteristics

- programmability
- separability



Control Strategy

- organizational design
- incentive/coercive mechanisms

Information system characteristics

- measurability
- uncertainty
- risk

Source: adapted from Eisenhardt (1985)

Mahoney's (1992) work provides a general framework for predicting and prescribing the alternative governance structures of vertical integration. Mahoney recognizes a continuum of governance structures, including spot markets, short term contracts, franchising, joint ventures, and vertical financial ownership (hierarchy). His approach constitutes an attempt to aggregate agency-related perspectives (such as Eisenhardt's) and transaction-cost theory.

His review of the strategic management literature shows that the motives for vertical integration may be classified into three categories: strategic considerations, output and/or input advantages, and uncertainties in costs and/or prices. According to Mahoney (1992), these factors constitute explanations for vertical integration strategies but "they do not provide insight on the choice of organizational form" (i.e. the governance structure).

The missing link to predict this choice is the existence of transaction costs. In fact, as Mahoney suggests, "in absence of transaction costs, vertical contracting can replicate the advantages of vertical financial ownership" (Mahoney, 1992). In other words, the effective form of vertical corporate control cannot be predicted when transaction costs are ignored.

In order to understand the choice of governance structure, Mahoney (1992) affirms that "measurement costs and transaction costs should be considered simultaneously". Then the governance structure chosen to implement the vertical coordination strategy will minimize the costs of "negotiating, adapting, monitoring, and enforcing buyer-supplier relationships" (Mahoney, 1992). From this point of view, a comparative institutional analysis between different forms of governance structure will allow consideration of the advantages and the disadvantages of vertical integration strategies.

We have seen that frequency, uncertainty and asset specificity are the critical criteria of Williamson's framework. For Mahoney (1992), frequency can influence the choice of governance structure especially in case of intermediate asset specificity. But, following Williamson, Mahoney considers that when asset specificity is either low or high, frequency influence is indeterminate. Then two key dimensions remain: asset specificity and uncertainty (of demand and/or technological).

On the other hand, research on control in organization (especially Eisenhardt and Ouchi) adds two critical variables: programmability and separability of tasks. According to Mahoney, external uncertainties (for example demand and technological uncertainties) have an indeterminate influence¹²

¹² External uncertainties can either favor or prevent a vertical integration strategy.

on governance structures and are not included in his framework. Hence, three dimensions are combined in a eight-case chart to predict the governance structure (cf. figure 5).

FIGURE 5: The organizational form of vertical control/ownership

	Low task programmability Asset specificity		High task programmability Asset specificity	
	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>
<i>Low</i> Non-separability	spot market	Long-term contract	spot market	Joint venture
<i>High</i> Non-separability	relational contract	Clan (hierarchy)	Inside contract	hierarchy

Source: Mahoney (1992)

For Mahoney, a combination of three determinant variables is sufficient to explain the choice of a vertical coordination mechanism. His framework allows the prediction of six different forms of vertical contracts (in eight generic situations). His approach is very similar to Williamson's; he considers that "the transaction-cost approach provides insight into the key role of asset specificity". But he adds: "(this approach) neglects the interactive effects of measurement problems that have been highlighted by agency theory. On the other hand, positive agency theory emphasizes measurement costs but neglects asset specificity. Combining these two efficiency perspectives enables us to make predictions and offer prescriptions on the make-or-buy decision" (Mahoney, 1992).

3) Strategic management approaches: competitive advantage through vertical value-added chain

Porter's interest in vertical integration strategies initiated abundant research in the strategic management field. His 1991 article summarizes his main concepts. For Porter, the basic unit of competitive advantage is the discrete activity. The firm is a "collection of discrete, but interrelated economic activities such as products being assembled, salespeople making sales visits, and orders being processed. A firm's strategy defines its configuration of activities and how they interrelate". Consequently, competitive advantage will result "from a firm's ability to perform the required activities at a collectively lower cost than rivals, or perform some activities in unique ways that create buyer value and hence allow the firm to command a premium price" (Porter, 1991).

Porter defines the value chain as "activities that directly produce, market, and deliver the product and those that create or source inputs or factors (including planning and management) required to do so. The firm's strategy is manifested in the way in which it configures and links the many activities in its value chain relative to competitor" (Porter, 1991).

The central interest of Porter's approach is his conception of vertical coordination (along a value chain) as a result of firm's behavior. Initiated by this approach, strategic management scholars will adopt this perspective and will focus their research on the links between environmental circumstances and firm's strategy. Hence, the study of strategy appears to be an in-house means of investigation into the vertical coordination process.

Harrigan (1984,1986) represents a classical strategic management perspective on vertical integration. She develops a complete framework for the formulation of vertical integration strategies. She proposes an extended model of choice, including the breadth of integrated activities undertaken, the number of stages of integrated activities, the degree of internal transfer for every vertical linkage and the form of ownership used to control the vertical relationship. Substantial additions have been made to the simple make-or-buy decision model, but the main factors that determine the choice of vertical integration strategy are coherent with industrial organization assumptions and Porter's theory of strategy.

These factors are demand uncertainties, nature of competition (on the buyer/supplier interfaces) and corporate strategy requirements.

Recent contributions are more directly connected with new microeconomics research (essentially in transaction-cost and agency fields) or at least concerned with the possible bridges between the two areas of strategic management and organizational economics. Four of the most recent and significant works are particularly stressed here.¹³

The tendency toward vertical disintegration frequently observed in manufacturing industries is the starting point of Boone and Verbeke's (1991) analysis. According to them, a simple transaction-cost analysis does not provide a full explanation of this phenomena because the Williamsonian paradigm underestimates the bureaucratic costs and the incentive problems of hierarchy. Moreover, the strategic implications of vertical integration are ignored. Thus, they extend transaction-cost theory through the introduction of "conceptual elements" from organization theory and strategic management theory.

While economizing on transaction costs, vertical integration, on the other hand, may significantly increase the bureaucratic costs. According to Boone and Verbeke, "the competitive strategy chosen by the firm largely determines the level of bureaucratic costs and may thus influence the optimal level of vertical integration". Their main statement is that bureaucratic costs are not automatically determined by the structural conditions of internalization, but are on the contrary related to the strategic choices of the firm. Consequently, the incomplete character of transaction cost analysis leads to an overestimation of the advantages of vertical integration.

For Boone and Verbeke, the optimal degree of vertical integration stems from two core variables: asset specificity and the importance of innovation and flexibility in competitive strategy. The level of asset specificity is coherent with the original transaction-cost model. The degree of flexibility of the competitive strategy is a particularly relevant variable because it is highly interrelated with costs due to the internalization of the transaction. In the cases of intermediate or high asset specificity and innovation strategies, hybrid forms of vertical coordination are likely to occur. Indeed, the two extremes (hierarchy and market) are both inefficient because of too high bureaucratic costs in the former case or uncertainty of the transaction in the latter case. Thus, the main challenge for the firm is to "develop strategic networks of contractual arrangements, so as to build reciprocal commitments with suppliers". This is what Boone and Verbeke call the "strategic management of contractual relations", where "benefits normally associated with a hierarchical organization (coordination and control) can be obtained, but without incurring the bureaucratic costs of such a hierarchy". Various forms of long-term contracts will benefit from the high-power incentives of the market, but in case of dissatisfaction, contractual arrangements may be canceled.

Finally, for Boone and Verbeke, vertical coordination cannot be explained solely in terms of transaction costs. The necessity for a firm to have "flexibility and innovation (of its) corporate strategies (partly as a reaction to environmental dynamism -such as rapid changes in demand or new information technologies)" lessens considerably the theoretical advantages of vertical integration.

Hennart (1993, 1994) on his side addresses two main criticisms to transaction-cost analysis. First, this theory is only a theory of market failure and does not explain why a particular firm will succeed. Second, the two classical categories of market and hierarchy are irrelevant because most of the governance structures cannot be classified under these two categories. Utilizing concepts from agency and organization theories, Hennart's view is an attempt to extend transaction-cost theory to a general model of competitive advantage through organization.

First, Hennart (1993) distinguishes two notions that are usually confused:

¹³Among other works close to this perspective, see: Kogut (1988), Reve (1990), Bouvier-Patron (1993), Ring and Van De Ven (1992,1994).

- the methods of organizing: the mechanisms utilized to conduct the transactions (price-constraints or behavior-constraints).
- the institution: the organization which implements a particular set of methods of organizing.

While markets rely principally on prices and firms on hierarchy, Hennart (1993) insists on the fact that "there is not a one-to-one correspondence between prices and markets, and hierarchy and firms".

Then, Hennart broadens the definition of transaction costs in defining the shirking costs (the costs of constraining behavior plus the residual amount of shirking due to imperfect behavior constraints) and cheating costs (the costs of using price-constraint systems -- i.e. of measuring output - plus the losses due to imperfect measurement). While the choice of a price-constraint system minimizes shirking but encourages (or at least allows) cheating, on the contrary the choice of a behavior-constraint system minimizes cheating but encourages shirking. Under particular transaction conditions (cf. Williamson, 1979,1985) and considering the existence of diminishing returns to measuring output and constraining behavior, institutions will try to combine price and behavior constraints in order to reach the lowest global costs. This extended conception of "organizing costs" is the foundation of Hennart's theory of the firm.

The distinction between intra and inter-firm transactions is 'that intrafirm transactions are mediated by employment contracts, while inter-firm transactions are contracts for outputs. Choosing the appropriate mix of contracts and improving the efficiency of each type is a source of competitive advantage" (Hennart, 1994). The source of rents is the ability for a firm to better coordinate its activities. In fact, three strategies are available: reduce organizing costs within firms, increase efficiency of external contracts, and assess more efficiently the costs of alternative strategies.

In other words, competitive advantage arises from "inter-firm differences in their organizing capabilities" (Hennart, 1994). In that sense, the role of strategy is essentially one of implementation and coordination, in "reducing both internal and external transaction costs and achieving the lowest total level of organizing costs by developing better internal and external contracts" (Hennart,1994).

Dosi, Rumelt, Teece and Winter (1994) provide a general theory of corporate coherence, i.e. an explanation of the boundaries of the modern corporation. Although not exclusively concerned with vertical integration issues, this theory is very useful to understand vertical corporate coherence, for example the multiproduct scope, the distribution of product portfolio inside firms, and the relative stability of these portfolios. Vertically integrated firms appear, in this view, as one out of several models of corporate coherence.

In traditional theories of the firm, market power and economies of scope are the common explanations of corporate coherence. But, according to Dosi et al., such theories are unable to explain "why a set of contractual relationships among specialist firms could not accomplish the same objectives". With economies of scope for instance, the organizational dimensions are not considered: a wide variety of organizational arrangements could provide the same effects. Technological economies explain the make-or-buy decisions but not the choice of specific contractual forms. Transaction-cost economics may have some capacity to explain vertical relationship, but does not provide, for the same reasons, an explanation of firm's diversification.

Fundamentally, the inability of these theories to fully explain the multidimensions of corporate coherence lies in the fact that the firm is seen either as a production function or as a nexus of contracts involving vertically interrelated factors of production. For these authors, an organization is more than a minimization of production and/or transaction costs.

In their attempts to understand coherence, Dosi et al. (1994) add new criteria. Borrowing from organizational economics, these authors affirm that four factors are relevant to study: complementary

assets, enterprise learning, technological opportunities, and selection. These four factors determine the "evolutionary path" of the firm and the fluctuation of its activities' boundary over time.

Existence of *complementary assets* is probably the strongest factor that explains the contour of the evolutionary path. Typically, complementary assets lay upstream or downstream "from product-process development in the value-added chain". *Enterprise learning* is the ability for a firm to learn through its economic activity (learning by doing). This knowledge is cumulative and concerns organizational skills rather than individual skills¹⁴. But enterprise learning is not omniscience. This necessarily local feature limits what a firm is able to do. Moreover, the choice of new activities will be dependent on what has already been done: there are 'path dependencies'. In fact, Williamson's concept of idiosyncratic assets and its impact on organizational design is broadened by the introduction of irreversibility and dependencies.

As a result, "firms can be thought of as an integrated cluster of core competencies and supporting complementary assets. The degree of coherence one would expect to observe among a particular point in time depends on the relationship between learning, path dependencies, opportunities, inherited complementary assets, and selection". They distinguish six forms of corporate coherence: specialist firms, vertically integrated firms, coherent diversifiers, conglomerates, network firms, and hollow corporations (cf. figure 6). The vertically integrated firms for instance are characterized by "slow learning but high path dependencies and specialized assets ...; older firms are likely to be more vertically integrated than young firms because start-ups are less common in industries where learning is slow."(Dosi et al.,1994).

Figure 6: Corporate coherence matrix.

		Slow learning/ Restricted opportunities	Rapid learning/ Rich opportunities
Evolutionary path	<i>Wide</i>	Coherent diversifiers (low growth)	Coherent diversifiers (high growth)
	<i>Narrow</i>	Vertically integrated firms	Specialist firms
	<i>Converging</i>	Network firms (low growth)	Network firms (high growth)

source: Dosi/Rumelt/Teece/Winter (1994)

Olsen and Zajac (1993), while stressing the interorganizational strategies of firms, propose another variant of integration between strategic management and transaction cost perspectives. For them, the standard transaction-cost theory is only a 'single-party analysis of cost minimization and neglects the interdependence between partners". They suggest that an exchange, instead of being passive and costly, can also be a means to construct and create value, even if the exchange comes with new transaction costs. They consider that "the transaction-cost: theory — overemphasizes the structural analysis — of interorganizational exchange relationship without taking into account the processual/behavioral aspects" (Olsen/Zajac,1993).

Instead, their transactional value analysis shows that an exchange can create value that "could otherwise not be created by either firm independently" (Olsen and Zajac, 1993). The classical Williamsonian analysis appears to be relevant in the particular case of a single firm's make-or-buy decision, where the main (or exclusive) objective is the minimization of costs. But in many other cases, two firms involved in a transaction could also try to develop a common strategy of, for instance, product

¹⁴ Langlois (1992) also stresses the importance of learning, but with a different approach. For him, firms and markets are "alternative - and sometimes overlapping - institutions of learning." These institutions will differ in their ability to learn - at a particular cost - new capabilities over time. In that perspective, learning costs are another type of transaction costs.

differentiation. Therefore, the central question will be how to create/maximize this value and how to claim it.

This new perspective has another implication: Olsen and Zajac focus on the process of decision making. Indeed, because of its highly strategic and behavior content, the choice of a governance structure is seen as largely unpredictable. Instead, Olsen and Zajac propose a model of interorganizational process, configuring the stages of decision making, useful in understanding the likely choice of vertical structure (cf. figure 7).

Figure 7: A stages model of interorganizational processes.

Initializing stage	Processing stage	Reconfiguring stage
<p><i>Summary of key issues</i></p> <ul style="list-style-type: none"> -Weighing exchange alternatives -Projecting exchange into future - Clarifying exchange parameters -Engaging in preliminary exchange communications and negotiations -Conducting initial exchange rounds 	<ul style="list-style-type: none"> -Accelerating learning -Managing conflict -Creating relational norms -Developing trust 	<ul style="list-style-type: none"> -Reaching end of expected duration -Assessing performance gap -Redefining type of strategy -Redefining nature of exchange process

Source : Olsen and Zajac (1993)

From the essentially structural and deterministic transaction-cost framework, the authors moved to a strategic and processual framework, not denying but extending and in a sense reinterpreting the transaction-cost foundations.

4)Convention theory and contract economics

To be complete on the recent theoretical developments particularly relevant for the study of vertical coordination, one must consider the two following approaches: convention theory and Brousseau's contract economics.

Convention theory is not yet structured in a single theoretical paradigm. We will refer to Eymard-Duvernet's (1989) article focused on the central role of quality uncertainty in structuring interfirm relationships. For Eymard-Duvernet (1989), "prices do not constitute a determinant variable anymore to assure coordination, but one of the links of industrial organization, subject to conventional rules more or less institutionalized". He adds: "If markets work well, quality will be assessed without ambiguity in a given state of market and in a perfectly determined fashion by a given price; the price is the only quality determinant. But quality conventions are necessary when the price -- alone -- cannot evaluate quality". Thus, in numerous cases, economic agents set up 'quality conventions' that lead to different forms of coordination.

Eymard-Duvernet distinguishes four generic forms of coordination: domestic, industrial, civic and market. *Domestic coordination* occurs when uncertainty about quality is solved through trust: for example, long-term relations between agents or use of private brands which increase the quality reputation of products. *In industrial coordination*, quality is not defined by the agents themselves but by

a third party outside the market which determines common norms or standards. Economic agents, in their exchanges, will refer to these objective definitions. If prices are sufficient indicators to evaluate quality -i.e. if there is no uncertainty about quality- then the market works by itself: this is *market coordination*. *Civic coordination* occurs when there is a collective commitment to avoid conflicts.

Figure 8: Quality, quality conventions and coordination.

	Way of recognizing quality	
Way of defining quality	<i>With uncertainty</i>	<i>Without uncertainty</i>
<i>Externalized</i> (standards, norms)	Industrial coordination	Market coordination
Internalized (trusts, authority)	Domestic coordination	Civic Coordination

In this theory, conventions are a set of mechanisms and rules that involve private agents as well as public institutions. Therefore, the analysis focuses on the way quality uncertainty is solved. The content of product specification, the nature and genesis of third parties involved, the strategy of product differentiation or labeling, or other empirical observations about quality help to understand the conventions. Convention theory shows that quality conventions are a strong factor structuring industrial organization. Far from being static or non-competitive, these conventions belong to the competitive process. Influenced by strategic management approaches, convention theorists insist that coordination mechanisms determine the degree of cooperation or competition between agents. Eymard Duvernet (1989) for instance, emphasizes the similarity between Porter's strategic groups and models of coordination. As soon as they are set up, quality conventions constitute, in a sense, a particular category of mobility barriers. Moreover, the convention theory approach shows that the definition of contracts cannot be understood exclusively at a microeconomic level, i.e. between two single parts. A convention is also a mode of regulation found at a collective level, for instance a region or an industry. In return, the choice of specific conventions is not neutral: it affects greatly the basic conditions of competition.

Unlike neoclassical economists, convention theorists do not consider nonprice exchanges between firms as market failures or imperfections. Instead, adopting a positive approach, they integrate at once the diversity and the complexity of the quality issue and build their analysis on it. They insist on the institutional and strategic dimensions of quality and are able to explain the existence and juxtaposition of several coordination modes in the same industry. In spite of methodological incompleteness, this approach usefully links quality questions with industrial structure.

Brousseau's (1993) contract economics extends the Williamsonian paradigm but reconsiders some of his fundamental assumptions in a positivist way. He proposes a general theory of bilateral economic relations and combines, in an original fashion, transaction-cost theory and elements of industrial organization. His contribution completes the Williamsonian paradigm in two main directions: the description of contracts and the way these contracts are chosen.

First, Brousseau proposes a discrete and descriptive grammar of contracts. Contracts are complex, and unified framework to describe this complexity is needed. For Brousseau, every contract can be interpreted as a set of clauses, with for each clause several possibilities. These clauses are based on the main functional characteristics of contracts¹⁵. Then each particular contract is fully described by a specific combination of the alternatives of the seven clauses. This common grammar allows the description of a wide range of contracts. According to Brousseau, this discrete and strictly descriptive approach avoids ambiguities and analogical limits of categories such as market, hybrid or hierarchy. The

¹⁵ These clauses are: strategic coordination, organizational coordination, operational coordination, guarantee system, control mechanism, risk sharing, duration.

process of choice involved in a particular contract will be more understandable. Indeed, the final choice is in fact the sum of all the clauses' choices.

The second contribution by Brousseau to the transaction-cost framework concerns the definition of a decision-making model. Although strongly influenced, Brousseau differs from Williamson on several important matters. His definition of costs is more extensive. To the traditional transaction costs, he adds two categories of costs: production and incentive costs. These three categories of costs are the basic elements for the evaluation of contract efficiency.

Unlike Williamson, Brousseau does not consider that the choice of a governance structure is strictly determined by the structural conditions of the transactions. One must consider the objectives of the contracting process, which will depend greatly upon the asset specificity and distribution. Different objectives lead to different optimization rules: the simple transaction-cost minimization objective is completed by rent maximization of either the coalition or of the agent having bargaining power.

Figure 9: Contracts, an economic model of choice.

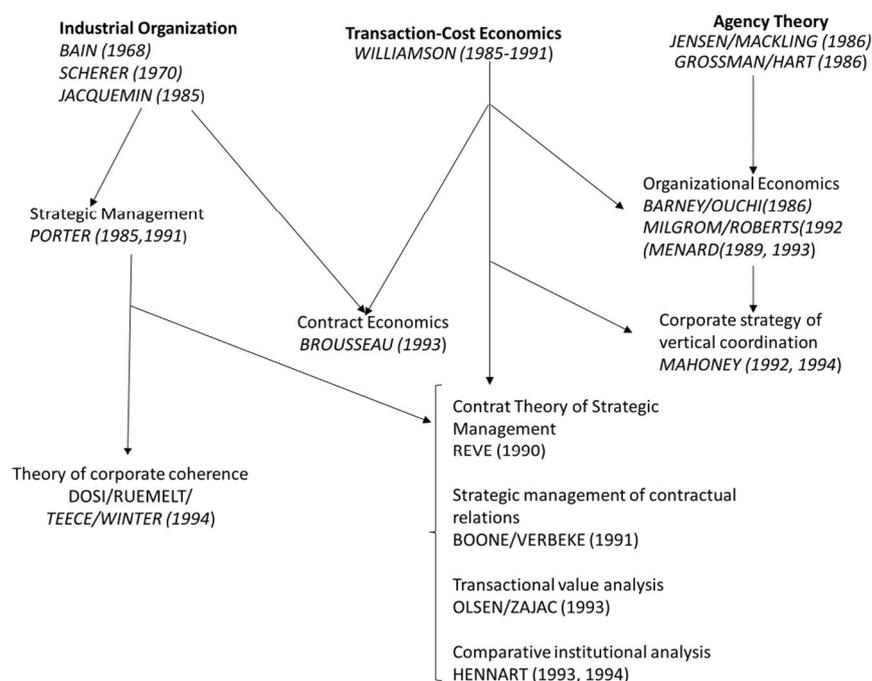
Bounded rationality opportunism Imperfect information	Basic conditions: demand and technology	
	↓	↓
<i>Relative efficiency of alternative</i> <i>Coordination mechanisms</i>	<i>Asset distribution</i> <i>Asset specificity</i> - inside the coalition -between the coalition and the competitive environment ↓	<i>Characteristics of the transaction</i> - uncertainty- frequency - ability to be measured
	<i>Coordination's process of choice</i> → <ul style="list-style-type: none"> - Objectives: value maximization/cost minimization -Evaluation: relative cost assessment 	<i>Definition of contract's clauses</i>

Source: adapted from Brousseau (1993)

Brousseau combines and completes Williamsonian concepts with strategic and organizational considerations. A redefined notion of contracts replaces the governance structure. He focuses on the comprehension of the decision process, instead of defining a determinist model of governance structure.

Figure 10 synthesizes -- in a necessarily schematic way -- the major influences and relations between most of the theoretical backgrounds seen in part A. One notes that all the recent approaches to coordination try to combine -- to various extents -- transaction-cost theory and industrial organization (or strategic management).

Figure 10
Vertical coordination and theoretical backgrounds:
major influences and relations



B-Vertical coordination in agricultural economics research

1) Methodological backgrounds of agricultural economics research on vertical coordination

Since the seminal works of Jones and Mighell (1963) and Goldberg (1968), the study of vertical coordination in agricultural subsectors has been particularly rich. Not surprisingly most of this research, during the past thirty years, has been on the same wavelength with theoretical findings¹⁶

Recently, a renewed interest in these issues fueled the motivation for empirical works¹⁷. Among the factors explaining this trend, one must emphasize the role of *information technologies* and a new marketing context. Information technologies have an indirect effect on organizational problems. In increasing availability and lowering the costs of data, transaction and control costs are modified. These technologies will allow partial or complete redefinition of asset specificity, and will induce the emergence of new strategies. Hudson *et al.* (1991) show for example that, in agribusiness sectors, "information technologies may facilitate new strategies among players by providing better information flows and by facilitating coordination of production and marketing activities". This use of information technology is itself boosted by a *new environment in food markets*. Many agricultural subsectors have been deregulated and have faced increasing competition. Stagnation of food demand and substitution effects between products still accelerate the tendency.

¹⁶ See for instance Campbell *et al.* (1981), Sheldon (1991), and Valceschini (1993b) for a complete survey and appendix 2 for a summary. Some of the most significant results include Torgerson (1983), Kilmer (1986), Schrader (1986), Cotterill (1987), Tomek (1989), Sporleder (1992).

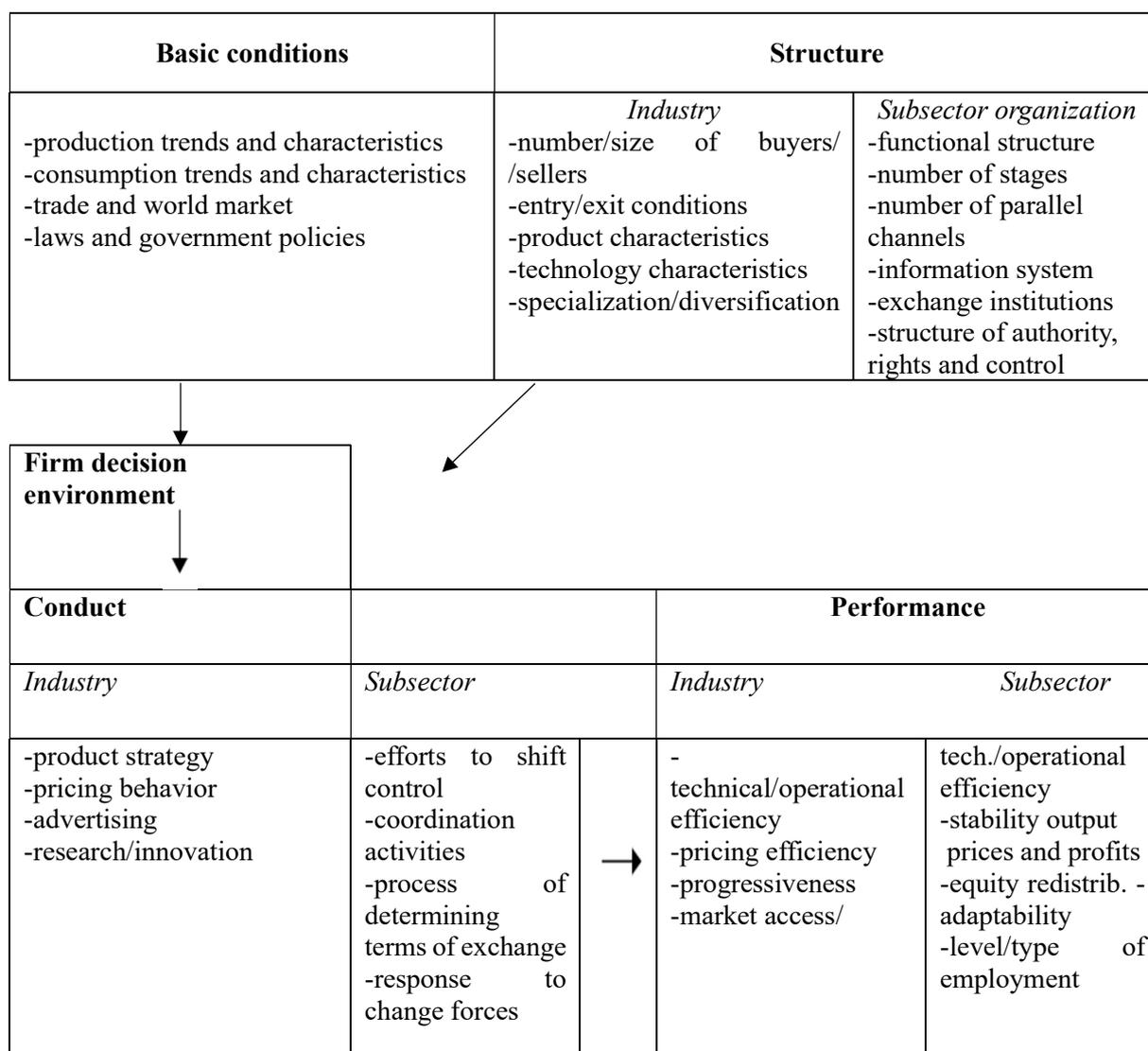
¹⁷ Several research networks or teams currently work on these questions, and notably: North Central Regional Research Project 194 (Ohio State University), Food and Agricultural Marketing Consortium (Texas A&M University), Food Marketing Policy Center -NE 165 Project (University of Connecticut) in the USA; George Morris Centre-Food Industry Research Group (University of Guelph) in Canada; INRA-SAD Paris and INRA-ESR Toulouse in France; the Department of Management Studies-Agri-chain Management Program - at the Wageningen Agricultural University in The Netherlands.

Agribusiness firms' competitiveness is likely to be found in a reduction of production and coordination costs. But, as Barkema et al. (1993) suggest, it is the ability to "reach targeted consumer niches" and to maintain these positions which will constitute in the future the main competitive advantage. To respond to a more consumer-oriented environment, agribusiness firms have to coordinate activities needed to assure the tailoring of particular product attributes, such as nutritional attributes, or particular product specifications.

Recent contributions in agricultural economics research deal with these questions. Their methodological approaches are diverse. We will review here some of the most illustrative works in industrial organization, institutional economics and convention theory.

In their study of the U.S. food system, Marion *et al.* (1986) consider the question of vertical coordination as "a central dimension of the organization and conduct of economic activity". For that purpose, they adapt the traditional strategy-structure-performance model to subsector analysis, where a subsector is the "total value-adding process leading to the final products".

Figure 11: Subsector structure, conduct and performance paradigm.



source: adapted from Marion et al. (1986)

In their comparative and descriptive approach of the organization of agricultural subsectors, Marion et al. (1986) also try to identify the main problems of these subsectors and therefore propose criteria which can evaluate the performance of the system. Four dimensions of performance are acknowledged: resource allocation, equity, transaction costs, and accessibility of markets and information. In their study of coordination mechanisms, a strong emphasis is put on the pricing methods and the pricing discovery. Their objective is to describe the process of interaction between and among buyers and sellers by which they identify alternatives and arrive at transaction price” (Marion et al.,1986). From important empirical works concerning the main subsectors, they draw some trends in the evolution of agricultural vertical coordination or in their comparative efficiency.

This approach is an attempt to identify and understand the heterogeneity of vertical coordination mechanisms, and in particular the pricing mechanisms. The search for efficiency by active agents is the source of dynamic change inside each subsector, and of diversity between them. In the end, what can be expected from a system of vertical coordination is "(ideally) the delivery of the quantity and quality of products at the time and place that maximizes the benefit to society from the resources available". Their interpretation of efficiency is normative and close to microeconomic assumptions. In this research, vertical coordination institutions have three important dimensions: the pricing methods employed, the degree of geographic centralization, and the forms of control (cf. figure 12).

Figure 12: Relationship between vertical coordination institutions, pricing mechanisms and performance in agricultural subsectors.

Vertical Coordination Institutions	<i>Pricing methods</i> -auction -private treaties -administered -formula	→	<i>Performance</i>
	<i>Centralization</i> <i>Control</i>		-equity -transaction costs -access -stability

Source : adapted from Marion et al. (1986)

Frank and Henderson's (1992,1993) research is an attempt to "quantitatively analyze transactional inefficiencies and their effects on food industry performance". For this purpose, they create a vertical coordination index aggregating product flow linkages and control methods. This index is used to evaluate the vertical linkages between production agriculture and food manufacturers.

Several structural characteristics may affect the level of transactional inefficiencies. As industrial organization and transaction cost theories suggest, Frank and Henderson choose four factors: uncertainty of supply, concentration on the buyer/supplier sides, idiosyncratic investments, bureaucratic (administered) costs. Their empirical analysis supports the fact that transactional inefficiencies are positively correlated to the coordination index. The most influential factors in the choice of an 'integrated' form of coordination are uncertainty of supply, input supplier concentration, and asset specificity.

A second test examines vertical coordination and performance correlation, measured through return to capital and export propensity. The results are irrelevant, and Frank/Henderson consider that "the theoretical understanding of vertical coordination and its relationship to performance in both domestic and foreign markets is incomplete." Frank and Henderson use the main features of Williamson's framework and industrial organization concepts. Their approach is strictly quantitative and measurement of vertical coordination reduced to a one-dimension index. They demonstrate that, in the

food sectors, the degree of vertical integration shows coherence with transaction-cost theorists' fundamental insights.

Convention theory focuses on the question of conventions (Eymard-Duvernet, 1989; Favereau, 1989b), seen both as private and collective rules or contracts¹⁸. This theory has been used in the study of quality conventions found in agricultural subsectors. Two authors, Valceschini (1993a) and Sylvander (1992a), have applied this theory to the study of economic coordination.

Valceschini (1993a) demonstrates that, in the French vegetable processing industry, the traditional articulation between civic and industrial coordination -- where price discovery and definition of quality are centralized -- is no longer relevant. In this sector, production contracts between vegetable producers and processors have been established at a collective level, in a national interprofessional organization. For Valceschini, this contract economy is "not reducible to a (simple) contract minimizing technological and strategic uncertainties between agents, but is a conventional arrangement whose goal is to create value through cooperative behavior and to share (ex-ante) this value".

Valceschini (1993a) shows that the definition of these 'institutional arrangements' is contingent upon the economic and political context. In the sixties, these conditions (and notably a high economic growth) lead to a centralized and civic interprofessional organization. This organization defined a standard contract which specified price discovery, risk sharing, production planning, technical monitoring. This quasi-complete contract aims to limit conflicts and competition between producers. But Valceschini insists that this industrial/civic form of coordination, far from eliminating competition between processing companies, exacerbates it among the only remaining variables: investment policy and production-cost minimization. In the eighties, a new competitive environment (high concentration ratio, high substitution effects between canned and frozen vegetables...) invalidates the traditional rules of value creation and risk sharing. Increased competition between companies and between producers leads to new quality standards (defined by the market i.e. the consumer needs) and to more flexible price discovery mechanisms. In fact, the industrial/civic coordination is progressively replaced by an industrial/market coordination.

Sylvander (1992a) demonstrates that in the French poultry processing industry "quality specifications influence the choice of coordination mechanisms" and, consequently, the way firms compete and cooperate. Notably this is the emergence and the strengthening of an industrial convention which determines the economic behavior of the firms. In this industrial convention, quality is defined and controlled by a third party. Each grower is held to a strict set of standards and requirements about feed, genetic stocks, housing conditions, etc.

This convention played an important role in the development of the subsector, and particularly in restoring trust among consumers about the product quality. This convention progressively shaped competition between processing companies. Indeed, the competitive advantage in such a system is mainly found in the ability to improve its quality management and its productivity (at the production level, in order to decrease costs). For Sylvander (1992a) only the biggest companies were able to improve significantly these constraints because of financial availability and marketing skills. They benefited from the rapid growth of consumption.

Coherent with convention theory assumptions, Valceschini and Sylvander's approaches have three methodological implications for the study of vertical coordination. First, the comprehensibility of

¹⁸ This conception of contracts is close to what Williamson (1993a) calls the two levels of institutional environment (macroscopic level) and institutional arrangements (institution of governance level). "The institutional environment is the set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution. Rules governing elections, property rights and the right of contracts are examples...An institutional arrangement is an arrangement between economic units that governs the ways in which these units can cooperate and/or compete. It (can) provides a structure within which its members can cooperate, or (it can) provide a mechanism that can effect a change in laws and property rights" (Williamson, 1993a).

contract's genesis cannot be understood exclusively at the microeconomic level: indeed, the content of contractual arrangements (microlevel) may stem from institutional arrangements and institutional organizations (macrolevel). Secondly, these institutional arrangements greatly contribute to shape the competition in the sector. Contracts are not outside the competitive process but are a part of it. Third, the genesis of these arrangements is itself dependent upon external and internal factors. Therefore, a complete vertical coordination analysis should include the study of interplay between basic conditions and strategic behaviors, and their consequences on the institutional environment.

2) Critical comments and methodological implication

As Spulber (1992) suggests, "vertical integration provides in varying degrees the beginning of a theory of the firm because (it) addresses the rationale for including specific activities within the firm". Mahoney (1992), in the same vein, considers that vertical coordination and theory of the firm are "largely isomorphic". Indeed, if vertical coordination can be seen as a process of selecting and organizing activities, the questions of the boundaries and of the conceptual essence of the firm inevitably arise¹⁹.

Starting from a neoclassical point of view, theorists became more and more preoccupied with questions such as imperfect competition, uncertainty and control. The status of the firm itself evolves: the production function makes room for the institutional form where economic and legal aspects are inseparable. But how could these theories be articulated for the study of vertical coordination? And to what extent are they irreducible? In spite of this diversity and complexity, it is possible to highlight the main contributions of these theories through two questions. These two questions are the complementarity between economic and institutional approaches, and the strategic dimension of economic coordination. A critical discussion about these points will lead to our own assumptions and hypotheses.

Economic institutional approaches

The industrial organization approach shows that technological and market structure considerations are relevant but insufficient to understand the choice of a coordination system. Indeed, control strategies for instance involve legal aspects and are not reducible to the choice of a technological sequence through an optimization of costs.

In fact what institutional theories, in their diversity, show is that economic and legal aspects cannot be easily separated. Organizational issues need specific concepts. The contract, as an economic concept, is a particularly pertinent category for the study of economic organizations. Pertinence of new concepts lies in the fact that they provide a different vision of reality and those specific facts, until now neglected, are taken into account. Strictly microeconomic perspectives consider the organization as a black box. More important, no common conceptual bridge links organizations and markets. No microeconomic concepts allow their study simultaneously as alternative forms of institutions. Indeed, if the market is the only reference, nothing or very little can be said about organizations.

The contract provides this unified vision and it becomes the central unit of analysis. Some discrepancies exist between economic and contractualist approaches, but some convergences are already significant. We have seen that some integrative approaches emerged. Works such as Milgrom/Roberts (1992), Ménard (1989, 1993) and Barney/Ouchi (1986) show that organizational economics is already valid.

The main interest of contractual approaches is their ability to introduce in the analysis more realistic assumptions about agents' behaviors, such as *bounded rationality* and *opportunism*. Coordination issues permanently cope with the existence of an uncertain environment and with the fact that individuals or firms seek to satisfy their own interests and try to use advantageous positions. Another

¹⁹ Appendix 3 shows this theoretical contingency between theories of the firm and representation of vertical coordination.

pertinent contribution of contractual approaches is the concept of institution. An institution combines a particular distribution of power over assets with specific exchange mechanisms. All socio-economic 'structures' can be seen through the prism of this *institutional analysis*²⁰. Our approach will emphasize the institutional nature of vertical coordination. These approaches are at their beginning but, as Williamson (1990) affirms, "the main axis (of future research) will be economics and organization theory, where the former provides an economizing orientation and the latter supplies added behavioral and organizational content".

The strategy dimension

Vertical coordination is the resultant of a highly complex process. With a dynamic and uncertain environment, and incomplete information about opportunistic partners and competitors, the choice of a coordination mechanism can surely not be understood in a purely determinist way.

In fact, strategic management scholars²¹ and economists like Brousseau share a common interest in the study of the decision process. Opposed to determinist models of choice, they open the way for a specific conception of coordination, deliberately focusing on the planning process. For them, the choice of alternative linkages is a result of goal-directed collaboration or conflict among the economic agents who make the exchange, but not (or not only) the result of external/structural forces. Consequently, the building of a determinist framework appears to be unrealistic. In an uncertain environment, there is no optimal equilibrium. Instead, economic agents are radically opportunistic and will adopt strategies that will maximize their own utility²².

This approach has important consequences and modifies underlying assumptions of economic analysis: its role is therefore to understand and explain the behavior of agents. The choice of an organizational structure cannot be deduced only from the basis of cost, but will also reflect the existence of hierarchy and power relationships. If one cannot predict the result of economic agents' behavior, therefore it is possible to better understand how they will take their decisions and what is their process of choice.

This procedural conception of rationality leads one to reconsider the question of efficiency. Notably, the traditional criterion of transaction-cost minimization must be reexamined for several reasons. First, bargaining power within the coalition will benefit the dominant agent, which may have other objectives than a transaction-cost minimization. Secondly, the goal of the coordination process may differ greatly as a function of the competitive situation. And the two more common generic strategies, cost domination and product differentiation, suggest that the objectives assigned to a particular vertical coordination process could be either cost-minimization or value-maximization. Third, as shown by the convention theory, institutional arrangements can affect greatly this notion of efficiency: collective rules will define specific coordination mechanisms involving non-strictly economic factors.

The fundamental methodological implication is that competitive analysis is a necessary step in the study of coordination. Indeed, firms' behaviors are specific to circumstances. For Oster (1994) "Strategies that are able to help an organization move forward in response to changing times and integrate and disseminate the corporate vision are necessarily conditioned by the circumstances of the organization, its history and its environment."

²⁰ This conception of institution allows a 'comparative institutional analysis' (Hennart, 1994) and this thought process, as shown by Hennart (1994), can be applied to a wide range of organizational issues.

²¹ And notably Hennart (1993,1994), Olsen/Zajac (1993), Reve (1990).

²² similar conception is found among organizational economics scholars. Milgrom and Roberts (1992) "do not presume that organizations *per se* have goals that they seek to realize". They are careful "to treat organizational decisions and actions as the outcomes either of strategic interplay among self-interested people responding to incentives designed to influence their behavior, or of collective or managerial attempts to compromise the interests of parties affected by the decisions." They add: "using *efficiency as a positive principle* requires taking care about whose interests are being served."

Spulber (1992) insists on the role of strategic management research in the building of an extended model of choice. He says: "A unified theory of the firm can address in detail how managers answer the questions of what to produce, how to produce it, and for whom....; (that) may eventually lead to a richer description of competitive markets by introducing some of the organizational issues missing from the neoclassical and industrial theories of the firm. At the same time, a clearer understanding of incentives and delegation of authority will emerge from the introduction of competitive forces into a multiple organization framework..." Finally, and most significantly, greater integration of competitive and organizational issues will allow increased application of economic analysis to practical problems in management strategy." Participating in this debate, Williamson (1994b) argues that "many errors of myopic strategic reasoning can be avoided by approaching the problem of economic organization as one of incomplete contracting in its entirety... Parties to an incomplete contract are assumed to behave perceptively with respect to present and prospective benefits and hazards, whence they decide simultaneously on the technology to be employed, the price under which a good or service will be transferred, and the governance structure within which a transaction is located." Thus the central question in the study of vertical coordination will lie in the decision-making process, where economic, strategic and organizational issues are at stake.

3) Proposal for a theoretical framework of vertical coordination

Porter (1991) gives an excellent definition of a framework and its construction: "A framework encompasses many variables and seeks to capture much of the complexity of actual competition. Frameworks identify the relevant variables and the questions which the user must answer in order to develop conclusions tailored to a particular industry and company. In a sense, they can be seen almost as expert system.... The theory embodied in frameworks is contained in the choices of included variables, the way variables are organized, the interactions among variables, and the way in which alternative patterns of variables and company choices affect outcomes".

The framework developed here contains two main objectives:

- to provide a full description of vertical coordination, in its main institutional characteristics, and
- to propose a model of decision-making within the firm concerning the choice of these characteristics. In the following section we will consider an hypothetical model of bilateral coalition, i.e. of two economic agents entering a process of exchange.

Two dimensions are sufficient to describe the entire possibility of institutional arrangements: the distribution of ownership/control over assets, and the mechanisms involved in the exchange.

First one considers the 'ownership' dimension. In our bilateral model, two extreme cases are possible: unified (common) or bilateral (separated) ownership. But agency literature points out the complementary notion of control as another relevant concept in the study of bilateral contracts. When ownership over assets is unified, the control will be, obviously, internal. A third party may complete this procedure, without modifying the approach. In the case of bilateral ownership, control between assets can be either external (the case of principal/agent relationship) or absent. In the former case, two independent agents enter in an exchange relationship and one of them has a direct *ex-ante* control over the other. In the latter case, there is no *ex-ante* control (but an *ex-post* control -- over the products for instance -- is likely to exist).

The second relevant dimension of coordination is the exchange mechanism. Organization theory literature distinguishes two extreme forms of mechanism: price and behavior constraints, separated by a continuum of combination between these two generic forms.

Figure 13: The germane dimension of vertical coordination, a descriptive approach.

Ownership and control		Unified Internal control	Bilateral	
			External control	No control
Mechanisms of exchange and/or control	Price-constraints	Vertical integration: profit-center firm	Vertical contracting: Piece, work	Pure Market
	Mix price/behavior constraints	Vertical integration: price+behavior constraints	Vertical contracting: Piece work+monitoring	Alliance or agreement
	behavior constraints	Pure vertical integration	Vertical contracting: Monitoring	Alliance or agreement

As shown by the figure 13, a diagram matching the ownership/control and the exchange mechanism dimensions allows the description of a wide range of vertical coordination *institutions*. An institution can be *defined by the way authority(ies) is(are) distributed over a specific sequence of assets and by a particular choice of exchange methods between these assets*.

The figure gives nine hypothetical variants of vertical coordination. With unified ownership, we find three generic forms. If this unified structure uses the price-constraint system, this is the case of the 'profit-center' firm. Pure vertical integration occurs when all the exchanges within the firm are under behavior constraints. A third intermediate form is possible, when the firm uses a combination of price and behavior constraints. With bilateral ownership but external control, this is the case of the vertical contracting mode of coordination. The two parties are legally independent but one has an authority over the other. The exchange can be done under exclusive price constraints (piece work), exclusive behavior constraints (monitored work) or under an intermediate mechanism. In the case of bilateral ownership and without ex-ante control, two independent and autonomous economic agents exchange. The 'pure market' is found when the price is the only reference. But this exchange can also involve behavioral elements (on a reciprocal basis): the coordination is a type of agreement or alliance between the parties. Theoretically, a third-party could also control the transactions.

In a process of decision making, a wide range of variables act simultaneously. But, for the analysis, we propose a two-step model, in correspondence with the two main dimensions of our coordination description. A successful analysis of coordination problems lies in a complete description of what may influence the decision process. It must include, as emphasizes Brousseau (1993), both production and exchange.

Transaction-cost economics theory is concerned with exchanges between technologically independent entities. The process of asset segmentation and distribution between entities is not taken into account. On the other hand, industrial organization economics, with the notion of vertical market structure, includes the comparative market structure on the buyer/supplier interface, and the situation of competition between the coalition and the other competitors (level of entry and exit barriers). The two approaches may be articulated and Brousseau's framework is an attempt to do so²³. The objective of

²³ A similar construction, but with a different set of variables, is found in Stuckey and White (1993) and Venkatesan (1992).

such an attempt is therefore to better understand the authority relationship and the objectives assigned to the vertical coordination process.

In the first step, the goal is to analyze the situation of asset distribution and specificity. The particular layout of stages of an industry chain are likely to be the reflection of scale and scope economies. Agents are already specialized, but this situation is not static; new technologies may affect this layout. Asset specificity is also an important feature of production characteristics within the coalition. Like asset distribution, asset specificity does not remain static. Many factors may modify this specificity; in fact the choice of vertical coordination mechanisms itself often reflects an attempt to modify this specificity. In this perspective, transaction-cost and industrial organization theories are complementary. They help to understand how authority will emerge between the parties and what could be the objectives of vertical coordination strategies.

The second step focuses on the exchange (and control) mechanisms of the transactions between the parties. Characteristics of uncertainty in the transaction is probably one of the determinant variables that affects the design of control mechanisms. The definition of uncertainty is highly contingent upon the conditions of competition, the strategies of the agents and the characteristics of technologies. The contract must set up and define, at the lowest costs, what is expected from the agents, reduce their opportunism, and share equitably the risks. Given a particular context, the analysis, as the organization theory approach suggests, must focus on the criteria that most affect the control costs. The objective is to understand the choice between outcome-based, behavior-based or a combination of these two generic forms of control strategies.

Programmability and *separability* are such criteria. Indeed, programmability is the evaluation of task readability, that is the (more or less costly) feasibility to see what is done by the agent and how. For example, particular product specifications will be more or less programmable -- easy to control. But programmability itself can be modified. A redefinition of an agent's tasks can improve their readability. On the other hand, separability is the evaluation of individual performance readability, that is the (more or less costly) feasibility to see who has done the work. With low separability, the principal will face either high control costs or intense cheating. Like programmability, separability can be modified. For instance, the selection of agents or the set-up of an information system can increase separability.

The choice of a control mechanism is the result of a complex evaluation process. Hennart (1994) notes that the ability to assess precisely (or more precisely than its competitors) the cost of a wide range of alternative control mechanisms is probably a key dimension of competitive advantage. And this knowledge is likely to be highly related to organizational learning. As Hilmer and Quinn (1994) suggest, this choice is also dependent upon competitive conditions. Indeed, they consider that companies deal with "a constant trade-off between flexibility and control". Companies have to compare their needs between rapid adaptations to environmental conditions and their needs to be directly involved in the partner's activities.

Still, the question of risk sharing remains. An optimal contract must be able to distinguish idiosyncratic risks (agent-specific) and non-specific risks. Then the non-specific risk can be equitably shared between the parties. But when it is not possible to separate these two types of risks, it could be preferable to adopt either a pure market or a full integration solution. Thus, the analysis must stress the feasibility of the separation specific/non-specific risk. One finds a similar problem already seen above: that is the feasibility of identifying idiosyncratic features (like risk, task, individual behavior etc...) and the cost of modifying these features. Problems of programmability and separability are also found here.

Figure 14 summarizes the main characteristics of the analysis. The first step is industrial organization/competitive analysis oriented. Results from this first step play as 'basic conditions' of vertical coordination: existence of authority relations, firm's strategic objectives, number of technological stages...The second step focuses on the contract's design. Indeed, there is a full spectrum of possible outsourcing arrangements and one must consider the nature of transactions (uncertainty, opportunism...) to understand this choice. In fact, this two-step model is largely a matter of perspective:

at a first level the focus is on the firm's situation in its environment, at a second level the focus is on a particular transaction. But the interplay between these two levels does not permit a partial analysis.

Figure 14: Vertical coordination and the decision-making process: an analytical framework.

	FIRST STEP	SECOND STEP
FOCUS	Production (assets)	Exchange (transaction)
OBJECTIVES	<ul style="list-style-type: none"> >understand the layout stages of industry chain (configuration) >understand the emergence of authority relations >determine the strategic objectives of the coordination process 	<ul style="list-style-type: none"> >analyze the control and exchange mechanisms >describe the agency problems (if any) <ul style="list-style-type: none"> -adverse selection -moral hazard >analyze the incentive problems
VARIABLES	<ul style="list-style-type: none"> >technological variables >asset specificity <ul style="list-style-type: none"> -of the agents -of the coalition vs. environment >vertical market structure <ul style="list-style-type: none"> -buyer/supplier concentration -exit/entry barriers >quality conventions 	<ul style="list-style-type: none"> >transaction frequency >transaction characteristics >uncertainty >quality conventions >tasks' programmability >tasks' separability
APPROACHES	<ul style="list-style-type: none"> >competitive analysis >IO analysis >convention theory analysis 	<ul style="list-style-type: none"> >transaction/coordination costs Analysis >agency theory

4) An application: the U.S. broiler industry

The framework developed above can be applied to a particular subsector in order to understand how a firm will choose its vertical coordination strategy. From the empirical studies available²⁴, we will use this framework to understand the specific vertical linkages of the U.S. broiler industry.

The U.S. broiler industry is highly competitive, and has benefited from a constant shift in substitution effects from other types of meats. Indeed, during the period 1960-1994, the consumption per person has increased from 19.2 to 49.7 pounds for broiler, while increasing only from 59.8 to 63.6 pounds for beef (cf. appendix 4). Many socio-economic factors have favored this trend (Rogers, 1992), but the ability of firms to increase productivity and reach new consumer needs is likely to be determinant. The industry concentration remains relatively low. According to Rogers (1992), the CR4 is about 40%. In the beef industry (slaughter level), the same ratio is 70% (cf. Kim and Marion, 1991 and appendix 4). The constant rise in the concentration ratio during the past ten years is mainly the result of mergers among leading firms (Kim and Marion, 1991). These leading firms are Tyson Foods with a 20% market share and Conagra with a 8.5% market share. These companies develop — strategies of cost domination and product differentiation. In a context of high competition, rapid technical change and a relatively low degree of product differentiation, the search for the lowest costs -- both in production/processing and coordination -- is absolutely necessary. But the leading firms try to differentiate their products through advertising or product innovation, and notably Perdue Farms, Conagra and Tyson Foods (Rogers, 1992).

²⁴ These empirical studies are: Marion et al. (1986); Christensen et al. (1988); Knoeber (1989); Kim and Marion (1991); Rogers (1992); Amanor-Boadu et al. (1993). Elements of comparison are drawn from Sauvée (1989) and Sylvander (1992).

One of the most distinguishing characteristics of the broiler industry is probably its vertical organization. Indeed, the spot markets are virtually absent and the totality of vertical exchanges between production and processing stages occurs through vertical contracting and integration. According to several inquiries (Rogers,1992; Christensen et al., 1988), the resource-providing type of vertical contracting is largely predominant (from 80% to 90%), while pure vertical integration is around 10 % of the total value of farm originated inputs. In a resource-providing contract, the processing company provides feed, chicks, medicine, management program and technical/management advice services. The grower provides housing, labor and management/technical skills.

According to our thought processes, one must understand the genesis of such a configuration or, in other words, analyze the successive economic and strategic choices (and constraints) that led to what is observed. The main features of this configuration are:

- three main technological stages in the industry: feed mill, grow-out farm, processing plant,
- the existence of vertical integration between the feed mill and the processing plant,
- the existence of a principal/agent relationship between processors and growers,
- the definition by the principal of cost-domination/differentiation strategies,
- a high degree of competition between the coalitions (and a low degree of concentration),
- a vertical contracting between growers and processors with resource-providing contracts.

Economies of scale and scope explain the particular market structure of the broiler industry (Rogers,1992). The size of processing and milling plants are large compared to a single grow-out farm because of the internalization of specific technological economies in the respective stages. Very high in the case of processing and milling activities, these economies rapidly reach a maximum in the growing activities.

Asset specificity is high in this industry. This is essentially a site-specificity: feed milling, growing and processing activities are tied together through their proximity. Indeed high costs of transportation of both feed, chicks and live chickens prevent a dispersion of the operations. And the transportation of a processed product is relatively less costly. As shown by Rogers (1992), the situation of the broiler belt, located in the southeastern states, allows efficient shipping to the population centers without being too far from the supply sources (corn and soybean from the mid-west states). This particular asset specificity suggests that there is no real asset specificity asymmetry between the economic agents: they depend upon each other. But the vertical market structure is asymmetric: one processing company deals with a large number of grow-out farms. It indicates a likely source of authority in the relationship and explains the principal/agent situation. The asset distribution, along the industry chain, can be featured as a *bilateral dependency*: about twenty coalitions (that account for about 80% of the domestic market) which are highly vertically-dependent and facing a competitive environment²⁵.

The principal-agent relationship found here has to resolve the generic problems of agency theory: uncertainty about the agents' opportunism of the agents, uncertainty about product quality, incentives for a good performance, risk sharing between the parties. An optimum contract is expected to solve these problems at the lowest cost.

The first uncertainty, for the processor, is the choice of skillful growers. A response would be to internalize totally the growing operations and to monitor directly the labor force -- through a labor contract. But the cost of monitoring such work would be costly, and the choice of good workers remains problematic. An efficient *ex-ante* selection of growers is necessarily related to the possibility to assess the skills of these growers, which is difficult to measure. With the choice of resource-providing

²⁵ A comparison with the Dole Fresh Vegetables Company, a shipper, and their vegetable producers provides interesting insights (for a complete analysis, cf. Amanor-Boadu et al.,1993). In that case, and despite an unbalanced vertical market structure (one shipper for many producers), there is no significant authority relationships but instead a vertical alliance. Indeed, the producers are much less asset-specific than the shipper both because they can easily find another shipper and because other marketing channels are available. The objective of the coordination process here is to design steady and rewarding arrangements between the two parties of the exchange.

contracts, the grower has to invest himself in housing facilities. Highly specific, this investment will have a low value outside the coalition and, consequently, the incentive for the grower to succeed will be enforced.

The second uncertainty, for the processor, is the product quality. The ability to sell products with a constant quality and very precise characteristics is absolutely necessary in a competitive environment. Among the factors affecting this quality, the composition of feed and the genetics of broilers have a great influence. As usual, many alternatives are available. The first one would be an *ex-ante* control of the inputs (feed, chicks, medicine...), which would be costly and probably difficult to set up. It is also possible to control the products *ex-post* (for instance at the farm gate). Likewise, it will be very costly to control all the products, if one wants to limit as much uncertainty as possible and avoid bad products. But, perhaps more important, the risk for the growers not to sell their products would be too high and would prevent them from investing in such a business.

Finally, a resource-providing contract is a better alternative. If the principal directly tailors and, consequently, perfectly knows feed and chicks, the growers' tasks become more programmable. Management and technical advice are also a means to limit heterogeneous behavior. Reproduced on a large scale, these operations are not costly. And the need for control exists only at a significantly more centralized level (the feed mill or the hatchery). Therefore the control costs are lessened.

As we can see in this case, contracting is a means to modify task programmability, and thus control costs. An important dimension in the choice of vertical contracting is probably the way a particular contract will affect task programmability²⁶.

The question of price discovery remains. Knoeber (1989) describes the contract commonly found in the broiler industry: the performance-order tournament. The grower is paid per pound of live broiler produced. This is a piece rate contract with outcome-based control. The size of this per pound is not fixed but instead determined by the relative performance of the grower compared with other contestants.

A tournament may be rank-order: in that case it is only the grower's performance rank that matters. But more frequently, the tournament is based on a cardinal measure of performance. In that case, a grower's settlement cost (inputs consumption -- i.e. chicks and feed -- divided by the production of live broilers) is "compared with the average of several flocks' settlement cost (at least ten), and the payment per pound is determined as the sum of a base payment minus a portion (sometimes all) of the deviation between the grower's performance and the average" (Knoeber, 1989).

This type of relative performance-order tournament has several advantages. First, it requires a relatively simple and cheap measure of performance. A comparison of, for instance, fifteen growers' inputs consumption and output production, will be sufficient. The processor company, being the supplier/buyer, has a perfect knowledge of this consumption/production. Moreover, the separability problem is minimized: the company determines easily each individual performance. But, more importantly, this contract has high incentives. Knoeber (1989) shows in his example that some of the payment per pound depends upon relative performance.

As an outcome-based contract, problems of cheating may occur. Several features of the contract will discourage them. First the grower(s) whose settlement costs are substantially above the average is (are) not included in its calculation. Thus, the tendency of sabotage against a grower in order to increase the average cost will be limited or avoided. Wide collusion between growers to reduce efforts

²⁶ The comparison with the Dole Fresh Vegetable Company is enlightening. This company invested heavily in information systems, in order to "identify the source of quality problems and recognize the contributions of both farmers and Dole to delivering high valued products to the markets"(Amanor-Boadu et al.,1993). This case study shows that the problem of "separability -who is responsible for quality- can be alleviated with information"(Amanor-Boadu et al.,1993)

collectively is also prevented. Indeed, the processor company will select and decide secretly what growers, at a particular moment, will enter in the same tournament and consequently will compete with each other's. Not knowing who their competitors are, the growers should collude with all of them, which is either too costly or practically impossible.

The question of risk sharing between the parties must be considered. The grower may agree to bear idiosyncratic risks (specific to his own behavior) but not those -- or at least only one part -- inherent to external shocks (climate, disease...). Nor will he agree to bear the risk of low productivity inputs. For instance, a grower's low performance may result in deficient chicks or unbalanced feed, which are provided by the principal. In the case of external shocks, they are likely to affect all the growers of the tournament, increasing the average settlement cost and consequently not greatly modifying each grower's relative performance. In the case of input problems, the company tries to limit as much as possible the heterogeneity of inputs. In fact, the problem is not to have variation in input productivity- which variation is impossible to avoid- but to provide all the tournament contestants with inputs of the same characteristics. The company does so in delivering the contestants at the same time with the same products (chicks from the same hatchery and the same breeding, feed from the same milling operation).

These contracts are short term, usually one year. But in order to minimize opportunism and risk for both principal and agents, they are tacitly renewed each year, unless repetitive poor performance occurs.

The existence of a small proportion of pure vertical integration is problematic. But it could be interpreted in many ways. It gives an objective indicator of the settlement cost, without the bias of growers' behavior. It can be a means to innovate with new inputs, new management programs...more easily than with an independent grower. Finally, a direct control over a small part of the production will allow the company to respond more quickly to the demand fluctuations. In these two latter cases, growers are too risk-averse and cannot bear such risks as innovation or frequent surplus.

This example shows that an integrative framework using insights from different theoretical backgrounds²⁷. helps to better understand the genesis and shape of vertical coordination in a particular subsector. Obviously, this partial theoretical interpretation of case studies does not demonstrate the validity of the results proposed nor does it provide explanations for the entirety of coordination features. But the purpose here is to illustrate the relevance of a framework focused on the strategic planning process. It also gives an example of how these theories could be implemented.

²⁷ And principally Mahoney (1992,1994); Hennart (1993,1994); Brousseau (1993); Olsen and Zajac (1993). And for a general perspective on organizational economics through strategy issues: Oster (1994).

**Figure 15: Vertical Coordination in the U.S broiler industry:
an interpretation of the process of choice.**

FIRST STEP		SECOND STEP	
<i>Facts</i>	Implications	Facts	Implications
*three main technological stages *unbalanced vertical market structure *low concentration	*interdependent coalitions *authority relationship *high competition <i>choice of -vertical integration (feed/mills/process.plants) -vertical contracting (process.Companies/growers)</i>	*highly recurrent transactions *uncertainty about quality *uncertainty about behavior	*programmability/separability problems *incentive problems *opportunism *risk-sharing problems
		<i>choice of resource-providing contracts between growers and processing/milling companies</i>	

Conclusion

Our understanding of vertical coordination benefits greatly from new approaches in institutional economics, organizational economics and strategic management. New concepts and new assumptions allow a more realistic and more complete vision of coordination and broaden considerably the scope of the analysis. But schools of thought are diverse and far from being unified. The main methodological oppositions are found between organizational economics and strategic literature perspectives: the intense debate existing between these two fields is symptomatic²⁸.

In spite of important progress, many questions remain unsolved. Among these problems, the question of organizational efficiency and of its assessment is particularly problematic. Indeed, as soon as the source of organizational dynamics and change can no longer be found in the optimization of a production function, theorists must provide new explanations. For instance, economic treatment of incentive problems in organizational economics is incomplete. Indeed, as suggests Simon (1991), "economic rewards are not the only means of motivation available". Notions such as loyalty, commitment, trust, explain greatly the behavior of economic agents (and therefore organizational efficiency) but do not fit easily in economic concepts. For Simon (1991): "Organization size and degree of integration, and the boundaries between organizations and markets, are determined by rather subtle forces. The wide range of organizational arrangements observable in the world suggests that the equilibrium between these two alternatives often be almost neutral, with the level highly contingent on a system's history. A traditional arrangement may be preserved until its inefficiencies become overwhelming -- or even beyond."

Interestingly, Casson (1991) considers that the notion of trust is central to organizational problems²⁹. Indeed, for Casson, trust reduces transaction costs and improves the allocation of resources. This notion of trust is itself embedded in the cultural environment (both local, at a corporate level, and in society). Simon's (1991) 'subtle forces' probably find a part of their explanation on this level of trust; organizational arrangements are contingent not only to a system's history but also to its social and corporate values.

²⁸ See for instance important contributions to this debate in Rumelt et al. (1994), and especially Williamson (1994a) and Nelson (1994).

²⁹ Baudry (1992, 1993) also insists on the importance of this notion of trust. Boehlje and Schrader (1994) recommend a similar approach.

Another fundamental question lies in the methodological assumptions. In agency and transaction³⁰-cost theories, vertical coordination is fully understandable at a microeconomic level. For convention and organization theories, and strategic management perspectives, the building of an intermediate level is an indispensable step in the analysis³¹. Indeed, the 'structure' is more than its components and has emergent properties. But, as suggests Brousseau (1993), we think that the necessity to take into account structural criteria should not prevent one from using microeconomics concepts.

The ability to explain why heterogeneous vertical business linkages emerge, remain and compete is far from being achieved. Vertical coordination decisions are the result of complex procedures. Despite promising concepts and significant results, a full understanding of this phenomena challenges future research. The progressive building of an institutional analysis, implementing organizational economics and strategic management, should contribute to this future research.

³⁰ But, in a recent article, Williamson (1993b) considers that "governance does not operate in isolation". He proposes a "three-level schema according to which the object of the analysis, the governance, is bracketed by more macro features (the institutional environment) and more micro features (the individual)."

³¹ One finds here the traditional conflict between the methodological individualism and the methodological holism.

Appendix 1

Vertical coordination between farm-originated inputs and food manufacturing industries (1985-1988, % values, USA)

<i>Industry</i>	<i>Spot market</i>	Market Specification ³²	Contracts Product management ^{33t}	Resource providing ³⁴	Integration
Meat packing	89.5	7	0	0	3.5
Sausages	89.3	7.2	0	0	3.5
Poultry dressing	13	0	0	73	14
Poultry/egg processing	6.5	0	18.5	48.2	26.8
Cheese	17.7	81	0	0	1.3
Ice cream	19	70.8	3.6	0	6.6
Fluid milk	17.7	81	0	0	1.3
Canned specialities	31.1	6.2	38.8	0	24.9
Canned fruits/veget.	35.4	10.4	30.6	0	23.6
Deshyd.fruits/veget.	24.9	14	33.4	0	27.7
Pickles/sauces/dressings	36.9	1.3	40.3	0	21.5
Frozen specialities	19.3	14	15.7	24.1	26.9
Flour	91.7	7.8	0	0	0.5
Cereal breakfast foods	81.6	13	0	0	5.4
Rice milling	91.5	8	0	0	0.5
Wet corn milling	92.5	7	0	0	0.7
Bread, cake	40	35	0	0	25
Cane and beet sugar	0	0	69	0	31
Cottonseed oil mills	82.3	7.7	0	0	1
Soybean oil mills	89.5	10	0	0	0.5
Malt beverages	93.2	6	0	0	0.8
Wines and brandy	32	41	0	0	27
Fresh/froz.packaged fish	96	3	0	0	1
Roasted coffee	100	0	0	0	0
Pastas	11	0	45	0	44

Source: Franck and Henderson (1993)

³² market specification: transferred management to the contractor regards the decisions of what to produce and when, and where to deliver it.

³³ product management: similar to market specification + control over production process.

³⁴ resource providing: similar to product management + supply of inputs into the production process.

Appendix 2

Vertical coordination in agricultural economics: some significant works

Authors	Institutions/projects	Theoretical approaches	Case studies
Marion/ Schrader	NC 117 (University of Wisconsin -Madison)	Industrial organization and subsector analysis	All subsectors
Frank/ Henderson	NC 194 (Ohio State University)	Transaction-cost analysis quantitative measurement	Food industry.
Barkema/ Drabenstott/ Cook	Food Agricultural Marketing Consortium (Texas A&M University)	Mahoney's framework	None
Amonor-Boadu/ Martin	George Morris Centre (University of Guelph)	Mahoney's framework	Poultry
Sylvander	INRA-ESR Toulouse	Mahoney's framework	Poultry industry
Valceschini	INRA-SAD Paris	Convention theory	Vegetable processing industry
Zuurbier/Van Heck	Wageningen Agricultural University	Strategic management	n.d.

Appendix 3

Theories of the firm and vertical coordination: correspondences

Theory	Representation of the firm	Representation of vertical coordination	Determinants of vertical coordination
<i>Neoclassical</i>	production function	vertical technological economies	economies of scale economies of scope
<i>Industrial organization</i>	strategic	vertical integration strategy	idem supra + vertical market structure and imperfect competition
<i>Transaction cost theory</i>	governance structure contractual	vertical contractual relations	transaction-cost minimizing
<i>Agency theory</i>	Nexus of contracts	vertical contract	Contractual cost minimizing
<i>Strategic management</i>	Competitive advantage	value chain strategy	cost minimizing/ value maximizing

Appendix 4

U.S. broiler industry: data and facts

Meat and poultry consumption (in boneless equivalent weight, pounds/person)

Year	Beef	Pork	Broiler	Poultry	Total (all meats)
1960	59.8	48.9	19.2	24.1	140.1
1962	62.5	47.7	20.6	26.2	143.6
1964	70.5	49.2	21.6	27.4	153.5
1966	73.8	43.1	24.5	30.8	153.5
1968	77.5	48.7	25.3	31.7	162.9
1970	79.8	48.6	27.7	34.1	166.6
1972	80.8	48.1	28.7	35.8	168.5
1974	80.7	47.1	27.9	34.9	165.8
1976	89.1	41	29.4	36.6	170.6
1978	82.4	42.8	32	39.2	167.4
1980	72.2	52.6	33.6	41.9	169
1982	72.6	45.3	34.6	43.1	163.5
1984	73.8	47.5	35.9	44.9	168.8
1986	74.5	45.6	37.4	47.5	170.2
1988	68.7	49.2	39.7	52.1	172.2
1990	64.1	46.8	42.5	56.4	169.2
1992*	63	49.9	46.3	60.6	175.2
1994*	63.6	48.2	49.7	63.9	177.3

*projections
: USDA

source

Leading broiler companies (1990)

Rank and market share based on

	<i>Production</i>		<i>Advertising</i>	
	Rank	Share	Rank	Share
Tyson Foods	1	21.1	2	24
Conagra	2	8.5	3	21.3
Gold Kist	3	6.9	5	4.1
Perdue Farms	4	5.8	1	28.4
Foster Farms	10	2.8	4	10
<i>Top 4</i>		<i>41.2</i>		<i>83.7</i>

source : Rogers(1992)

Four-firm concentration ratio in beef packing and broiler industries

	1977	1982	1988
Beef packing industry	29.1	45	69.7
Broiler industry	20.6	30.3	38.8

source : Kim and Marion(1991)

GLOSSARY*

* Major sources of these definitions are: Milgrom and Roberts (1992), Oster (1994) and Williamson(1993c).

adverse selection: A kind of *precontractual opportunism* that arises when one party to a bargain has private information about the something that affects the other's net benefit from the contract and when only those whose private information implies that the contract will be especially disadvantageous for the other party agree to a contract.

agency relationship: One in which one person (the agent) acts on behalf of another (*the principal*).

agent: One who acts on behalf of another. **asset:** A potential future flow of benefits and services. Also, the article giving rise to the stream.

asset: A potential future flow of benefits and services. Also, the article giving rise to the stream.

authority relation: One in which one party (the superior) has the right to direct the behavior of the other (the subordinate), at least within bounds, and to supervise, monitor, and punish or reward the subordinate.

backward contracting: Bringing an *upstream* activity under the contracting of the firm.

backward integration: Bringing an *upstream* activity under the ownership and management of the firm. A form of vertical integration.

barriers to entry: Industry characteristics that reduce the rate of entry below that which would level profits.

barriers to exit: Factors that impede exit from an industry. The major source of exit barriers are specific assets of the operation.

barriers to mobility: Factors that prevent the movement of firms across strategic group boundaries in response to profit differences.

bilateral dependency: An on-going dependency relation obtained between a buyer and a supplier when one or both have made durable specialized investments in support of the other.

bounded rationality: The limitations on human mental abilities that prevent people from foreseeing all possible contingencies and calculating their optimal behavior.

competitive advantage: Characteristics of an organization that allow it to outperform rivals in the same industry.

complementary assets: A group of assets that work together to mutually support a particular strategy.

complete contract: A hypothetical contract that describes what action is to be taken and payments made in every possible contingency.

contracts: Formally, a legally enforceable promise. They may be oral or written, and they typically must involve obligations on each party.

convention: A set of non-price rules and arrangements between firms based on custom, usage, reputation or formal agreements.

(corporate) control: Authority over the decisions of a firm.

downstream: An activity that follows the *reference* activity in the sequence of steps from producing raw materials to delivering a finished product to the customer.

economies of scale: The reduction in average cost that is achievable when a single product is made in large quantities.

economies of scope: The reduction of total cost that is achievable when a group of products are all made by a single firm, rather than being made in the same amounts by a set of independent firms.

exit costs: Costs of leaving an industry; such costs typically depend on the amount of specific assets involved in the operation.

forward contracting: Bringing a *downstream* activity under the contracting of the firm.

forward integration: Bringing a *downstream* activity under the ownership and management of the firm. A form of vertical integration.

governance structure: The institutional matrix within which the integrity of a transaction is decided. Within the commercial sector, three discrete structural governance alternatives are commonly recognized: classical (*spot*) market, *hybrid contracting*, *hierarchy*.

hierarchy: The governance structure where transactions are placed under unified ownership and are subject to administrative control.

hybrid: Long-term contractual relations that preserve autonomy but provide added transaction-specific *safeguards* as compared with the market.

hold-up problem: The problem that one who makes a relationship-specific investment is vulnerable to a threat by other parties to terminate that relationship. This threat then permits these parties to obtain better terms than were initially agreed.

idiosyncratic asset: Asset whose value is much greater in a particular use or relationship than in the next-best alternative. Also called specific asset.

idiosyncratic investment: An investment that creates an *idiosyncratic asset*.

implicit contracts: Shared understandings that are not legally enforceable but that the parties consider to be binding on one another's conduct.

incentive: A means, for a firm, to stimulate greater performance by workers or other parties.

incentive intensity: A measure of the degree to which a party reliably appropriates the net receipts (which could be negative) associated with its efforts and decisions.

informational asymmetries: Differences among individuals in their information, especially when this information is relevant to determining an efficient plan or to evaluating individual performance.

institutional arrangements: The contractual relation or governance structure between economic entities that defines the way they co-operate and/or compete.

institutional environment: The rules of the game that define the context within which economic activity takes place. The political, social and legal ground rules establish the basis for production, exchange, and distribution.

measurements costs: Costs involved in determining the quality of a good or service that a party incurs to improve its bargaining position.

mixed assets: An intermediary form of asset specificity between idiosyncratic and nonspecific assets.

mixed investment: An investment that creates a *mixed asset*.

monitoring: An activity whose aim is determining whether the contractual obligations of another party have been met.

moral hazard: A form of *post contractual opportunism* that arises when actions required or desired under the contract are not freely observable (*low programmability*).

nonspecific assets: Assets that are equally useful when employed in combination with any of various other assets or in any of several relationship.

nonspecific investment: An investment that creates a *nonspecific* asset.

opportunistic behavior: Self-interested behavior unconstrained by morality.

opportunity cost: The value of the next best opportunity which must be sacrificed in order to engage in a particular activity.

piece rate: The amount paid for each unit of a product that is produced. Also, the system of compensating people in proportion to the amounts they produce.

post contractual opportunism: Opportunistic behavior by a party that takes place after a contract is signed. *Moral hazard* and the *holdup problem* are two kinds of post contractual opportunism.

precontractual opportunism: Opportunistic behavior by a party that takes place before a contract is signed. *Adverse selection* is a kind of precontractual opportunism.

principal: The party whose interests are meant to be served in an agency relationship.

private ordering: The self-created mechanisms to accomplish adaptive, sequential decision making between autonomous parties to a contract.

programmability: The capacity, for one party to a bargain, to observe the other's activity and performance.

reference: An activity under the ownership and management of the firm.

relational contract: A contract that specifies only the general terms and objectives of a relationship and specifies mechanisms for decision making and dispute resolution.

risk aversion: The preferring of a sure thing to a risky outcome with a somewhat higher expected return.

safeguard: The added security features, if any, that are introduced into a contract, thereby to reduce hazards and infuse confidence.

separability: The capacity, for one party to a bargain, to identify the others' individual activity and performance.

specialization: (1) The division of tasks on the basis of comparative advantage. (2) The process of narrowing -and presumably deepening- the range of tasks that a particular individual or machine can perform.

specificity: The extent to which the assets cannot be redeployed of alternative uses or by alternatives users except at a loss of productive value.

spot market contract: A contract for the immediate exchange of goods or services at current prices.
strategic alliance: An arrangement by which two or more firms combine resources outside the market to accomplish a task.

strategic alliance: An arrangement by which two or more firms combine resources outside the market to accomplish a task.

strategic group: Clusters of firms within an industry that share certain critical asset configurations and follow common strategies.

team production (problem): A production process in which the individual outputs cannot be separately identified. A case of low *separability*.

tournament: A contest in which the prizes received depend only on relative performance.

transaction: (1) An exchange involving goods, services, or money. (2) The microanalytic unit of analysis in transaction-cost economics.

transaction costs: (1) Costs of carrying out a transaction or the opportunity costs incurred when an efficiency-enhancing transaction is not realized. (2) The *ex-ante* costs of drafting, negotiating, and safeguarding an agreement and, more especially, the *ex post* costs of maladaptation and adjustment that arise when contract execution is misaligned as a result of gaps, errors, omissions and unanticipated disturbances.

upstream: An activity that precedes the reference activity in the sequence of steps from producing raw materials from natural resources to delivering a finished product to the customer.

vertical coordination: The configuration of ownership and control between upstream/downstream activities and a reference activity.

vertical integration: Bringing two or more successive stages in production and distribution under common ownership and management.

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