

# From Contracts to Networks: New Directions in the Study of Governance of Agro-Food-Energy Networks

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## 1 Introduction

The debate about the governance of complex systems of production represents a rich branch of the literature of applied organization theory. The particular application to agro-related networks is a relevant example since agriculture plays new roles in modern society. The core of the analysis is centered in the rationale for allocation of residual decision rights and distribution of the rights regarding the value created. Contributions based in transaction cost economics, resource-based view, dynamic competences, and incomplete contract theory explore different dimensions related to the allocation of property rights.

The question of how joint strategies are defined, and how value added (or subtracted) is shared among network players is still relevant. Indeed, the questions of how residual decision rights are defined and how residual rewards of resources applied in production are shared are relevant for the modern theory of organizations in general. Most of the traditional literature considers the transaction as the unit of analysis, following the tradition of the alignment hypothesis proposed by Williamson (1996). Hence the literature as developed so far deals with two limitations. First, the dyadic perspective, which narrows a complex and multidimensional task down to two actors, one transaction, and a choice of internal or contractual mechanisms of coordination. Second, the traditional perspective places its attention on the existing value, whether real or potential, that can be revealed by choosing the efficient mechanism of allocation of authority. This is only part of a larger and more complex frame, where value generation becomes a central question.

A large literature of economics of organization and strategy applied to agro-industrial relations has emerged from the traditional perspective. Value creation based on the generation of new knowledge, innovation, and enlargement of the production frontier is not covered in this literature. A new development in the literature points to new directions. The recent reconstruction of the theory of organization is based in the governance of knowledge and discovery mechanisms and contributes to the traditional analysis of governance regimes. The branch of literature based on constitutional contracts perspective allowed the introduction of dimensions other than asset-specific investments (Grandori, 2009). Less attention is directed to allocation of authority and more to the discussion about the actual need for hierarchy to govern complex networks, moving the attention from the question of

who dictates rules to the alternative question of how rules are continuously adapted and whether fixed rules are compatible with real production conditions.

This paper derives from the recent literature on complex organizations, highlights the relevance of relational contracts, and explores the use of the concept of the “firm as a Contract of Society” as introduced by Grandori (op. cit). The paper explores the adoption of this new concept to the study of complex relations in the food, fiber, and energy networks. The paper links relational contracts with network governance, exploring dimensions not yet applied to agro-food networks. The two particular dimensions treated are the genesis and stability of agro-industrial networks.

The thesis presented in this paper considers that there are different perspectives related to value creation and protection in agro-related networks. First is the value based on cost minimization incentives as explained in the literature of chain optimization (logistics) and industrial organization.

Second is the traditional dimension of protection of property rights, which includes Klein’s quasi-rents argument and relational contracts that provide the structure of the alignment hypothesis in transaction cost economics. This vein informs the origin and stability of spontaneous forms of cooperation based on co-specialized assets. The consolidation of formal institutions helps the growth of network organizations but is not necessarily aligned with their survival through time. Formal institutions allow for impersonal transactions and the exploration of economies of scale and low switch costs, but also might raise new obstacles to the evolution of mechanisms of cooperation. Informal institutions reduce transaction costs as well, but are dependent on personal transactions on a smaller scale that tend to last longer.

The third approach adds to the existing literature of governance and is based on value creation and discovery. In this view authority is meaningless, allowing for the perception of governance of complex relations based on continuous value enhancement, based in turn on the emergence of general and procedural rules as proposed by Grandori (op. cit). This perspective breaks with the myopic dyadic perspective, placing decisions more in a multi-transactional scenario. It also allows the evolution of the analysis of mechanisms of governance, adding to the hold-up protection perspective.

The present study opens room for a new branch of empirical analysis of agro-based networks based on flexible mechanisms of governance. It is organized in five sections. The second presents the evolution of the governance perspectives as applied to agro-food organizations. The third section explores arguments focused on dynamic perspectives of value creation not yet applied in the agro-food sector, and proposes a conceptual model that explores the perspectives of relational contracts, the measurement cost approach, and the firm as a Contract of Society. Part four presents empirical cases based on the comparative institutional analysis of agro-food-energy networks that represent the categories of formal, relational, and constitutional ties. Finally, part five examines conclusions.

## 2 Governance Perspectives of Agro-Food Organizations:

Organization studies of complex agro-food-energy systems gained importance during the last decade the 20th century due to three complementary aspects: the first wave of studies focusing on governance of complex food organizations emerged after the incidence of mad-cow disease in Europe (Maze, 2002, Farina, 2001). Consumers, food processors, and governments realized that in order to deal with food safety issues, the complexity of networks had to be deeply understood.

The second reason relates to environmental impacts and resource depletion. Agriculture is historically an industry that affects the landscape, exploiting natural resources such as soils, forests, wild life, and water. It also tends to affect the way of life of traditional communities, in particular having an impact on large populations that are displaced from their original areas.

The third reason is related to the new roles played by agriculture. Farmers are increasingly acting as protectors of the environment, receiving payments for environmental services. More recently the role of bio-energy has gained importance, being a source of new bio-fuels in the energy matrix. Finally, farmers are acting in the social services, providing health care, drug addiction treatments, and offering activities for the increasing elder population in the world (Hassink, J. and van Dijk, 2006).

### 2.1. Evolution of Theoretical Approaches

The traditional view of agriculture organizations has changed, and the profile of value created far exceeds the one related exclusively to food production. Three different governance mechanisms are explored in the literature of agro-industrial coordination. The first and most traditional is based in the price mechanism where the Walrasian auctioneer functions as a costless match maker. No transaction costs are present and no firm or organizations of any kind are relevant. This is a world of zero transaction costs and its structure of production is not based on firms, but on the price mechanism. Organizations are irrelevant and the explanatory variables have their technological nature expressed in terms of input and output prices, as expressed in the literature related to production functions.

The second perspective considers the existence of supply chains and studies mechanisms of coordination based on contracts. Several perspectives are adopted from the alignment hypothesis as proposed by Williamson (1985, 1996) that obeys the logic of protection of quasi-rents originating from the existence of investments in specific assets. As specific assets and uncertainty increase, transactions are carried out by other means than markets and placed instead in terms of contract mechanisms of coordination. At its limit, transactions can only be performed inside firms in hierarchic structures. Alternative transaction cost explanation is based on the measurement costs perspective as suggested by Yoram Barzel (1997). Both perspectives are contrasted and discussed in Zylbersztajn (2007). A large literature based on transaction cost economics explores the alignment hypothesis, originating a successful empirical trend.

Similarly, the resource-based approach focuses on the diversity of organization mechanisms partially explained by the existence of non-replicable resources and path-dependent experiences. Incomplete contract theory is also explored to explain the allocation of authority among different players in a contractual relation.

These approaches share a common perspective, based on a dyadic contract mechanism, where two actors define relevant attributes to be agreed upon and mechanisms of allocation of rights are considered to be of hierarchic nature, or by introducing third parties to define the allocation of property rights. In addition, the literature on transaction costs emphasizes the role of specific assets, neglecting the relevance of uncertainty.<sup>1</sup> This particular aspect is treated in the next section of this paper.

The third vein of references leaves the dyadic perspective and considers the complex structure of network mechanisms. The literature of networks gains in reality since it considers the existence of many players acting simultaneously, but loses in terms of empirical performance. Most of the studies of network organizations have a descriptive nature and are based in cases. The tradeoff has shown to bring relevant insights based on the sociological perspective where institutions, as expressed by informal rules added to relational contracts, are the support, explaining the logic of complex organizations.

Although it is not the intention of this paper to make a survey of studies of agro-industrial organization, some contributions are presented to demonstrate how the different approaches have been adopted to explain organizations in agro-based industries, particularly related to contracts and networks.

Specific analysis of agriculture contracts is developed by Allen and Lueck (2004), condensed in the book *The Nature of the Farm*. The proposed motivation of the studies is that agricultural contracts have a simple nature and do not involve complexities found elsewhere. Particular contracts of sharecropping and equipment are analyzed. Along similar lines, the literature of agricultural contracts found support in the studies made by MacDonald (2004), and a survey has been presented by Zylbersztajn (2005). The main point expressed in this branch of studies is that contracts, instead of markets, represent the most important mechanism of governance observed in agro-related businesses. Studies of agro-industrial contracts represent a rich vein of literature in the study of organizations, as can be found in Bogedof, P. and Olesen (2004).

A second approach departs from the contract description and its specific characteristics and moves towards complex contract structure analysis. Menard (1996) explored the properties of governance structures described as hybrid forms. In Menard (2004), the author adopted a transaction cost perspective which deepened the study of diverse contractual forms, proposing a model to fit the observed complexity in the real world of organizations. The first work is rooted in the transaction cost economics approach where adaptation is crucial to deal with consequential disturbances. The mechanisms of controlling opportunistic behavior play a role in terms of safeguards against unpredicted events. In addition, Menard also suggested

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1. Oliver Williamson (xx) suggests that asset specificity, frequency, and uncertainty play a role in defining the choice of governance mechanism. The empirical literature, however, gives little attention to uncertainty.

that contracts are not just substitutes for vertical integration, but mechanisms where continuous relationships evolve based on specialized mechanisms of arbitrage, and reciprocity where cooperative adaptation takes place. Menard's paper does not consider uncertainty as explicitly being, in this sense, a typical example of the transaction cost literature. Uncertainty is considered important, but so far has not motivated a real analytical effort, and still a dyadic perspective prevails.

A third contribution in the literature of networks and complex forms can be found in Omta et. al. (2001). The authors explore the myriad theories that are adopted to study network organizations, ranging from industrial organizations to supply chain management, and business economics and organization theories. Particular effort is made to distinguish chains from networks, considering the role of social capital theory.

Along these lines, Sauvèe (2002) explores the emergence of governance mechanisms in complex networks. First, the author sees networks as combinations of vertical and horizontal governance structures, non-reducible to a single transaction unit. The author gives explicit consideration to networks as governance structures that combine authority and collective action. Hence, allocation of decision rights added to the relational mechanisms that shape inter-organizational cooperation are relevant in defining the process of adjustment through private order and adherence to rules based on collective action mechanisms. The author looks to networks strictly in terms of a strategic structure, basically driven by diversification purposes. The author concludes that networks cannot be reduced to a simultaneous mix of markets and hierarchies. Instead, they are the result of the articulation of two institutional sets that define a decision structure based on authority and several complementary enforcement mechanisms, derived from the existing social structure.

The study by Lazzarini, Chaddad, and Cook (2001) represents an effort to integrate the supply chain approach and the network theories, stressing two main aspects: first, the simultaneous pattern of vertical and horizontal coordination mechanisms; and second, the coexistence of coordination mechanisms based on relational contracts, cost minimization, and transaction cost economizing alternatives. The study highlights the different sources of value creation related to each dimension of coordination. Basically, it relates the supply chain management approach with optimization of operations and therefore cost reduction, reductions of transaction costs, and appropriation related with innovation. The same study reinforces the linkage of network approaches with the relational aspects of the social norms that shape embeddedness mechanisms, learning, and network externalities.

The authors present an opening for the dimensions explored in the next section since they mention the relevance of flexible and weak ties to generate information and create opportunities.

Hendrikse (2003) identifies four aspects related with governance, namely decision rights, income rights, alignment, and cognition. The first three elements are explored in previous works reviewed in this paper. The author concludes that asset-specific based explanations for governance mechanisms should be replaced by complexity, since many parties are engaged in transactions and other elements that focus ex-post reasoning. He concludes by posing

some challenging research questions related to enforcement mechanisms of relational contracts and the coexistence of governance structures.

The branch of literature briefly covered here shows some intriguing aspects:

1. Transaction cost economics and incomplete contract theory have exhausted their ability to respond to questions involving complex multi-agent, multi-task, inter-temporal transactions. Empirically, TCE shows its strength—at the cost of keeping a dyadic perspective—in focusing on one of the three basic explanatory variables, namely asset specificity.
2. The resource-based approach is particularly useful to explain diversity based in specific knowledge built within hierarchies.
3. Hierarchic models that focus on the rules to solve conflicts related to appropriation of value are relevant to deal with existing transactions and known sources of value, but have little to say about the discovery of valuable opportunities and/or inter-firm generation of knowledge.

A new question seems to arise, namely how to place a theory to deal with the allocation of decision and residual rights that is not based on hierarchies. It differs from the question that inspired the research program in governance mechanisms and economics of organization during the last decade. The new question has to reveal the mechanisms associated with the creation of new value under strongly uncertain environments.

The question is how knowledge is created and how agents organize inter-firm bodies whose existence might be ephemeral and based in weak ties, or alternately might be based in solid long-lasting contractual relations or even hierarchies. It seems that uncertainty is a key element in responding to the new question; exactly the variable that was pointed out by Williamson (xxx) but did not motivate researchers as asset specificity did. So far, uncertainty has been largely neglected in the literature of organizations.

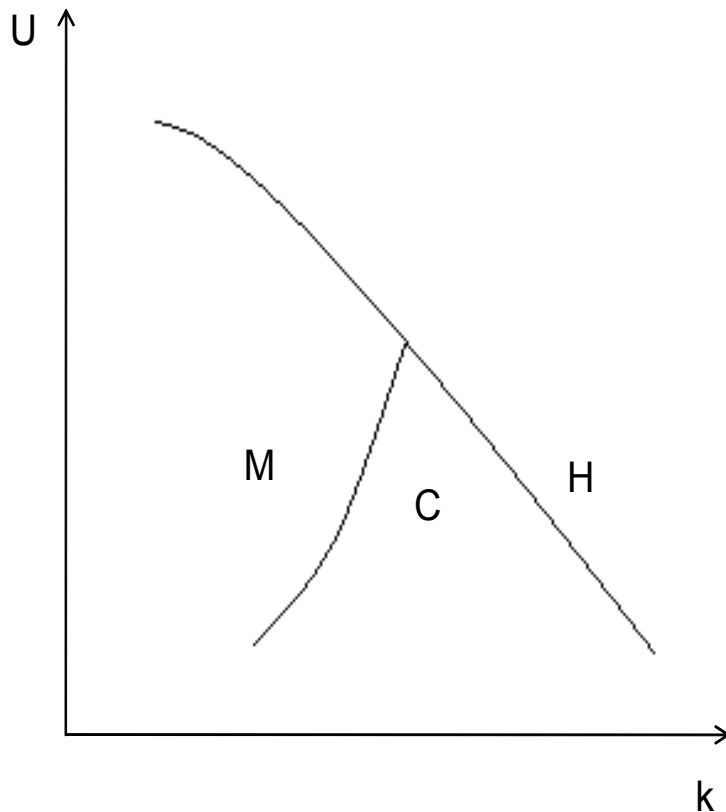
### **3 Contracts of Society—Beyond Transaction Cost Economics**

The studies of transaction cost economics that evolved during the 1960's, 70's, 80's, and 90's have pointed to many veins not yet explored in the empirical literature. Among many possible cases, I will highlight two, namely the role of uncertainty and relational contracts. The relational aspects of a transaction are treated by the transaction cost theory. A transaction/contract is defined as a relation that is set in motion, a relational view acting as a micro-society. Williamson does not ignore the dynamic elements that are part of a contract, addressing the relational aspects as well as the embeddedness conditions that are part of the institutional environment that shapes the observed institutional arrangements.<sup>1</sup>

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1. Therefore the criticisms related to the absence of social norms in Williamson are not acceptable. The debate with Granovetter seems to have found a solution.

With respect to uncertainty, the same author observed that unexpected external shocks, which can be defined as having a Knightian nature, can have real unanticipated consequences. Therefore uncertainty motivates the need for more intense controls. Figure 1 is a representation of the effect of uncertainty on the governance choice. The author suggests that above a given level of uncertainty the agents are not expected to adopt contracts, moving directly from markets to hierarchies. High levels of uncertainty are expected to be aligned with vertically integrated organizations.



**Figure 1.** Uncertainty and Asset Specificity

Source: Williamson (1996)

Likewise, variability is part of the measure branch of transaction cost economics. Barzel (op. cit.) suggests that variability relates to difficulty of measure. One can distinguish between risk and uncertainty in the measurement cost model. Barzel (op. cit.) defines the firms not as a nexus of contracts but as a nexus of guarantees associated with the impacts of variability, originating from risk or uncertainty.

Recent literature on inter-firm organization and hybrid arrangements brings new information to the debate. The new institutional approach to organization as presented in Menard (2005) means an amplification of the governance approach as per Williamson, where asset specificity remains at the core of the efficient governance choice. Focusing on the dynamics of institutional change, Brusseau (2006) discussed the relations between different levels of institutional mechanisms of governance, particularly how the rules evolve through time.

Approaches that are concerned with the dynamics of value creation are presented in Foss and Foss (2005) and Nickerson (2004), which the connection between entrepreneurship and value discovery. More recently Grandori (2009, 2010) introduced the concept of the firm as a Contract of Society, which expands the traditional view of relational contracts. The central question here is not how to allocate authority, but how to shape flexible mechanisms of governance that permit the discovery of opportunities and create value. Her argument is central to this paper, therefore in the next section the main points are highlighted.

### *3.1 Contracts of Society*

The recent contribution of Grandori (2010) opened new avenues to be explored in terms of mechanisms of governance of complex organizations. She departs from firm-like contracts and moves towards flexible mechanisms of complex organizations, ones not based on specific investments but rather rooted in uncertainty.

She asks which type of organization matches opportunity with actions of discovery and generation of knowledge. Uncertainty, usually associated with incomplete contracts, might not be a source of conflicts and opportunistic capture of quasi-rents. On the contrary, uncertainty is associated with value generation based on innovation, new knowledge, and discovery of opportunities.

She introduces a new concept, "Contract of Society" (CoS), to suggest that property rights can be protected without recurring to intense hierarchic power as suggested in figure 1. The solution differs from relational contracts since it does not assume that the effects of uncertain impacts are known. Therefore, "contracts are rules governing the relation among parties, as opposed to the substance of transaction" (Grandori, 2010). A CoS can be defined and the allocation of rights (decision and control) can be defined as a result of the establishment of a society among partners. Contingencies are not as relevant as resource commitments based on agreed rules. Her contribution is aligned to the transaction cost perspective in the sense that contracts are seen as a dynamic process like mini-societies. At the same time, her model departs from the transaction cost perspective in the sense that the prescribed solution to uncertainty is not more hierarchy, but rather more flexibility. Constitutional contracts are mechanisms to govern the ongoing relationship.

Recognizing that value generation is related to uncertainty, the model recognizes that specific actions are not conducted under a CoS, but rather the rules that define the distribution of property rights and the strategic choices, under strong uncertainty. Therefore stable and static systems can be governed by agency contracts or relational contracts provided that low uncertainty prevails. This scenario is related to existing knowledge, low uncertainty, and an interaction among players related to specific and known tasks. Value is known, low variability is expected, and the strategic problem is not to leave potential value unexplored, placing players at or close to the frontier of possibilities.

Alternately, high uncertainty is associated with knowledge generation based on new matches among unknown players. No relational ties are supposed to exist at the beginning and knowledge is shared among players that do not hold social ties. Rules based on CoS are

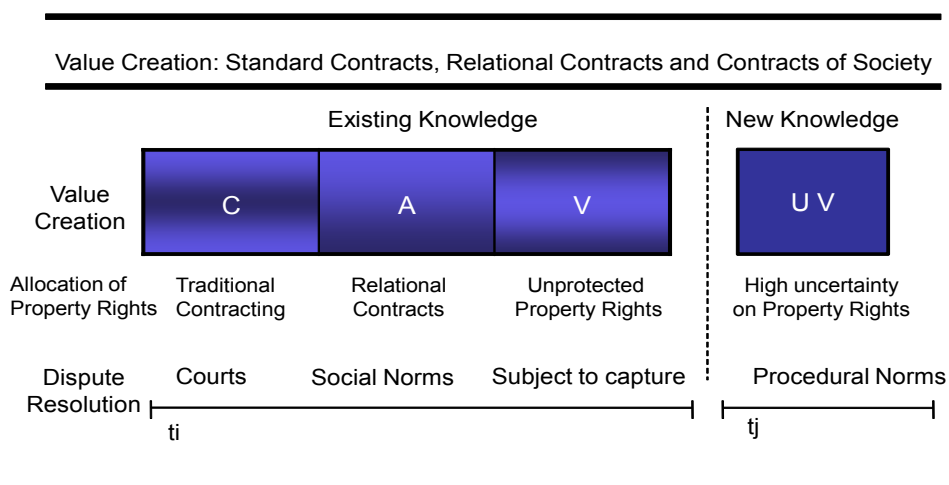


designed to share decision and residual rights in the relationship.<sup>1</sup> Procedural filling rules emerge instead of rules to complete contracts, leaving room for different states of the world. This theory focuses on the expansion of the frontier of possibilities, adding a new vein to the existing theories.

The work developed by Grandori dialogues with the study of Brusseau (op. cit.) dealing with the dynamics of formalized and informal institutions. In some sense, CoS can play a role in expanding the frontiers of possibilities based on new knowledge. Once done, other players can profit as followers depending on the kind of proprietary resources involved. It also dialogues with the work done by Klein and Nickerson on entrepreneurship that devises the mechanisms of discovery of opportunities.

### 3.2 A Conceptual Model

The conceptual model pictured in figure 2 represents different theories of property rights allocation and intends to contribute to the model proposed by Grandori (op. cit) suggesting empirical venues to be exploited. It is designed to direct the case analysis of the subsequent chapter, which has its focus on agro-based complex organizations. The model aims to study the genesis of alternative governance mechanisms aligned with the discovery and protection of value. It embraces different coordination mechanisms described in previous chapters, and is organized in three levels.



**Figure 2.**

1. Anna Grandori also points to the definition of existing rights, which are relevant to explain ephemera relations. It is related to the literature on weak ties as discussed by Lazzarini, Miller, and Zenger (2008).

The conceptual model does not consider the price mechanism, where markets function perfectly based on existing knowledge under the shared domain of all participants. No specific investments are made, no measurement costs exist, and agents are spontaneously at the production frontier.

Consider that decision rights and residual rights are represented by an index that ranges from 0 – 1, where zero means that property rights are totally unprotected and 1 means perfect protection of property rights, where  $C+A+V=1$  at  $t_0$ . At the left-hand side of the picture, the area C represents the level of property rights that is allocated in terms of written contracts and therefore enforceable by courts. Easy-to-measure transacted dimensions are placed in this area and courts are sufficient to deal with conflict resolution. For difficult-to-measure dimensions no standard contracts might be architected, being replaced by relational contracts that provide incentives based on social interactions. This is represented by area A, where agreements add to contracts and provide a given level of protection of existing rights.

At figure 1, some value remains unprotected, as represented by V. This area is defined as public domain in Barzel (op. cit.). Based on the protection of property rights represented by areas C+A, agents are expected to decide whether or not to engage in cooperative production efforts. The limit level of protection that offers sufficient incentives for cooperation is defined as  $PR_i$ . The left-hand side of figure 1 represents the situation based on low uncertainty, existing knowledge, stable social norms, and static production conditions. It represents the existing production possibility frontier as a target to be reached in order not to leave unexplored value.

In addition, the right-hand side of the picture represents the dynamic condition linked with high uncertainty, innovation, and value creation. Contracts of Society play a role in defining constitutional rules as mechanisms to allocate the new value eventually created, offering incentives to engage in joint production of new and uncertain value. The potential value created is represented by UV.

Existing rights associated with the production characteristics at time  $t_i$  (areas C+A+U) are added to UV, which represents the potential value related at time  $t_j$  with uncertain results from cooperative efforts to produce new knowledge and value. The size of UV is unknown, and the design of the Contract of Society is expected to offer incentives for engagement in cooperative efforts not based in co-specialized assets but instead in the expected future value to be derived from any kind of productive opportunities, as expressed by Grandori.

Some characteristics of CoS should be highlighted. First, they are continuously transformed in relational and formalized contracts as the knowledge is controlled and spread, lowering uncertainty. Second, the process continues with new CoS being generated. Third, the model does not preclude capture of new value; however, it suggests that new value relies strongly on new matches among unknown agents. There is a kind of joint dependence among players, and the allocation of decision rights is based on dynamic rules that evolve continuously. Fourth, failures can exist and mistaken evolution of constitutional norms might emerge. In that case, the dynamic process becomes static and no new knowledge is created. Potential value originated from the dynamic interaction falls into the public domain or just disappears.

The model suggests, and opens room for, empirical analysis due to two elements. First, the dyadic perspective is ruled out, since no reductionism is needed. Second, any complex transaction among many players can be decoupled in terms of four elements. Next, I identify each element and the possible related empirical questions in agro-based organizations.

- a) Traditional Contracting (area C): Which transaction dimensions are governed by contract terms potentially enforceable by courts? How are property rights allocated in existing formal contracts? This level is relevant to the study of the role of courts and institutional evolution, and is also applied to the effects of changes in measurement costs as related to the adoption of standards.
- b) Relational Contracting (area A): Which transaction dimensions are governed by social norms? How are property rights allocated by means other than formal contracts? How do social norms operate? This level is relevant in dealing with organization transplants between different regions.
- c) Public Domain (area U): Which transaction dimensions are unprotected? What is the level of unprotected rights that remain subject to capture? Can institutional evolution affect the level of U, either by informal or formal mechanisms? This level is relevant to the study of institutional change, sustainability of agro systems, and the use of resources, as seen in the model developed in the work of Elinor Ostrom.
- d) Contracts of Society (area UV): How can potential and uncertain value, shrouded by lack of knowledge, be revealed by new matches among agents? How are constitutional rules designed so cooperation emerges? As new value is revealed and resource allocation is defined, how are the constitutional norms gradually transformed into social norms or formalized contracts? This new vein opens room for the analysis of complex governance mechanisms and non-dyadic relations. Complex transactions and network organizations present governance mechanisms revealed through the lenses of CoS. The empirical impact in agro-based systems is promising.

The next part of this paper discusses different organizations observed in the agro-food-energy industry, decoupling and categorizing the described theoretical elements.

#### **4 Formal Relational Contracts and Contracts of Society in Agro-Food-Energy Networks**

Agro-industrial organizations have emerged as an important subject of study due to the new roles that agriculture plays in modern economies. In addition to the traditional roles of food and fiber production, modern agriculture is amplifying its objectives with activities such as renewable energy, environmental services, and more recently social services. Some interdisciplinary studies also include the relevant cultural role of agro-based communities. Entirely new sources of value have been explored based on the definition of new connections among agents with no previous history of interactions. Hence, agro-industrial organizations present a spectrum of possibilities of value generation that encompasses distinct mechanisms of coordination.

Complex agro-food-energy organizations have provided interesting cases for empirical studies. As a first stage, this chapter intends to classify existing complex agro-industrial organizations in each of the four models identified above. In order to proceed, I selectively reviewed the literature of contract organizations and interviewed players in five different agro-industrial organizations, related to poultry, soybean, bio-fuels, specialty coffee, and care farmers. In the present chapter I briefly describe the organization mechanisms, identify the sources of value, and provide a classification of the observed coordination mechanisms as decoupled transactions. Key variables associated with value creation are: transacted dimensions; the existence and structure of formal contracts; some evaluation of contract contents; the existence and relevance of social norms; the existence of valuable transaction dimensions subject to capture; the existence of highly uncertain initiatives among agents aiming to generate value; and the existence of evidence of joint production of flexible rules connected to value creation.

This section briefly describes the organizations and represents a first step towards a more analytical and detailed work.

#### *4.1 Soybean production*

**Description:** The activity represents a large proportion of Brazilian and Argentine exports in recent years. Soybean production relies on the interaction of specialized agents, namely farmers; seed and agro-chemical industries; traders; cooperatives; commercial banks; and research institutions. The product is mostly traded as a commodity, and players use well-defined transactions, partially carried out under pure market mechanisms and partially based in formal contracts.

The existence of contracts between farmers and traders/crushers is explained by the existence of some specific aspects that generate value based on coordination and interaction. Some examples are the distance between the production site and the crushing plant, the existence of a market for GMO-free soybean, and the institutional program designed by the Brazilian government that offers specific incentives for family farmers to engage in bio-fuel production. Contracts also represent an important mechanism to allocate risk associated with price variability, as discussed in Leles and Zylbersztajn (2009).

The production of a commodity basically generates value in terms of low production costs. However, other attributes can also play a relevant role, such as GMO-free and social aspects related to the profile of the farmers. Two main coordination mechanisms coexist: prices and contracts.

**Value Creation:** The institutional structure of soybean production is intended to control, and provide incentives for, the production of large quantities of homogeneous, low-cost soybean grains. Formal contracts are crafted between farmers and traders, who are usually also the same companies that sell inputs and offer credit. Therefore, contracts regulate a complex transaction that involves the commerce of seeds, fertilizers, and the acquisition of the final product. The technology is very homogeneous and widespread. Contracts specify prices and delivery conditions, and in some cases genetic specificities are included, as represented by

GMO-free. No value generation is observed that demands strong interaction among players. Farmers are passive players in the process.

Traditional contracting is supported by court mechanisms, in many cases showing imperfect operation as described in the paper of Leles and Zylbersztajn (op. cit.). Therefore public enforcement is observed as well as some forms of private sanctions, based on the purchasing power of large trading companies. Farmers have low capacity to interfere in the contract terms, particularly in cases where traders make loans to finance the production. In some sense, courts interpret that the property rights of the production should be allocated to traders, in cases where they anticipate payments in the form of inputs. Therefore the relation C/A is high, suggesting that relational mechanisms are not relevant. In cases of contract breach, players go to the courts.

**Value Discovery:** A large part of the production does not rely upon social norms, and interaction mechanisms between players is very limited or nonexistent. We observe very homogeneous and standard contractual mechanisms. Risk is relevant, and explains the existence of contracts, but uncertainty is low. New sources of value have recently been introduced and might change the profile of the organizations in the future. One example is related to environmental concerns as provided by the “soybean moratorium,” which represents an informal agreement between players that sets the goal to restrict or eliminate production in areas inside the Amazon region. New players are engaged in this process, which includes non-governmental organizations, certification organizations, traders, and banks. New mechanisms of control and enforcement are being shaped involving a large number of players. Since farmers are legally allowed to farm in the Amazon region, courts are not expected to play a relevant role to enforce the new allocation of property rights. Therefore, new mechanisms to allocate property rights are expected to evolve, and the unknown characteristics of the relevant variables suggest that a particular type of Contracts of Society might evolve in order to reveal the new value associated with the environmentally-friendly production system.

Similar cases, where farmers play a limited and passive role and where the technology is commanded by processing and/or farmers’ input industries, are seen in the pig and poultry industries. Farmers act under strict contractually-defined rules, and reward rights are out of their reach.

#### *4.2. Bio-Fuel production in Brazil*

**Description:** Brazil adopted an aggressive policy to promote the production of renewable energy based on ethanol and bio-diesel. Both cases are agro-based industries that involve complex coordination of farmers, processors, and traders of sugar-cane for ethanol, and alternative crops for bio-diesel production.

The ethanol system is based on contract relations between farmers and ethanol mills. Two basic systems are observed; one where the processing industry buys the sugar cane from independent farmers, based on contracts and rules set by joint negotiation committees. The negotiation board involves all stakeholders and the architecture of the contract is defined in a

continuous negotiation process. The alternative system is also based on contracts, but in this case the processing industry performs the farm operations, exercising total control on the production operations. It looks more like a land rental contract, where the farmer is not involved in the activity but just collects the annual rent for the land ownership.

To a large extent the production technology, the genetics of sugar cane, and the industrial process are well-known and the information is accessible.

The bio-diesel system has been implemented based on governmental incentives aiming to include small family farmers from poor regions of the country. The goal is to upgrade their income level through the introduction of alternative cash crops. A social stamp has been created to provide tax exemptions for processing industries that make contracts with family farmers. A large centrally-managed governmental program has been devised to support the new agro-based system. Farmers receive credit, seeds, and technical assistance, and supply the processors, based on formal contracts.

**Value Creation:** In the case of ethanol the system is based on formal contracts, and in addition relational mechanisms are developed, particularly in regions where farmers have options to sell to alternative processors. Long-lasting relations are observed and in some cases no formal contracts are drafted, being entirely based on social norms and reputation mechanisms.

In the case of bio-diesel the new players did not have a previous history of interaction: they have been attracted by the governmental incentives. The lack of technological knowledge to produce newly-introduced crops like jatropha and castor oil, and the lack of knowledge in dealing with formalized contractual relations, resulted in contract breaches and malfunctions in the systems during the initial period of operation. In many cases, failures have been observed, increasing the concerns of farmers on the one hand, and on the other moving processors to source commercial soybeans in the market.

**Value Discovery:** The trials to implement complex systems from top to bottom resulted in malperformance during the initial phase of the program. Players do not have a functional market at their hands and also lack structured contracts to support their relations. Therefore, most of the product sourced by the bio-fuel industry is being originated from the soybean industry, based on large industrial farms. As and if knowledge is diffused, both in terms of production technology and in terms of contract mechanisms, then the scenario might change. So far, industries have motivation based on tax rebates.

#### *4.3. Specialty coffee production in Brazil*

**Description:** Coffee is a traditional product that involves the engagement of a large number of small farmers in producing countries, mainly in South America, Asia, and Africa. Besides being a large commodity market, the market for specialty coffees has grown since the 1980's with the operation of specialized roasters characterized as family businesses as well as large corporations that identified the growth in the niche market of specialty products.

Coffee production in Brazil has completely changed its profile, moving from the production of a low-cost commodity towards an increasing proportion of higher-value specialty coffees.

International roasters and coffee traders moved to the country with the intention of creating incentives to reveal the hidden value of high-quality grains. The process started after 1980 with the deregulation of the market. Fixed prices gave place to floating prices, and incentives to improve quality have been implemented (Saes, 1997).

**Value Creation:** Basically, two different phases are devised to explain the process of value creation in the coffee business. The first considers the mechanism of incentives for specialized agents to sort the high-quality coffee that was produced but not identified by the production process and not recognized by the market. New mechanisms to generate value have been devised by players, being rooted in the intense communication between specialized farmers, traders, and roasters. This process was related to the effect of price mechanisms, as prices could vary according to quality. Value was produced but remained hidden, since the high-quality coffee was not identified. In addition, new organization mechanisms based heavily on personal relations and relational contracting evolved. The second is related to the research and development and identification of promising regions able to produce high-quality attributes. Therefore, players involved in the activity are coffee farmers, cooperatives, research institutes, and roasters who offered incentives to farmers to engage in efforts to increase the quality of the product.

An example is provided by illycaff  of Trieste, Italy. It represents a company that moved from traditional contracts towards relational contracts, and in addition evolved towards flexible mechanisms that can be seen as Contracts of Society. After acting for many years as a small family-owned business sourcing the product from different countries through pure market operations and formal contracts, the company decided to put in place local efforts creating connections with specialized agents in some countries. In Brazil, illy defined a network structure where farmers, a specialized trader, a specialized quality lab, and the university interacted continuously with the aim of upgrading the quality, generating share value among the players, including farmers (Zylbersztajn, 2004).

The president of the company established personal contacts at the farming regions and the company has continuous presence in targeted countries. Other companies followed the model, which is based on relational contracting where local social norms have played a role in facilitating the horizontal organization of farmers. Value creation was based on incentives for technology adoption, knowledge-sharing among farmers, and efforts to upgrade the technological level associated with quality attributes.

**Value Discovery:** With the growing relevance of environmental sustainability and social dimensions related to the production of food, new possibilities of value generation have emerged. The adoption of practices that lower the potential environmental impact depend on strong interaction among unconnected players. The processing company cannot offer a guarantee of acquisition or a price support, nor even enforce the adoption of environmentally-friendly practices. The company decided to create an agreement with indicative rules that sets in motion the intention to generate value through joint development of practices and identification of technological gaps.

A protocol has been devised defining general principles to promote responsible chain production (annex 1). It foresees the spontaneous cooperation of many agents and foresees

future recognition by market players and governments in order to consolidate the value creation based on environmentally-friendly production. This activity can be considered as characterized by high uncertainty, since no-one knows where the principals will generate value and also cannot anticipate whether value will be captured.

In this case, very flexible general rules are in place which regulate resource pooling among players, and residual decision rights as well as reward rights are shared along the way.

#### *4.4. Care Farmers in the Netherlands, UK, and Denmark*

Description: Among the new activities performed by the agriculture sector, one is the production of social services. A program in the Netherlands funded by TRANSFORUM<sup>1</sup> has the objective to organize farmers who share a specific profile of low income and declining economic performance to offer different types of health care to particular groups of people. The specific profile of farmers includes being a family farmer living on the farm. The farming activity should be facing some type of economic stress for variable reasons. The specific profile of the social groups that are the targets includes elderly people, persons with light mental disabilities, and patients recovering from hospital treatment.

**Value Creation:** The basic purpose is to create value by providing incentives to farmers to stay on the farm by upgrading their income level. Social value is created by the offer of lower-cost health treatment and offering a healthy environment to clients in the country, instead of the stressful and costly environment of urban hospitals.

**Value Discovery:** Since the new activity was not originally formally accepted by the medical community a lot of distrust emerged at the beginning. As the initiative grew based on some pioneering work by farmers and social leaders, it attracted more support. The specialized agents involved in the network are: farmers and farmers' associations, hospitals, insurance companies, regulatory agencies in the health sector, social organizations dealing with elder care groups, drug addiction recovery groups, and mental health organizations.

High uncertainty prevails at the beginning and the rules evolve based on common beliefs that are shared by unconnected agents. New networks are defined based on high-level procedural and non-enforceable rules. Potential generation of value to each player served as the original motivation to cooperate. No proprietary rights are devised. The system is open and any one can replicate it at other sites. Local and specific rules evolve as agents interact, suggesting a Contract of Society-like mechanism.

## **5 Conclusions**

Agro-based organizations show continuous evolution, outpacing academic efforts to understand their explanatory mechanisms. The common characteristic is the complexity of the cooperation mechanisms observed in agro-based organizations. The efforts of the academic community to describe and model the complex interactions observed in agro-

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1. [www.transforum.org](http://www.transforum.org)



based organizations have adopted different lenses through time. Price mechanisms, contracts, social networks, and supply chain optimization are all examples that indicate the evolution of explanatory models applied to agro-based organizations.

Pure commodity markets no longer exist, meaning that pure price mechanism is not effective to coordinate complex institutional structures of production. However, prices play a relevant role in agro-based production systems. In addition to that, contract mechanisms coexist with relational contracts and with Contracts of Society. In one single system, as is the case with soybeans, one can find the co-existence of the named mechanisms. In cases where high uncertainty prevails, formal or relational contracts might not operate efficiently. This is where Contracts of Society emerge, showing dynamic mechanisms of value discovery.

Based on the anecdotal analysis, some propositions can be defined to motivate further empirical research:

Proposition I: Through time, if uncertainty is controlled by better definitions of transaction attributes and property rights are allocated among players, Contracts of Society can be replaced by relational and formal contracts, representing a transitory governance mechanism.

Proposition II: Agro-based systems can present all kinds of governance mechanisms simultaneously in operation. Each is associated with a different profile of value protection, value generation, and value discovery.

Proposition III: Highly cost-efficient agro-based systems such as poultry and pigs are associated with low uncertainty mechanisms. No value discovery prevails, but rather cost minimization under well-controlled technological conditions. Farmers have no decision rights to share and contracts are designed to offer incentives to stay close to the production frontier and control agency costs through risk allocation.

Many empirical venues are opened by the characterization of different governance mechanisms. This paper reinforces the potential of new theoretical veins recently opened but yet to be applied to the analysis of agro-based organizations. The Contracts of Society perspective is an example of the new frontiers of theories that now demand the definition of more precise empirical methods to be adopted. The promising elements are related to the possibility of explaining non-dyadic and dynamic organization mechanisms.

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## Annex 1:

### DNV CERTIFICATION of RESPONSIBLE SUPPLY CHAIN PROCESS - ILLYCAFFÈ

#### THE PROTOCOL B: a specific protocol for the green coffee primary chain.

The protocol B principles derive from the Protocol A, which contains the general principles for the Organization.

The protocol B has been specifically designed for the green coffee production process.

#### The Protocol B focus

illycaffè has always recognized a remunerative premium price for the purchase of the green coffee that meets its high quality standards.

The protocol B of the DNV certification scheme is focused on finding the best systematic way to improve the efficiency and effectiveness of the sustainability cooperation and engagement activities along the illycaffè green coffee supply chain. It is absolutely not meant to be a form of entry barrier or a way to increase the market transaction costs for the green coffee suppliers. illycaffè will continue to base the green coffee purchases on its set of high quality standards. The Protocol B does not require extra costs for the green coffee supplier, because the certification costs are entirely beared by illycaffè. If investments in improving the green coffee process are advised to the coffee suppliers, this is because these investments are considered to add value to the product in a beneficial way for the producer.

#### The Protocol B procedure

In order to satisfy the procedure required by the protocol B, illycaffè is carrying on the following activities:

- Diffusion of the corporate vision of sustainable green coffee production through guidelines manuals among all the illy green coffee suppliers. The approach of illycaffè to sustainable agriculture is inspired by the integrated agriculture approach. The development of the guidelines manuals has been done with the participation of several national coffee institutes, experts, technicians, coffee farmers and universities.
- Collection of farming and processing practices carried on at field level by the illycaffè coffee suppliers. This is done through auto evaluation questionnaires sent to the producers supplying coffee to illycaffè. These field practices are randomly checked at farm level in each relevant supplying origin by the international illy team of agronomists.
- Analysis of the information, determination and measure of KPI (key performance indicators).
- Following the measurement of the most relevant performance indicators, several critical sustainability points in the primary coffee chain are identified.
- illycaffè undertakes actions in participation with the green coffee sector (growers, processors, society, governmental and non-governmental institutions, etc.) to improve the identified critical points in the green coffee production processes.
- illycaffè monitors along the years the improvement actions and eventually takes corrective decisions.