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## **IMPACTS OF NON-GM STANDARDS ON POULTRY SUPPLY CHAIN GOVERNANCE: TRANSACTION COSTS VS. RESOURCE BASED VIEW**

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### **Abstract**

**Purpose** – Following a negative attitude of consumers in the European Union (EU) toward Genetically Modified Organisms (GMOs) some EU retailers and processors aim at avoiding the presence of GMOs in their products. Private voluntary standards (PVS) allowing to define food as “non-GM” have been introduced since the beginning of 2000. This implies a sophisticated arrangement of procedures and coordination at each stage of the supply chain, with firm boundaries being key strategic decisions. The purpose of this article is to understand: a) how the implementation of this new retailer-driven standard changes governance structures along the entire supply chain; and, b) the determinants of such change.

**Design/methodology/approach** - The introduction of “non-GM” standards is investigated as a case study in the poultry industry of France and Italy. The case relies on information collected from the main actors at each level of the supply chain, from the retailer up to animal feed and crop production. The study proposes a conceptual framework where determinants of governance structure are evaluated under the two theoretical perspectives the mostly used in supply chain studies: transaction costs approach (TCA) and resource based view (RBV).

**Findings** – Results show how, with the introduction of non-GM, more integrated relationships are observed between retailers and poultry processors and between international traders and overseas farmers. These decisions can be both explained by TCA and RBV determinants. However, RBV explains boundary decisions when vertical integration is involved. In fact, the non-GM standard can turn the perception of a procurement activity to highly strategic. When this occurs, firms tend to vertically integrate the upstream activity developing it internally or by acquisition, according to their superior knowledge potential.

**Research limitations/implications** – The adopted qualitative approach limits the generalization of results to alternative types of PVS and supply chains. Yet, interesting patterns

on governance and its determinants emerged. These could be validated using the same conceptual framework on other cases or in a quantitative setting.

**Originality/value** – To our knowledge, no study on the agri-food sector evaluated the impact of a PVS adoption at the different levels of the supply chain. This is relevant not only to highlight the implications on the whole supply chain, but also to understand the patterns and changing determinants. With respect to frameworks comparing TCA and RBV, concepts of opportunism, “potential” superior knowledge, and strategic importance of the activity are further developed offering a more operative setting.

## Introduction

Food safety crises (e.g. Bovine Spongiforme Encephalopathy) and the consequent decreasing consumers trust in public regulations spurred retailers and food processors introducing private voluntary standards (PVS) to assure the safety, quality and traceability of their products (Gruère and Sengupta, 2009; Wesseler, 2014). These standards “go beyond” public regulations as they can be more stringent in terms of product and process requirements or they can implement additional controls as compared to those required by regulations (Henson and Humphrey, 2010). The non-GM standard is an example of such standards. Following a negative attitude of consumers in the European Union (EU) toward Genetically Modified Organisms (GMOs) and the spaces left by a positive labeling legislation on GMOs, some retailers and processors introduced non-GM standards since the beginning of 2000. Generally speaking, adopting these standards, firms aim at avoiding the presence of GMOs in their products.

Interestingly, non-GM labels are still an actual subject. In the United States, the regulation does not require any labeling for products containing authorized GMOs as they are considered “substantially equivalent” to conventional products. However, since 2012 a strong campaign by anti-GMO activists pleading for the introduction of mandatory labeling in several US states claiming the “right to know” the presence of GMOs (Bain and Dandachi, 2014). This raised public awareness about the subject and several retailers and manufacturers began to introduce non-GM labels and brands trying to take advantage from this differentiation strategy (Bain and Dandachi, 2014). On the other hand, in 2013 and 2014 several UK retailers decided to abandon the non-GM standard arguing that the additional costs were not counterbalanced by a sufficient willingness to pay by their customers (Wesseler, 2014).

In fact, the introduction of non-GM standards implies sophisticated procedures, including audits and qualification of suppliers at each stage of the supply chain. Identity Preservation (IP) practices need to be adopted along the supply chain; that is, the unique characteristics of a product must be preserved and maintained through isolation and identification along the supply chain. This refers to the adoption of costly segregation and traceability practices (Smyth and Phillips, 2002; Gruère and Sengupta, 2009). Given that non-GM is fundamentally a credence attribute<sup>1</sup>, these practices are important for the credibility of the non-GM scheme to the final consumer as well as for assessing liability.

The adoption of a new PVS, such as non-GM, affects vertical relationships along the agri-food supply chain. From a buyer-driven perspective, companies can decide whether to source from arm’s length markets, vertically integrate, or define a governance structure in-between. The purpose of this article is to understand: a) how the implementation of retailer-driven non-GM standards affects the governance structures along the entire supply chain; and, b) the determinants of such change.

The implementation of non-GM standards involves different actors along the supply chain (retailers, food processors, feed compounders and oilseed crushers, international traders, and farmers domestically and abroad). The resulting relations can impact the competitiveness of the supply chain, the actors involved, and their management practices, or they can assume policy relevance when market failures occur<sup>2</sup>. These relationships have been recently studied in a non-

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<sup>1</sup> An attribute has “credence” characteristics if it is not verifiable by consumers not even after purchase and consumption.

<sup>2</sup> For example, alternative governance structures can influence the level of price transparency and transmission, the access to market of producers, the ability to provide minimum food safety standards or, as highlighted by Von Schlippenbach and Teichmann (2012) in the context of PVS, can generate market power. The literature on PVS

GM context by Passuello et al., (2015), using a retailer-food processor relationship as a case study, and by Varacca et al. (2014) discussing the governance implications from an international trade perspective. However, little evidence is provided about the overall effects of the introduction of non-GM standards at the different levels of the supply chain.

Understanding the determinants of governance structures allows a better interpretation of the dynamics' drivers introduced by a new standard. Governance decisions have been widely studied in the literature, especially under a transaction cost economics (TCA) perspective with resource based view (RBV) as the main alternative (McIvor, 2009). However, to our knowledge, insights from the two approaches have been rarely jointly considered in the agri-food literature on non-GM and, more generally, on PVS. Building on Conner and Prahalad's (1996) seminal work, and leveraging on the concepts of opportunism, "potential" superior knowledge, and strategic importance of an activity, this research suggests a conceptual framework for identifying the determinants of governance structure under TCA and RBV.

This study investigates the introduction of non-GM labels and standards in the poultry meat value chain of two European countries, France and Italy. Among the different animal products, the poultry supply chain is the most relevant for the non-GM standard as poultry meat production largely depends on soy-based input, which is mostly GM in world trade. Although official statistics are not available, experts estimate in the EU-27 a 15% share of non-GM in the compound feed production and a 17% share of non-GM in poultry meat (Martin and Boussit, 2012). Also, the EU relies on the international market for soybean for more than 95% of its net consumption. Even Italy, the largest EU producer of soybean, imports over 90% from outside the EU (Varacca et al., 2014).

France and Italy are particularly relevant for the case at stake, the first being the EU leader in poultry production and the second the main, if not the only, EU country where domestic soybean production (entirely non-GM) covers most of the needs of the feed industry<sup>3</sup>. At the time when the non-GM standard was adopted the French poultry processing was highly concentrated, with the first two groups covering 40% of the total production. Concentration in Italy was even higher with 80% of the market controlled by the top three companies (Passuello et al., 2015). The two countries show different market structures concerning food retailing: while in France large retailers dominate, with the first five close to a market share of 60%, in Italy the top five retailers do not reach 30% (Bunte et al., 2011).

The article is organized in the following sections: the first part proposes a framework to evaluate the determinants of governance structures under TCA and RBV approaches; the second part illustrates the research design and analysis; the third part discusses the results for the different transactions identified along the poultry meat value chain.

## **Theoretical framework**

When it comes to understanding governance structure determinants in agri-food supply chains, transactional determinants appear to be the most largely used. Hobbs and Young (2001) provide an overview of vertical coordination in agri-food supply chains and alternative theoretical

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mainly focuses on the consequences of backward vertical coordination of exporters or international buyers for market access by smallholders and the export performance of developing countries (e.g. Schuster and Maertens, 2013; Lee et al., 2012).

<sup>3</sup> In Italy, considering a domestic production of non-GM soybean meal of 361,260 tons and imports of 170,000 tons, the degree of self-sufficiency was almost 70% in 2010 (Boccaletti et al., 2012).

approaches including TCA, RBV, agency theory, strategic management theory, and convention theory. In this article we concentrate on TCA and RBV. These methods are widely used in logistics and supply chain management studies (Defee et al., 2010)<sup>4</sup>.

### Transaction Costs Approach

TCA represents a widely discussed approach that has dominated the conceptual as well as the empirical literature. As emphasized by David and Han (2004), since the publication of Williamson's 1975 and 1985 books, starting from the early 1990s, between 250 to 500 citations per year empirically tested the main propositions from TCA across several business fields (Boerner and Macher, 2001). Because exhaustive theoretical developments of the TCA can be found elsewhere (Williamson, 1979, 1985, 1991), this section only highlights the main reasoning leading to the predictions that will be formulated.

The first reasoning concerns the concept of opportunism. Authors such as Niesten and Jolink (2012) assert that opportunism is an attribute of transactions based on the concept of behavioral uncertainty. Following authors such as Anderson (1988) or Leiblein (2003), we consider opportunism (O) as resulting from the combination of specificity (S), uncertainty (U) and frequency (F) that can generate different levels of potential opportunistic behavior. Therefore, the keystone of transactional thinking is to align governance structures (GS) that minimize transaction costs generated by *ex-ante* and *ex-post* opportunism (Conner and Prahalad, 1996). This can be represented by the following relationship:  $GS_{i=1}\{O(S, U, F)\} < \dots < GS_{i=N}\{O(S, U, F)\}$ , with  $i=1$  to  $N$ , where  $N$  is the total number of possible GS and  $GS_i$  is the level of transaction costs generated by governance structure  $i$ , for a given level O of opportunism.

Governance structures can be aligned in a space ranging from markets to hierarchies. While the two extremes are well defined and predicted by TCA, intermediate structures (hybrids) are largely debated in the literature (Ménard, 2013a). Hybrids can be categorized in ordered forms (e.g. Gareffi (2005) define modular, relational, and captive forms) or defined along a discrete scale according to several contract properties that can be grouped in the *formation*, *functioning* and *supervision* of contracts (Sauvée, 2013; Raynaud et al., 2009 Jaspers and Ende, 2006; Brousseau, 1995). These properties will be further discussed in the section of this paper on measures.

The relationship  $O(S, U, F)$  is particularly complex as the relevance of one transactional attribute can depend on the level of the others and attributes are often measured/perceived on a discrete scale. Williamson (1985) initially linked the level of transaction costs and the most adequate governance structure with two transactional attributes, namely specificity and frequency. However, several studies added the effect of uncertainty in combination with the two previous dimensions. Uncertainty has two forms: behavioral and environmental. While the first creates problems of performance evaluation, increasing monitoring and enforcement costs, the second, leads to more difficulty in writing contracts that cover changes over time.

As Williamson (2002) says, these two attributes of transactions are the most important, with asset specificity giving rise to the level of dependency between actors and uncertainty posing adaptive needs. Williamson (1985, p. 59) stipulates that when asset specificity is low, market governance should be preferred independently of the degree of uncertainty, since continuity

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<sup>4</sup> The review included the use of theories in leading SCM journal outlets over the six year period of 2004-2009. TCE and RBV together account for more than 20% of theories that are used, and 25% including two further RBV's extensions, namely core competency and resource dependence theory.

matters little and new transaction arrangements can be easily introduced by both parties if necessary. Carter and Hodgson (2006) offer more insights, stipulating that TCA predicts vertical integration when (1) asset specificity as well as uncertainty are high (2) uncertainty is at least of intermediate degree, and the transaction is recurrent, or (3) when there is an intermediate level of asset specificity, uncertainty is sufficiently high and the transaction is recurrent. They also argue that TCA predicts bilateral governance mechanisms when transactions are recurrent, with intermediate levels of uncertainty and mixed investment characteristics. Based on the combinations of specificity and uncertainty described above, and focusing on the recurrent transactions characterizing the poultry supply chain<sup>5</sup>, three discrete levels of opportunism can be defined (high, intermediate, and low) aligning three types of governance structures (markets, hybrids, and hierarchy) (Table 1).

----- TABLE 1 about here -----

The above discussion leads to the following propositions concerning firm boundaries decisions:

*Under high frequency of transactions and according to three discrete levels of opportunism considered by the firm:*

*P1a: The firm should rely on markets for its supply when opportunism is low.*

*P1b: The firm should use a hybrid governance structure when opportunism is intermediate.*

*P1c: The firm should rely on hierarchy when opportunism is high.*

From a theoretical perspective, the above propositions can be generalized to:

*P1: If governance structures could be defined on a continuous scale, as well as the level of opportunism, a marginal increase (decrease) of opportunism should lead to a governance structure closer to hierarchy (market).*

## **Resource Based View**

In its primary form, RBV was mainly concerned with putting in place resources that offer a sustained competitive advantage and provide greater value to the firm (Barney, 1986; Wernerfelt, 1984). Progressively, several “resource-focused approaches” (Priem and Swink, 2012) appeared, including a diversity of concepts such as core competencies, knowledge, capabilities, dynamic competencies, and showing a disparity among units of analysis (Argyres et al., 2012). At the same time, RBV has rapidly extended its interest to the firm boundary decisions. Some of the impetus behind the development of this approach as an alternative answer to the TCA framework stems from dissatisfaction with exclusively transaction cost explanations, and in particular: 1) its unit of analysis: the transaction, 2) the priority given to the role of opportunism (Kogut and Zander, 1996; Conner and Prahalad, 1996), 3) its cost minimization principle (Zajac and Olsen, 1993; Heiman and Nickerson, 2002).

During more than thirty years, literature showed no unified framework when it comes to firm boundary decisions (Foss, 1996; Priem and Butler 2001). However, two persistent concepts appear: 1) differential capabilities among firms covering closeness and complementarity

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<sup>5</sup> In the meat sector, following the life cycle of animals and perishability of products, frequency is highly recurrent at the different levels of the supply chain.

considerations, 2) strategic importance of the activity considered and its criticality in building a competitive advantage.

These two dimensions are often intertwined, strategic activities considered as activities offering a competitive advantage generated by the company's superior internal resources and capabilities. Following McIvor (2009) who mentions competitive advantage and relative capability positions in a distinct way, we make a clear distinction between the strategic importance of an activity and the firm's differential capabilities in undertaking such activity. In fact, we consider that firms may perceive an activity as highly strategic without necessarily possessing superior capabilities to undertake it, and on the contrary, they can possess superior routines and capabilities in undertaking an activity that isn't necessarily source of differentiation on the market.

*Differential capabilities and Potential Superior Knowledge.* The main argument of RCA as a theory of the firm is that the reason an activity is conducted within a firm is not necessarily market failure, but rather firm success, since it manages to put in place "a higher order of organizing principles". Therefore, internal structures can become a "creator of positive" rather than an "avoider of negative" (Kogut and Zander, 1996). Since firms differ in their ability to undertake an activity, unified governance should concern activities for which they possess superior capabilities. This prediction has been tested through several empirical researches comparing firms' and suppliers' capabilities and the impact on governance structures (Leiblein and Miller, 2003; Hoetker, 2005; Jacobides and Hitt, 2005; Jacobides and Winter, 2005; Parmigiani, 2007; McIvor, 2009).

Internal complementarities facilitate the creation of superior capabilities. Firms can therefore integrate because of asset complementarity (McIvor, 2009), also called "relatedness", "interconnectedness" (Dierickx and Cool, 1989; Conner, 1991), "super-additive" assets (Montgomery and Wernerfelt, 1988), as well as "closeness" to present competencies (Gulbrandsen et al., 2009). Building on the link between capabilities and complementarities and closeness, the concept of "potential" superior knowledge can be elaborated. In fact, "actual" knowledge as a reason to vertically integrate is commonly used (e.g. Conner and Prahalad, 1996), while in reality, if the activity has never been undertaken internally, firms could only possess a high "potential" for knowledge acquisition. This can be facilitated by internal resources and competencies that are complementary. This change opens the avenue to further enrichments and raises a fundamental question, which is: "if the firm does not hold any actual superior knowledge but only a "potential" for it, then why to vertically integrate?" The answer to this question is strongly related to the strategic importance of the activity considered.

*Strategic importance of the activity.* The main idea behind this concept is that unified governance should be considered for activities of greater value, activities that contribute to building the firm's competitive advantage, offering for example a higher level of differentiation for customers (Ghozzi, 2008; McIvor, 2009). This argument is also underlined by Zajac and Olsen (1993) and Ghosh and John (1999) throughout the "strategizing" concept. This prediction has been tested and validated by several empirical studies (Delmond, 1994; Steensma and Corley, 2001; Schilling and Steensma, 2002; McIvor, 2009) including the context of retailer/processor relationships (Barrat and Oke, 2007).

In fact, based on the essence of RBV, for activities that are considered strategic, even if the firm does not initially hold a superior knowledge potential, it should still consider integrating the activity through acquisition or dedicating intense efforts to internally develop this activity (it



can hire experienced persons or rely on experts that progressively develop the know-how). In that case, the firm knows that potential superior knowledge is hard to reach, but realizing how strategic the activity is, it may still decide to develop such knowledge.

When the strategic importance of the activity stands at an intermediate level, either the firm considers holding a potential superior knowledge, and in that case has an incentive to use a unified governance, it is the supplier that holds the superior knowledge and in that case, *relational governance* guaranties the access to the supplier's resources and capabilities, and leverages the learning process.

Finally, when an activity is weakly strategic, firms should rely on classical contracts, even if they hold a superior knowledge. Unified governance should only be considered if suppliers are really inefficient and if the firm has the financial capacity to do so.

The above discussion leads to the following propositions:

*P2a: If the firm considers the activity as highly strategic:*

*P2a': It should use a hierarchical governance structure if it possesses a potential superior knowledge*

*P2a'': It should acquire the supplier that possesses the potential superior knowledge or internally develop the activity, if it does not possess a potential superior knowledge*

*P2b: If the firm considers the activity as intermediately strategic:*

*P2b': It should use a hierarchical governance structure if it possesses a potential superior knowledge*

*P2b'': It should use hybrid governance, if the supplier possesses a potential superior knowledge*

*P2c: If the firm considers the activity as weakly strategic:*

*P2c': It should rely on the market even if it possesses a potential superior knowledge (except if suppliers are unable to offer an acceptable quality level)*

*P2c'': It should rely on the market if the supplier possesses a potential superior knowledge*

Propositions from RBV clearly identify dichotomous choices between markets and hierarchies, the last being preferred when the firm possesses potential superior knowledge and the activity has some strategic relevance. Hybrid forms are predicted when the supplier possesses a potential superior knowledge and the strategic importance is at an intermediate level. In this situation a similar proposition to P1 could be formulated:

*P2: If governance structures could be defined on a continuous scale, as well as the level of strategic importance of the activity, when the supplier possesses a potential superior knowledge a marginal increase (decrease) of the perceived strategic importance should lead to a governance structure closer to hierarchy (market).*

## **TCT vs. RBV determinants**

Examples of frameworks comparing TCT and RBV can be found in the literature starting from the seminal work of Conner and Prahalad's (1996). These authors use the likelihood of opportunistic behavior vs. superior knowledge as discriminating variables and identify four situations based on high/low level of variables: two where the determinants of TCA and RBV offer similar predictions and two where the predictions differ. This framework has been applied by Argyres (1996) and Leiblein and Miller (2003), with the aim of testing the explanatory power of the two theories. The propositions formulated in this article can be considered as an extension of those in Conner and Prahalad (1996). On the TCA side, the concept of opportunistic behavior is further developed and an intermediate level of opportunism is introduced. On the RBV side, the concept of superior knowledge is extended to "potential" superior knowledge and the level of strategic importance of the activity is also included.

Propositions for TCA and RBV are summarized in Table 2. The table helps identifying situations where the determinants of TCA and RBV offer similar or different predictions, respectively "match zones" and "challenge zones".

----- TABLE 2 about here -----

## Methods

### Background and sampling

The introduction of non-GM standards at the beginning of 2000 offers the possibility to undertake a retrospective analysis, at the same time reaching managers who have been working in the company since then. Two poultry supply chains from France and Italy have been selected as units of analysis. The first country is the first poultry producer in the EU and the second the EU country with the largest domestic soybean production (entirely non-GM). As illustrated in the introduction, in both countries the poultry industry is concentrated, which limits the sample to a few players.

To improve the quality of information from a small sample and increase the generalizability of case studies, the company selection was information-orientated (Flyvbjerg, 2006), mainly based on the high degree of involvement in non-GM activities. The two supply chains were first studied to identify the key actors at five main stages (figure 1): (1) retail/processors (2) processor/growers (3) processor/ feed compounders (4) feed compounders/international traders and (5) international traders/overseas farmers.

----- Figure 1 about here -----

*Retailers.* Retailer R1 was selected in France and R2 in Italy. The retailers covering the largest share of non-GM labeled products in the two countries and, considering their total sales, they are among the most important retailers in the market.

*Processors.* In each country two processors dealing with the above retailers were selected, P1 and P2 in France and P3 and P4 in Italy. P1 is a private group that at the introduction of the non-GM product line was selling its national brand of poultry products to the retailer. P2 is a strong cooperative producing a well-known French poultry label product. It has always produced 100% non-GM products, even before R1 implemented its non-GM label. P3 is a

private and family owned Italian company. It is smaller than the first two big players in the Italian market, but sells a well-known national brand. P4 is a large private group with a well-known national brand and benefiting from economies of scale and logistic efficiency.

*Growers and Feed compounders.* Growers are responsible for raising animals using non-GM feed, while feed compounders provide them the necessary feed input. Both actors were not directly interviewed. Indirect information on the impact of non-GM adoption on the governance and transactional determinants was obtained from processors, as both appeared to be “quasi” or fully integrated with processors.

*International traders.* IT1 and IT2 were selected because they are the main suppliers of non-GM soybean to France and Italy respectively, each representing more than 80% of total non-GM imports in the two countries. P1 and P2 deal with IT1, while only P4 deals with IT2. P3 has a relatively small size and often buys soybean meal from brokers or from domestic crushers.

*Overseas soybean suppliers /domestic crushers.* Domestic crushers and overseas soybean suppliers were investigated collecting information from the two international traders and the four processors.

## **Data collection and informants**

To address the complexity of the supply chain and to better analyze the relationships and social processes among the actors, transactions were studied using a comprehensive qualitative method. In-depth interviews were conducted using a structured guide composed of two main parts. The first part captures the changes in governance structures resulting from non-GM introduction. A set of questions are asked to describe the contract and its closeness to market or to hierarchy. The second part focuses on the determinants related to TCA and RBV. A set of open questions is used, based on a pool of items identified from empirical literature and adapted to the context. Open ended questions were preferred to close questions or Likert scales as they permit a better understanding of the construct, allowing the respondent to motivate her/his perceptions about the importance of each dimension before and after the non-GM implementation (Fowler, 2013). More details are provided in Appendix A.

Several preliminary interviews with opinion leaders in the two countries helped to understand the context and the relevance of theoretical dimensions for this case study<sup>6</sup>. They also helped to identify key persons in charge of the non-GM activities and to facilitate their full access and participation in the research.

Data was collected for a total of 18 different transactions<sup>7</sup>. This involved 8 companies and required 16 different interviews. Interviews were conducted in Italy in June and July 2013 and from March to May 2014; in France from December 2013 to April 2014. They covered each time two to four transactions depending on the company and the respondent’s involvement

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<sup>6</sup> These experts were from universities, compound feed processors, associations of compound feed processors and poultry processors, third part certifiers, consultants on quality assurance management, and public relations.

<sup>7</sup> Five companies in France and four in Italy were interviewed. Overall, the analysis covers four transactions for T1 (R1 and P1, R1 and P2, R2 and P3 and R2 and P4), four transactions for T2 (P1, P2, P3, P4 and their growers), four transactions for T3 (P1, P2, P3, P4 and feed compounding), four transactions for T4 (P1, P2, P3, P4 and international traders) and two transactions for T5 (IT1, IT2 and overseas farmers).

along the supply chain. Fourteen were face-to-face lasting from one to three hours, while the remaining were conducted by phone. All interviews were conducted on-site with a one or more respondents, involved in the non-GM management, such as the supply chain director, the private label director, the quality assurance director and the CEO, making sure that they had been appointed since the adoption of non-GM. Several visits were sometimes necessary to complete the interview.

### **Data validation and analysis**

The non-GM implementation appeared to be a sensitive issue for respondents. For this reason, in 10 cases interviewees did not give consent to recording and transcription was not possible. In this case, to minimize biases and misinterpretations, at least two researchers were present during the interview and independently took hand notes. Notes were then cross-checked among researchers and a consolidated text was produced.

Following Yin (2013), construct validity was improved with supporting information from secondary data sources, such as company websites, annual reports, journal articles, as well as open interviews with independent experts involved in the non-GM business. Moreover, the were discussed among researchers to avoid misinterpretation and presented in an expert workshop organized by the research team<sup>8</sup>. When transcripts were incomplete or led to ambiguous interpretations, interviewees were re-contacted by phone or met face-to-face.

Internal validity is mainly given by the use of theoretical propositions extracted from empirical literature. To maximize external validity of the research design and its replication, all procedures were applied to the examined transactions. Researchers co-prepared the interview guide based on background information and preliminary interviews, pre-tested it, and submitted the same version to all interviewees in both countries and along the supply chain. Data collected were then analyzed following an analytical protocol.

The analytical protocol was developed to interpret the transcripts from the interviews and included the following steps: 1) coding of the answers in three discrete levels (Low, Medium, High) with respect to the investigated dimension; 2) grouping of the single questions and defining the level of each theoretical dimension according to the scale provided in the theoretical framework. Given the open ended nature of the questions, a grammatical magnitude coding method was adopted (Saldaña, 2009, p.58). Details are provided in Appendix B.

### **Measures**

*Governance structures.* Building on insights from several authors (Sauvée, 2013; Raynaud et al., 2009; Jaspers and Ende, 2006) the main contract properties were grouped to describe the *formation*, *functioning* and *supervision* of these vertical arrangements (table 3). *Formation* includes presence ownership, but also temporal adhesion mode: duration (short term vs. long term) and renewal conditions (renegotiated vs. tacitly extended). *Functioning* refers to the dynamic aspects of the collaboration (Barratt, 2004): exchange of strategic, organizational, and operational information between partners. Finally, *supervision* refers to monitoring and conflict resolution. Depending on these three contractual properties, governance structures can be classified in markets, hybrids, or hierarchies. The essential characteristics of markets are the

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<sup>8</sup> The expert workshop was organized in Brussels in September 2014 and involved more than 20 EU experts on non-GM supply chains from industry and academia. The main goal of the workshop was to discuss future scenarios of the supply chain, and preliminary results of this study were one of the inputs provided.

absence of dependency between actors, including arm's length relationships and easiness to adapt to supply needs, resulting in costless partner switching. Hybrids represent contractual agreements including a greater continuity of the relationship, with further collaboration and dependency. This form varies moving from more "market like" to more "hierarchical like" structures. Hierarchy includes ownership. Table 3 provides a definition of these governance structures according to the pre-cited properties.

*Determinants.* The main determinants were assessed according to the different dimensions associated to TCA and RBV including specificity, uncertainty, strategic importance, and potential superior knowledge. These dimensions have been operationalized using the main empirical literature that has been adapted to the context (e.g. Parmigiani, 2007; Poppo and Zenger, 1998; Delmond, 1994, Walker and Poppo, 1991).

## Results and discussion

### Results

The results presented in Table 3 show the level of the determinants of governance structures according to the data analysis, the predicted governance structure according to TCA and RBV, and compare the predictions with the observed structure.

----- TABLE 3 about here -----

#### *Transaction 1: Retailer/processor*

*Governance structure.* In all four transactions, before the introduction of non-GM, the relation between retailers and processors was managed through hybrid. In fact, duration was high, and the formation, functioning, and supervision of the contracts presented low and medium levels in all cases. Non-GM was among the first quality attributes being introduced by the retailer and added new provisions for processors, increasing collaboration. In both countries, given this activity was new for all actors, retailers asked processors to contribute in the construction of a non-GM supply chain with upstream suppliers, which entailed high collaboration on organizational and operational activities and the definition of technical requirements. Supervision also increased. R2 well illustrates this mechanism: "... *our mechanisms works as a domino effect. Every actor is controlling its supplier and we control everybody. Our control is a way to verify the efficacy of the non-GM supply chain management, to benchmark, and to let the supplier know that we are here, we do our own food tests and we have our own laboratories. Finally, a third part certifier has a transparency role*". The relationship between retailers and their processor maintained a hybrid governance structure, even though it now shows more "hierarchy like" governance properties.

*TCA determinants.* Specific investments related to the retailer/processor transaction were coded at a medium level, mainly related processor's investments to conform to retailer's specifications on product characteristics. With the introduction of non-GM, investments in human assets increased due to learning and training on both sides. Still, such investments did not impact asset redeployability. On the retailer's side, the investments on the non-GM brand equity created a medium specific intangible asset. Concerning uncertainty, it was medium before non-GM, and introduction of non-GM added further technical controls related to the enforcement of the traceability system. Eventually, the introduction of non-GM maintained opportunism at a

medium level. Under TCA these drivers predict hybrid governance that moves to a more “hierarchy like”, which is confirmed by the observed structure.

*RBV determinants.* After introduction of non-GM, retailers perceived that the strategic importance of processor’s activities increased. However, R1 and R2 did not consider developing this activity internally, since processors could more easily develop the required skills. Given their bargaining power, they brought the whole chain to cooperate in order to build best practices and processes. Considering that suppliers hold a superior potential knowledge and the increase of strategic importance of the activity, RBV predicts that moves to a more “hierarchy like”, which is confirmed by the observed structure.

### *Transaction 2: Processors/Growers*

*Governance structure.* Governance structure between growers and processors was already hybrid before non-GM introduction. In practice, the processor orders chickens to growers that seem “quasi-vertically integrated to the group”<sup>9</sup>, since it supplies animals, feed, and technical assistance to the grower which is paid depending on a feed-meat conversion rate. The non-GM supply chain added further technical requirements and higher controls over the animal feed, maintaining the relationship at the same degree of closeness to hierarchies.

*TCA determinants.* Before non-GM was introduced, human specificity stood at a medium level. Processors were involved in training and monitoring growers. As P2 explains:

*“Trainings are important, even if they aren’t really specific to our group, they are at least annual on all technical aspects and we frequently send our technicians...”*

Uncertainty was perceived as medium, with behavioral uncertainty being more problematic. As P1 explains:

*“Growers are not always easy to replace because their buildings offer an important volume”.*

Opportunism was therefore at a medium level leading to hybrid governance. TCA helps explaining why processors relied on this structure that has been adopted to maintain a constant group of growers and to improve control on meat volumes and quality specifications.

The introduction of non-GM didn’t change the perceived levels of specificity and uncertainty, maintaining a medium level of opportunism and the same governance structure.

*RBV determinants.* Before and after non-GM introduction, the relationship with poultry farming is perceived as highly strategic by all processors interviewed, as the high quality of meat is fundamental for their process. As stated by P3:

*“the quality of meat during processing can only diminish, and the input quality becomes essential to support our brand positioning and product innovation”.*

All answers provided by the four processors define their superior knowledge, as compared to growers, on feed, genetics of the chicks, and final demand in terms of both volumes and quality specifications. This superior knowledge is further enhanced by the cross information from their network of growers. RBV would predict a hierarchical governance for this transaction.

### *Transaction 3: Processors/Feed compounders*

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<sup>9</sup> In the case of P2, growers had more autonomy and were also exposed to a greater financial exposure, as it purchases the inputs from the cooperative with no conversion rate applied.

*Governance structure.* At the time of non-GM implementation, the sourcing of compound feed varied according to the different companies. P1 and P4 were highly integrated private groups and they both already produced their own animal feed using several plants. P2 had long term agreements with four main feed compounders which were exclusively non-GM until 1999. P3 was mainly buying from the market and was also renting a feed processing plant. The introduction of non-GM products implied a reorganization of the compound feed management, as the only way to technically avoid GM adventitious presence is to produce non-GM feed in dedicated plants. Accordingly, P1 and P4 dedicated one of their existing plants to non-GM feed, P2 decided to totally quit the external provision, vertically integrating into feed production, and P3 decided to dismiss the rented plant acquiring 30% share of a new feed plant, this resulting into hierarchical governance.

*TCA determinants.* Before introduction of non-GM, specificity was perceived as medium and redeployability of average difficulty. Uncertainty was also coded as medium, with the key variable being the degree of difficulty to replace suppliers. While it is true that processors requiring large volumes find the replacement of large suppliers harder, also the supplier would have problems finding other buyers. This reduces the risk of opportunism to a medium level. Non-GM introduction required investments related to physical and human assets, as well as to the final product itself. However, these investments can be easily redeployed. Traceability of the products is the most important factor and it can be assured by standard controls. According to the above drivers, non-GM introduction maintained opportunism at a medium level. TCA predicts hybrid governance for the described transactions, before and after non-GM introduction. This is different from the observed structure, as hierarchy was already present for P1 and P4 and a move toward vertical integration occurred for P2 and P3.

*RBV determinants.* Before non-GM introduction, P1 and P4 considered compound feed production as highly strategic. They also considered holding superior performance compared to potential suppliers. They believed the internal production guarantees greater coordination. Differently P2 and P3 considered the activity as having a medium or low strategic importance, respectively, with the supplier holding a potential superior knowledge in case of P3. In these transactions, RBV predicts hierarchical governance for P1, P2 and P4 and market governance for P3.

With non-GM introduction only P2 and P3 were impacted. Non-GM increased the strategic importance of compound feed as it created new opportunities to build reputation and competitive advantage. P2 explains that at the time the decision was made, the cooperative had no superior knowledge. However, they knew they could easily develop the know-how and enforce traceability systems. Presently, they believe that their plant offers a quality compound feed and integration increases efficiency. P2 also benefits from selling feed on the market. P3 considers strategic for supporting its own non-GM brand the control of a crucial input such as compound feed. However, P3 is convinced that an external supplier may have a superior knowledge. For this reason, its know-how was developed by acquiring a well-established compound feed processor. Determinants predict hierarchical governance in all these cases.

#### *Transaction 4: Feed compounders (Processors)/International Traders-Crushers*

*Governance structure.* Before non-GM introduction, only P1 and P4 were integrated in compound feed production and were involved with international traders using classical contracts. P2 and P3 started to deal with international traders only after non-GM introduction.

P2 participated in the creation of IT1 which has become the largest French international trading company. P2 offered support in co-building a strong relationship with the Brazilian supply chain, putting in place the first contract with the trader, monitoring the Brazilian's practices as well as learning from them, and holding 17% equity. Even if it was not involved in its creation, P1 also sources from IT1. In Italy, the relatively small size of P3 allowed the company to buy non-GM soybean from the domestic market, dealing with certified soybean crushers. Differently, P4 relied on certified commodities from international traders, mainly IT2.

The relationships between IT1 and IT2 and the feed compounders are based on detailed yearly contracts where the provisions on volumes are mandatory and the non-GM price premium is agreed upon. Monitoring is enforced through an external auditor and routinized. Collaboration occurs at a strategic level only between IT1 and P2, while for the others it is mostly operational. Observed governance is therefore based on market governance for all processors involved, with the exception of P2 that shows hierarchical governance.

*TCA determinants.* Processors consider the specificity assets low in the soybean trading activity. With introduction of non-GM, uncertainty moved from medium to high. In fact, it is perceived a higher volume uncertainty linked to possible trade disruptions caused by non-compliance as well as more complexity in conformity assessment. Overall, opportunism remained at a low level, with TCA predicting market governance.

*RBV determinants.* P1, P3, and P4 consider soybean trade as weakly strategic. They also perceive that they do not hold potential superior knowledge in this activity. Therefore, RBV would predict market governance. On the contrary, P2 considered soybean trade highly strategic, without possessing a sufficient potential know-how. This predicts a move toward vertical integration through acquisition or internal development.

#### *Transaction 5: International Traders/Overseas Suppliers*

*Governance structure.* Before non-GM introduction only IT2 was existing and operating in the market of commodities through more classical contract like. Renegotiation followed an arm's length relationship and renewal was not automatic. The introduction of non-GM required the identification of key suppliers with whom IT1 and IT2 established long term relationships and shared organizational and operational decisions. These suppliers were the crushers and grain aggregators located in Brazil and their supplying farmers. Relationships have been renewed since several years; yet, formal contracts are yearly negotiated, redefining the non-GM price premium and the committed volumes. Monitoring of suppliers and their supply chain is made by the international trader and a third part certifier. Observed governance therefore moved to a hybrid structure.

*TCA determinants.* Soybean crushing plants are not specific for a type of customer, and it is relatively easy for both ITs and crushers to change partner, making behavioral uncertainty low. The introduction of non-GM, required specific investments in human assets as non-GM traders coordinated the supply chain, supervising and training actors at different levels including port terminals, crushers, transportation, elevators, and farmers. IT1 and IT2 also built a reputation in the non-GM supply, increasing their dependency from their suppliers. Replaceability of non-GM suppliers became more complicate, increasing behavioral uncertainty. As a result, opportunism increased from a low to a medium level, with TCA predicting a move from markets to hybrid structures.



*RBV determinants.* Before non-GM introduction, IT2 considered overseas soybean production and crushing as non-strategic activities. Soybean was one of the traded products and could be sourced from the market and delivered overseas to the customer. However, with the introduction of the non-GM product, the strategic perception increased to an intermediate level. As both IT1 and IT2 operate in niche markets, this offered the opportunity to differentiate their offer enlarging their products' portfolio. Still, the two traders did not consider possessing a potential superior knowledge in this activity. Therefore, RBV determinants predict a move from markets to a tighter relationship with suppliers resulting in hybrid governance structures.

## **Discussion**

### *Theoretical implications*

As illustrated in table 5, empirical findings indicate that introduction of non-GM products in the French and Italian poultry supply chains differently impacted transactions along the entire supply chain, with a move towards greater coordination among the different actors, and that determinants related to both TCA and RBV contribute in explaining these governance changes. However, in this case their contribution differed depending on the activity considered.

Starting with retailers and their relationship with processors, non-GM introduction moved hybrid governance towards tighter relationships. Both TCA and RBV offer consistent predictions with, respectively, specificity (human and brand) and strategic importance being the main determinants. When it comes to processors, introduction of non-GM had different impact according to the performed activities. Concerning the relationship of processors with growers, "quasi-vertical" integration was maintained following TCA predictions. In fact, processors consider that quasi-vertical integration is sufficient to mitigate risk and transfer knowledge, making the strategic dimension less relevant. Contrarily, when it comes to their relationship with feed compounders, it is the strategic dimension of RBV that leads to hierarchical governance, while TCT would recommend a hybrid structure. In regards to their relationship with international traders, TCA and RBV are similarly consistent in explaining the use of market governance for supplying soybean from international traders, except for P2. Again, in this last case, the strategic dimension of RBV prevails in explaining hierarchy. Finally, introduction of non-GM impacted the way international traders had to manage their international sourcing, mainly located in Brazil. Rarity of non-GM soybean and the need to assure supply volumes pushed the focal firm to build closer relationships with international aggregators, crushers as well as farmers. In this case, TCT and RBV offer consistent predictions with human and brand specificity, behavioral uncertainty, and strategic importance being the main determinants.

Findings from this study also show that theoretical relevance depended on the type of governance mode considered. In this case, following the proposition P1b, opportunism was relevant in explaining the adoption of closer relational agreements while it failed in explaining hierarchical governance in compound feed activity. Indeed, in that case, RBV through propositions P2a' and P2a'' explained the move towards vertical integration. As Guan and Rehme (2012, p. 198) stipulate "considerations regarding strategic positioning in a supply chain and market with the aim of obtaining better conditions in appropriating value from other supply chain actors may have greater relevance and significance in vertical integration decisions". Results in this study confirm this position. Parmigiani (2007, p. 286) also follows the same standpoint asserting that « The choices that motivate the firm toward making may not be the

same as those motivating it away from buying ». Consequently, an approach can be relevant in explaining a particular structure without necessarily providing motivating forces along the whole continuum.

Findings also suggest a sequential reasoning on RBV dimensions. Managerial reasoning seems to lead to hierarchical governance for strategic activities, while differential knowledge then indicates whether to vertically integrate using internal or external development. To our knowledge, this sequential reasoning has never been highlighted in previous literature and deserves further investigation, since it offers a greater aid in understanding supply boundaries.

The above discussion leads to practical implications at different levels of the agri-food supply chain. As Hobbs and Young (2000) highlight, further vertical coordination requires upstream suppliers, such as farmers or farmers' cooperatives/associations, to develop new skills in contract evaluation and negotiation and requires proactivity in marketing activities in delivering customized quality traits. At the opposite side of the supply chain, players introducing new standards need to consider the domino effect on upstream governance. For example, as our results show, retailers have been particularly careful in monitoring and coordinating the supply chain to facilitate the implementation of the new standard. While this is effective on the short run, the domino effect alters market structure and supply chain relationships and a better understanding of determinants at play, would help anticipating actions to maintain the desired supply. Our article suggests that a theoretical standalone point might not provide a full understanding of the effects on agri-food supply chain and suggests an operational framework considering alternative determinants. Results show that perceived uncertainty and specificity of investments might not predict acquisitions or internal development of suppliers' activities. A careful look at the strategic dimension is also required. Moreover, the fact of holding a superior know how might not be sufficient for a player to maintain its independence and competitive advantage. As the case of non-GM introduction shows, buyers develop or acquire the knowledge if it is perceived as highly strategic to sustain their competitive advantage on differentiated goods.

## **Conclusions**

This study uses the two SCM leading frameworks namely TCA and RBV (Defee et al., 2010) to investigate the implications of non-GM standard adoption on governance structure along the French and the Italian poultry supply chains. A total of 18 different transactions were studied at five levels of the supply chain, namely: (1) retail/processors, (2) processor/growers, (3) processor/feed compounders, (4) feed compounders/international trader, (5) international traders/overseas farmers.

Findings indicate that introduction of non-GM products impacted differently the transactions along the entire supply chain, with a move towards greater coordination among the different actors. The current study provides conceptual contributions, enriching Conner and Prahalad's (1996) framework. The concept of opportunistic behavior is further developed with the introduction of an intermediate level of opportunism and on the RBV side, a sequential reasoning articulating strategic importance of activities and "potential" superior knowledge.

Conclusions showed how in some transactions, theoretical determinants are both consistent in explaining the changes in the supply chain while in others one theoretical dimensions offers superior explanation.

### **Limitations and suggestions for future research**

A clear limitation of this study is common to all studies relying on qualitative approaches and case studies, with the consequent limit in generalizing the results to alternative types of PVS and supply chains. Still, the method of analysis relied on different procedures to improve its external validity and could be replicated to other cases (Yin, 2013). This study is also not providing a falsification of the two theoretical approaches. Rather, it uses the richness of TCA and RBV to better explain the dynamics of governance structures when a new standard is adopted.

The conceptual framework presented in this study could be used in a quantitative study to test the existence of patterns that make one theoretical approach to prevail over the other or to test the effects of other types of standards. One difficulty in this type of survey will be to make sure that the “right” respondent is completing the questionnaire and that the questions are properly contextualized.

An aspect that was not covered in this article and worth further attention is the role of contextual variables in influencing the relevance of an approach over another. For example, following this standpoint, Steensma and Corley (2001) demonstrated how managers’ risk aversion can sharpen TCA’s relevance. They also showed that the resource-based rationale, grounded in the opportunity to develop sustainable advantages, plays a larger role when a firm has lower levels of recoverable slacks and risk attitude. As stipulated by Crook and Esper (2014), there is a strong belief that future studies must continue to assess contingency factors that shape supply chain relationships.

This article does not investigate the presence of “mixed forms” also called “plural forms” (Ménard, 2013b). Why do companies, facing the same level of specificity, differential knowledge and strategic importance still decide to maintain two or more governance forms at the same time? The discussion of mix governance forms is of growing importance in the literature (Ménard, 2013b; Jolink and Niesten, 2012) and it is still to be investigated as an alternative explanation for the challenge zones.

### **References**

- Anderson E., (1988), “Transaction Cost as Determinant of Opportunism in Integrated and Independent Sales Force”, *Journal of Economic Behaviour and Organization*, Vol 9, pp.247-264.
- Argyres, N. (1996), "Evidence on the Role of Firm Capabilities in Vertical Integration Decisions", *Strategic Management Journal*, Vol. 17, No. 2, pp. 129-150.

- Argyres, N.S., Felin, T., Foss, N. and Zenger, T. (2012), "Organizational Economics of Capability and Heterogeneity", *Organization Science*, Vol. 23, No. 5, pp. 1213-1226.
- Bain, C. and Dandachi, T. (2014), "Governing GMOs: The (Counter) Movement for Mandatory and Voluntary Non-GMO Labels", *Sustainability*, Vol. 6, No. 12, pp. 9456-9476.
- Barney, J.B. (1986), "Strategic Factor Markets: Expectations, Luck, and Business Strategy", *Management Science*, Vol. 32, No. 10, pp. 1231-1241.
- Barratt, M. (2004), "Understanding the meaning of collaboration in the supply chain", *Supply Chain Management: An International Journal*, Vol. 9 No. 1, pp. 30-42.
- Barratt, M. and Oke, A. (2007), "Antecedents of supply chain visibility in retail supply chains: a resourced-based theory perspective", *Journal of Operations Management*, Vol. 25, pp. 1217-33.
- Boccaletti, S., Leoni, G., Varacca, A. and Soregaroli, C. (2012), Coexistence implications within the EU and international supply chain, Deliverable prepared for PRICE Project, project n° FP7-KBBE-2011-5.
- Boerner, C. and Macher, J. (2001), "Transaction cost economics: a review and assessment of the empirical literature", *Unpublished manuscript*.
- Brousseau, E. (1995), "Contracts as Modular Mechanisms: Some Propositions for the Study of 'Hybrid Forms.'", *International Journal of the Economics of Business*, Vol. 2, No. 3, pp. 409-439.
- Bunte, F.H.J., Dobson, P., Bergès-Sennou, F., Monier-Dilhan, S., Juhász, A., Moro, D., Sckokai, P., Soregaroli, C., Meulen, v.d.B. and Szajkowska, A. (2011), "The impact of private labels on the competitiveness of the European food supply chain".
- Carter, R. and Hodgson, G.M. (2006), "The impact of empirical tests of transaction cost economics on the debate on the nature of the firm", *Strategic Management Journal*, Vol. 27, No. 5, pp. 461-476.
- Conner, K.R. (1991), "A Historical Comparison of Resource-Based Theory and Five Schools of Thought Within Industrial Organization Economics: Do We Have a New Theory of the Firm?", *Journal of Management*, Vol. 17, No. 1, pp. 121.
- Conner, K.R. and Prahalad, C.K. (1996), "A Resource-based Theory of the Firm: Knowledge Versus Opportunism", *Organization Science*, Vol. 7, No. 5, pp. 477-501.
- David, R.J. and Han, S. (2004), "A Systematic Assessment of the Empirical Support for Transaction Cost Economics", *Strategic Management Journal*, Vol. 25, No. 1, pp. 39-58.
- Defee, C.C., Williams, B., Randall, W.S. and Thomas, R. (2010), "An inventory of theory in logistics and SCM research", *International Journal of Logistics Management*, Vol. 21, No. 3, pp. 404-489.
- Delmond, M.H. (1994), *L'externalisation du développement d'applications*, HEC PARIS.

- Dierickx, I. and Cool, K. (1989), "Asset Stock Accumulation and Sustainability of Competitive Advantage", *Management Science*, Vol. 35, No. 12, pp. 1504-1511.
- Flyvbjerg, B. (2006), "Five misunderstandings about case-study research", *Qualitative inquiry*, Vol. 12, No. 2, pp. 219-245.
- Foss, N.J. (1996), "Capabilities and the Theory of the Firm", *Revue d'Economie Industrielle*, , No. 77, pp. 7-28.
- Fowler Jr, F.J. (2013), *Survey research methods*, Sage publications.
- Gereffi, G., Humphrey, J. and Sturgeon, T. (2005), "The governance of global value chains", *Review of international political economy*, Vol. 12, No. 1, pp. 78-104.
- Ghosh, M. and John, G. (1999), "Governance Value Analysis and Marketing Strategy", *Journal of Marketing*, Vol. 63, No. 4, pp. 131-145.
- Ghozzi, H. (2008), "L'approche par les ressources et les compétences en tant que théorie de la firme: apports, limites et aménagements nécessaires", "L'approche par les ressources et les compétences en tant que théorie de la firme: apports, limites et aménagements nécessaires", *AIMS*.
- Gruère, G. and Sengupta, D. (2009), "GM-free private standards and their effects on biosafety decision-making in developing countries", *Food Policy*, Vol. 34, No. 5, pp. 399-406.
- Guan, W. and Rehme, J. (2012), "Vertical integration in supply chains: driving forces and consequences for a manufacturer's downstream integration", *Supply Chain Management: An International Journal*, Vol. 17, No. 2, pp. 187-201.
- Gulbrandsen, B., Sandvik, K. and Haugland, S.A. (2009), "Antecedents of vertical integration: Transaction cost economics and resource-based explanations", *Journal of Purchasing & Supply Management*, Vol. 15, No. 2, pp. 89-102.
- Heiman, B. and Nickerson, J.A. (2002), "Towards Reconciling Transaction Cost Economics and the Knowledge-Based View of the Firm: The Context of Interfirm Collaborations", *International Journal of the Economics of Business*, Vol. 9, No. 1, pp. 97-116.
- Henson, S. and Humphrey, J. (2010), "Understanding the complexities of private standards in global agri-food chains as they impact developing countries", *The journal of development studies*, Vol. 46, No. 9, pp. 1628-1646.
- Hobbs, J.E. and Young, L.M. (2000), "Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence", *Supply Chain Management: An International Journal*, Vol. 5, No. 3, pp. 131-143.
- Hobbs, J.E. and Young, L.M. (2001), *Vertical linkages in agri-foods supply chains in Canada and the United States* translated by Anonymous Strategic Policy Branch, Agriculture and Agri-Food Canada.

- Hoetker, G. (2005), "How Much You Know Versus how Well i Know You: Selecting a Supplier for a Technically Innovative Component", *Strategic Management Journal*, Vol. 26, No. 1, pp. 75-96.
- Jacobides, M.G. and Hitt, L.M. (2005), "Losing Sight of the Forest for the Trees? Productive Capabilities and Gains from Trade as Drivers of Vertical Scope", *Strategic Management Journal*, Vol. 26, No. 13, pp. 1209-1227.
- Jacobides, M.G. and Winter, S.G. (2005), "The Co-Evolution of Capabilities and Transaction Costs: Explaining the Institutional Structure of Production", *Strategic Management Journal*, Vol. 26, No. 5, pp. 395-413.
- Jaspers, F. and van den Ende, J. (2006), "The organizational form of vertical relationships: Dimensions of integration", *Industrial Marketing Management*, Vol. 35, No. 7, pp. 819-828.
- Jolink, A. and Niesten, E. (2012), "Recent qualitative advances on hybrid organizations: Taking stock, looking ahead", *Scandinavian Journal of Management*, Vol. 28, No. 2, pp. 149-161.
- Kogut, B. and Zander, U. (1996), "What Firms Do? Coordination, Identity, and Learning", *Organization Science*, Vol. 7, No. 5, pp. 502-518.
- Lee, J., Gereffi, G. and Beauvais, J. (2012), "Global value chains and agrifood standards: challenges and possibilities for smallholders in developing countries", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 109, No. 31, pp. 12326-12331.
- Leiblein, M.J. (2003), "The choice of organizational governance form and performance: Predictions from transaction cost, resource-based, and real options theories", *Journal of management*, Vol. 29, No. 6, pp. 937-961.
- Leiblein, M.J. and Miller, D.J. (2003), "An Empirical Examination of Transaction- and Firm-Level Influences on the Vertical Boundaries of the Firm", *Strategic Management Journal*, Vol. 24, No. 9, pp. 839-859.
- Martin, N. and Boussit, J. (2012), "Demand for non-GM IP crops in the EU feed market: macro and micro-economic aspects of non-GM feed production", *Proceedings of a workshop on "Markets for non-Genetically Modified Identity Preserved crops and derived products" organised by the JRC Tillie, P.; Viganì, M.; Dillen, K.; Cerezo, E. R.*, Publications Office of the European Union, Luxemburg, pp. 39-41.
- McIvor, R. (2009), "How the transaction cost and resource-based theories of the firm inform outsourcing evaluation", *Journal of Operations Management*, Vol. 27, No. 1, pp. 45-63.
- Ménard, C. (2013a), "Hybrid Modes of Organization. Alliances, Joint Ventures, Networks, and Other 'Strange' Animals", *The Handbook of Organizational Economics* Gibbons, R.; Roberts, J.;, Princeton University Press, pp. 1066-1108.
- Ménard, C. (2013b), "Plural Forms of Organization: Where Do We Stand?", *Managerial and Decision Economics*, Vol. 34, No. 3-5, pp. 124-139.

- Montgomery, C.A. and Wernerfelt, B. (1988), "Diversification, Ricardian Rents, and Tobin's q", *RAND Journal of Economics*, Vol. 19, No. 4, pp. 623-632.
- Nielsen, E. and Jolink, A. (2012), "Incentives, opportunism and behavioral uncertainty in electricity industries", *Journal of Business Research*, Vol. 65, No. 7, pp. 1031-1039.
- Parmigiani, A. (2007), "Why do firms both make and buy? An investigation of concurrent sourcing", *Strategic Management Journal*, Vol. 28, No. 3, pp. 285-311.
- Passuello, F., Boccaletti, S. and Soregaroli, C. (in press), "Governance implications of non-GM private standards on poultry meat value chains", *British Food Journal*, Vol. 117, No 10.
- Poppo, L. and Zenger, T. (1998), "Testing alternative theories of the firm: Transaction cost, knowledge-based, and measurement", *Strategic Management Journal*, Vol. 19, No. 9, pp. 853.
- Priem, R.L. and Swink, M. (2012), "A demand-side perspective on supply chain management", *Journal of Supply Chain Management*, Vol. 48, No. 2, pp. 7-13.
- Priem, R.L. and Butler, J.E. (2001), "Is the Resource-Based "View" a Useful Perspective for Strategic Management Research?", *Academy of Management Review*, Vol. 26, No. 1, pp. 22-40.
- Raynaud, E., Sauvée, L. and Valceschini, E. (2009), "Aligning branding strategies and governance of vertical transactions in agri-food chains", *Industrial and Corporate Change*, Vol. 18, No. 5, pp. 835-868.
- Saldaña, J. (2009), *The coding manual for qualitative researchers*, Sage publications.
- Sauvee, L. (2013), "Hybrid Governance: Sketching Discrete Alternatives", *Journal on Chain and Network Science*, Vol. 13, No. 1, pp. 1-9.
- Schilling, M.A. and Steensma, H.K. (2002), "Disentangling the Theories of Firm Boundaries: A Path Model and Empirical Test", *Organization Science*, Vol. 13, No. 4, pp. 387-401.
- Schuster, M. and Maertens, M. (2013), "Do private standards create exclusive supply chains? New evidence from the Peruvian asparagus export sector", *Food Policy*, Vol. 43, pp. 291-305.
- Smyth, S. and Phillips, P.W. (2002), "Product differentiation alternatives: identity preservation, segregation, and traceability", *AgBioForum*, Vol. 5, No 02, pp. 30-42.
- Steensma, H.K. and Corley, K.G. (2001), "Organizational Context as a Moderator of Theories on Firm Boundaries for Technology Sourcing", *Academy of Management Journal*, Vol. 44, No. 2, pp. 271-291.
- Varacca, A., Boccaletti, S. and Soregaroli, C. (2014), *Economic aspects of segregation between GM and non-GM crops in Italy*, *AgBioForum*, Vol. 17, No 02, pp. 123-132.

- Von Schlippenbach, V. and Teichmann, I. (2012), "The strategic use of private quality standards in food supply chains", *American Journal of Agricultural Economics*, Vol. 94, No. 5, pp. 1189-1201.
- Walker G., Poppo L., (1991), "Profit Centers, Single Source Suppliers and Transaction Costs", *Administrative Science Quarterly*, Vol 36, pp. 66-87.
- Wernerfelt, B. (1984), "A Resource-based View of the Firm", *Strategic Management Journal*, Vol. 5, No. 2, pp. 171-180.
- Wesseler, J. (2014), "Biotechnologies and agrifood strategies: opportunities, threats and economic implications", *Bio-based and Applied Economics*, Vol. 3, No. 3, pp. 187-204.
- Williamson, O.E. (1979), "Transaction-Cost Economics: the Governance of Contractual Relations", *Journal of Law & Economics*, Vol. 22, No. 2, pp. 233-261.
- Williamson, O.E. (1985), *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, Free Press, New York.
- Williamson, O.E. (1991), "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives", *Administrative Science Quarterly*, Vol. 36, No. 2, pp. 269-296.
- Williamson, O.E. (2002), "The theory of the firm as governance structure: from choice to contract", *Journal of Economic Perspectives*, Vol. 16, No. 3, pp. 171-195.
- Yin, R.K. (2013), *Case study research: Design and methods*, Sage publications.
- Zajac, E.J. and Olsen, C.P. (1993), "From Transaction Cost to Transactional Value Analysis: Implications for the Study of Interorganizational Strategies", *Journal of Management Studies*, Vol. 30, No. 1, pp. 131-145.



## Appendix A: Questionnaire

<b>Part 1: Governance structure</b>
<b>General questions</b>
<p><i>When did you start distributing non-GM labeled poultry products?</i>  <i>What is the % of non-GM poultry products distributed as compared to the non-labeled?</i>  <i>Why did you start distributing these products: market needs, national regulation, marketing strategy?</i></p>
<b>Description of contractual agreements with suppliers (for each question, description is provided BEFORE and AFTER implementation of non-GM)</b>
<p><b>Formation</b></p> <ol style="list-style-type: none"> <li>1. To what extent do you hold equity from your supplier?</li> <li>2. What is the duration of your contract with the supplier?</li> <li>3. To what extent is renewal automatic?</li> <li>4. What is the frequency of contacts the company has with its supplier?</li> </ol> <p><b>Functioning</b></p> <ol style="list-style-type: none"> <li>5. Considering the relationship with your supplier:             <ol style="list-style-type: none"> <li>a. To what extent do you take strategic decision in a joint form? //Strategic: could include putting in place a new information system, reviewing the labeling and strategic aspects, increase of production capacity...</li> <li>b. To what extent do you take any organizational decision in a joint form? //Organizational: could include review of processes, creation of new sales position</li> <li>c. To what extent do you take any operational decision in a joint form? //Operational: could be more related to tracking products, deliveries, every day type of management.</li> </ol> </li> <li>6. To what extent do you adjust to changes with respect to specifications of the supply contracts?</li> </ol> <p><b>Supervision</b></p> <ol style="list-style-type: none"> <li>7. To what extent do you monitor the supplier?</li> <li>8. If you monitor the supplier, to what extent do you monitor also his own supplier?</li> <li>9. In case of conflicts, to what extent are they resolved internally?</li> </ol>
<b>Part 2: Theoretical drivers (for each question, description is provided also for the buyer/supplier relationship of conventional products)</b>
<p><b>Specificity</b></p> <ol style="list-style-type: none"> <li>10. To what extent you or your supplier needed to put in place an information system to ensure that non-GM products characteristics are effectively met?</li> <li>11. To what extent you or your supplier needed to invest into any equipment, material, in order to make sure the supplier meets your non-GM requirements?</li> <li>12. To what extent you or your supplier needed to make any specific changes related to building or logistics, or equipment's for non-GM labeled products?</li> <li>13. To what extent do you invest time and effort with the supplier (e.g. trainings) to make sure an adequate know-how for non-GM labeled product is developed?</li> <li>14. To what extent is this know-how difficult to be replicated to new suppliers?</li> <li>15. Once this know-how is created, to what extent would it be problematic that the supplier switches to another buyer?</li> <li>16. To what extent you or your supplier changed location to optimize the exchange of non-GM products?</li> <li>17. To what extent did you invest in your brand using the non-GM attribute?</li> </ol> <p><b>Uncertainty</b></p> <p><i>Behavioral</i></p> <ol style="list-style-type: none"> <li>18. To what extent is it difficult to find and replace non-GM suppliers?</li> <li>19. How important would be the switching costs from one non-GM supplier to another?</li> <li>20. To what extent is it easy for the supplier to find another buyer that could buy its non-GM labeled production?</li> <li>21. To what extent could the non-GM supplier behave in an opportunistic way if not controlled?</li> <li>22. How difficult is it to assess the responsibility of the supplier in case of any non-compliance with non-GM products (i.e. sanitary...)?</li> </ol> <p><i>Environmental</i></p>

23. To what extent are there unpredictable changes in the non-GM market that can occur on: volume, prices, product availability, other?

24. With the final customer, to what extent is demand for non-GM labeled products volatile?

**Strategic importance**

25. To what extent do you consider non-GM supplier's activities are strategic?

26. To what extent do you consider non-GM supplier's activities help to differentiate from competitors?

27. To what extent do non-GM supplier's activities contribute to bring brand equity to your company?

**Potential superior knowledge**

28. To what extent do you think your firm holds superior knowledge and know-how as compared to an external supplier in the non-GM activity?

29. To what extent are you able to undertake the non-GM activity at a lower cost than the market?

30. To what extent the non-GM activity helps to increase your knowledge on the product characteristics, the supply chain, the supplier, or anything else?

31. To what extent had your company complementary assets, skills, network or processes that could serve the non-GM activity?

## Appendix B: Measures

### Grammatical magnitude coding

Magnitude coding method was adopted to indicate the intensity of a given variable from the questionnaire in appendix A (Saldaña, 2009, p.58). In a first step, for each question, answers were coded as low, medium, or high according to the criteria listed in table B1. Then, grouping answers according to the groups provided in the questionnaire, coded answers served to code theoretical variables listed in table B2.

**Table B1: Coding answers to each questions based on attributes used by the respondent**

Code	Attributes used to qualify the answer
<b>Low</b>	“no”, ”not at all”, “I disagree”, “It is not important”, “irrelevant”, “minimal”, “low”, “short”, “decreased”, “negative”, “absent”, ...
<b>Medium</b>	“some”, ”to a given extent”, “in certain cases”, “it happens”, ...
<b>High</b>	“yes”, ”absolutely”, “totally”, “high”, “relevant”, “very”, “long”, “increased”, “positive”, “present”, ...

**Table B2: Coding theoretical variables based on coded answers**

Variable	Code	Criterion
<b>Governance structure</b>	Market	All answers coded as No/Low except for operational decisions
	Hybrid	Residual
	Hierarchy	All answers coded as Yes/High
<b>Specificity, Uncertainty, Strategic importance</b>	Low	All answers coded as Low
	Medium	Residual
	High	At least one answer coded as High
<b>Potential superior knowledge</b>	Firm	At least one answer coded as High
	Supplier	Residual

## Tables and Figures

**Table 1 – Governance structure according to the different levels of opportunism under TCA**

	<i>High Frequency</i>		
<i>Uncertainty</i>	<i>Specificity</i>		
	<i>Low</i>	<i>Medium</i>	<i>High</i>
<i>Low</i>	Markets(1)	Markets (1)	Markets (1)
<i>Medium</i>		Hybrids (2)	Hierarchy (3)
<i>High</i>		Hierarchy (3)	Hierarchy (3)

Note : Risk of opportunism: (1) Low; (2) Medium; (3) High.

**Table 2 - TCA vs RCA, an extended framework**

				<b>Opportunism</b>					
				<i>Low</i>		<i>Medium</i>		<i>High</i>	
				<b>TCT</b>	<b>RBV</b>	<b>TCT</b>	<b>RBV</b>	<b>TCT</b>	<b>RBV</b>
<b>Strategic Importance</b>	<i>Weak</i>	<b>Potential Superior Knowledge</b>	<i>Firm</i>	Market	Market	Hybrid	Market	Hierarchy	Market
			<i>Supplier</i>	Market	Market	Hybrid	Market	Hierarchy	Market
	<i>Intermediate</i>		<i>Firm</i>	Market	Hierarchy	Hybrid	Hierarchy	Hierarchy	Hierarchy
			<i>Supplier</i>	Market	Hybrid	Hybrid	Hybrid	Hierarchy	Hybrid
	<i>High</i>		<i>Firm</i>	Market	Hierarchy	Hybrid	Hierarchy	Hierarchy	Hierarchy
			<i>Supplier</i>	Market	Hierarchy (acquisition/internal dev.)	Hybrid	Hierarchy (acquisition/internal dev.)	Hierarchy	Hierarchy (acquisition/internal dev.)

White cell = “Match zone”; Grey cell = “Challenge zone”.

**Table 3: Governance structures defined using contract properties**

<b>Contract properties</b>	<b>Market</b>	<b>Hybrid</b>	<b>Hierarchy</b>
<b>Formation</b> <i>Ownership</i>	No	No	Yes
<b>Temporal adhesion Mode</b>  <i>Duration</i>  <i>Tacit Renewal</i>	Low Low*	↔	High High
<b>Functioning</b> <i>Strategic collaboration</i> <i>Organizational collaboration</i> <i>Operational collaboration</i> <i>Contract clause adjustment</i>	Low Low Low to High Low	↔	High High High High
<b>Supervision</b> <i>Monitoring</i> <i>Internal conflict resolution</i>	Low Low	↔	High High

\* Renegotiated

**Table 4 – TCA and RBV determinants and governance structure before and after non-GM introduction**

Transactions			T 1	T 2	T 3				T 4				T 5
			R1 - P1/P2, R2- P3/P4	P1/P2/P3/P4 - G	P1-FC	P2-FC	P3-FC	P4-FC	P1 -IT	P2 -IT	P3 - IT/C	P4 - IT/C	IT1-IT2/ Overseas
<b>Before introduction of non-GM standard</b>													
<b>Determinants</b>	TCA	Specificity	Medium	Medium	Medium	Medium	Medium	Medium	Low	-	-	Low	Low
		Uncertainty	Medium	Medium	Medium	Medium	Medium	Medium	Medium	-	-	Medium	Medium
		<b>Opportunism</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Low</b>	-	-	<b>Low</b>	<b>Low</b>
	RBV	Strategic	Medium	High	High	Medium	Low	High	Low	-	-	Low	Low
		P. knowledge	Supplier	Firm	Firm	Firm	Supplier	Firm	Supplier	-	-	Supplier	Supplier
<b>Governance structure</b>	TCA		Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Market	-	-	Market	Market
	RBV		Hybrid	Hierarchy	Hierarchy	Hierarchy	Market	Hierarchy	Market	-	-	Market	Market
	Observed		Hybrid	Hybrid	Hierarchy	Hybrid	Market	Hierarchy	Market	-	-	Market	Market
<b>After introduction of non-GM standard</b>													
<b>Determinants</b>	TCA	Specificity	Medium(+)	Medium	Medium	Medium	Medium	Medium	Low	Low	Low	Low	Medium
		Uncertainty	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
		<b>Opportunism</b>	<b>Medium(+)</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Low</b>	<b>Low</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
	RBV	Strategic	Medium (+)	High	High	High	High	High	Low	High	Low	Low	Medium
		P. knowledge	Supplier	Firm	Firm	Firm	Supplier	Firm	Supplier	Supplier	Supplier	Supplier	Supplier
<b>Governance structure</b>	TCA		Hybrid (+)	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Market	Market	Market	Market	Hybrid
	RBV		Hybrid (+)	Hierarchy	Hierarchy	Hierarchy	Hierarchy	Hierarchy	Market	Hierarchy	Market	Market	Hybrid
	Observed		Hybrid(+)	Hybrid	Hierarchy	Hierarchy	Hierarchy	Hierarchy	Market	Hierarchy	Market	Market	Hybrid

Note: grey cells highlight the cases where the predicted governance structure is confirmed by the observed one.

**Table 5 – Main determinants of governance change with non-GM introduction**

Supply chain	Observed governance change		Theoretical proposition's consistency	Main determinants for change
<b>Retailers/ Processors (T1)</b> - Retailer 1- P1/P2 - Retailer 2- P3/P4	Hybrid	→ Hybrid +	TCA- <b>P1b</b> RBV- <b>P2b''</b>	Human specificity Brand specificity  Strategic importance
<b>Processors/Growers (T2)</b> Processors 1, 2, 3, 4	Hybrid++	= Hybrid++		-
<b>Processors/Feed compounders (T3)</b> - Processor 1 and 4  - Processor 2  - Processor 3	Hierarchy	= Hierarchy		
	Hybrid	→ Hierarchy	RBV- <b>P2a'</b>	Strategic importance
	Market	→ Hierarchy	RBV- <b>P2a''</b>	Strategic importance
<b>Processors/International traders (T4)</b> - Processor 1 and 4  - Processor 2  - Processor 3	Market	= Market		
	n.o. <sup>(a)</sup>	→ Hierarchy	RBV- <b>P2a''</b>	Strategic importance
	n.o.	→ Market	TCA- <b>P1a</b> RBV- <b>P2c''</b>	Low asset specificity Not strategic
<b>International traders /Overseas suppliers (T5)</b> - International trader1  - International trader2	n.o.	→ Hybrid	TCA- <b>P1b</b> RBV- <b>P2b''</b>	Human specificity Reputation Behavioral uncert. Strategic importance
	Market	→ Hybrid		

<sup>(a)</sup> not observed as the firm did not perform this activity before non-GM introduction.

**Figure 1: Main Transactions in the Poultry Supply Chain**

